
ADDITION AND RENOVATIONS TO THOMAS GROVER MIDDLE SCHOOL

WEST WINDSOR-PLAINSBORO REGIONAL SCHOOL DISTRICT
WEST WINDSOR TOWNSHIP - MERCER COUNTY - NEW JERSEY



FVHD PROJECT #5063M / NJDOE# 5715-035-18-3000

Consulting Engineers:
Van Cleef Engineering Associates
Harrison - Hamnett, P.C.
French & Parrello Associates, P.A.

July 31, 2019

VOLUME 1 OF 2

SPECIFICATIONS

for

ADDITION AND RENOVATIONS TO THOMAS GROVER MIDDLE SCHOOL

10 Southfield Road, West Windsor, NJ 08550

for the

WEST WINDSOR-PLAINSBORO REGIONAL SCHOOL DISTRICT

WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

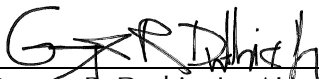
FVHD PROJECT #5063M / NJDOE# 5715-035-18-3000

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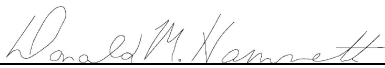


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ADVERTISEMENT FOR BIDS
BID: 2019-02
WEST WINDSOR-PLAINSBORO REGIONAL SCHOOL DISTRICT
MERCER COUNTY, NEW JERSEY

NOTICE IS HEREBY GIVEN that the West Windsor-Plainsboro Board of Education will accept bids for **Addition and Renovations to Thomas Grover Middle School**, together with all work incidental thereto, in accordance with the requirements of the drawings and specifications prepared by Fraytak Veisz Hopkins Duthie, P.C. (FVHD), Architects-Planners, **FVHD Project #5063M**.

Bids will be received for: Single Overall Contract (C008 or C009 with C029, C030, C032, C047)

Sealed Bids are due by 2:00 PM on November 7, 2019, to the West Windsor-Plainsboro Board of Education; Administrative Offices, 321 Village Road East, West Windsor, NJ 08550, and will be publicly opened and read immediately thereafter. Any Bid received after that time shall be rejected.

Prebid Meeting is scheduled for **2:00 PM on October 17, 2019**, at Thomas Grover Middle School, 10 Southfield Road, West Windsor, NJ 08550. Attendance at the pre-bid meeting is recommended.

Bid Documents for the proposed Work are on file at the office of the Architect, FVHD, 1515 Lower Ferry Road, Trenton, NJ 08618, www.fvhdpc.com, and may be inspected by prospective bidders during regular business hours. Any bidder should contact the Architect's office at (609) 883-7101 to confirm availability of documents. Bid Documents will be available from the Architect a non-refundable fee of \$100.00 for disk or upon deposit of \$250 for each paper set, checks payable to Fraytak Veisz Hopkins Duthie, P.C. If contractor requests shipping, a direct shipping account number must be provided to the Architect and for paper sets, a separate non-refundable handling fee of \$25 per set payable in advance. Deposits will be refunded if the bid documents are returned in whole in good condition, bound in proper order, unmarked and returned within ten (10) days after the opening of bids, by a Bidder submitting a bona fide bid. Bidders should only rely on original digital and paper versions of the bidding contract documents obtained directly from the Architect's office. **All questions must be sent only via mail or facsimile at (609) 883-2694 with the job number referenced.**

Bid Proposal shall be submitted in duplicate (one original, one copy) in a sealed envelope, addressed to the owner, bearing the name and address of the bidder written on the face of the envelope, and clearly marked "BID" with the contract title and/or bid number on the outside of the envelope and must be accompanied by a Certified Check, Cashier's Check or Bid Bond drawn to the order of the Owner for not less than ten percent (10%) of the amount of the bid, but in no case in excess of \$20,000; and must be delivered to the above place on or before the hour named. The Board of Education and the Architect assume no responsibility for bids mailed or misdirected in delivery.

If the bid exceeds \$20,000 bidder must be pre-qualified by the New Jersey Division of Property Management and Construction (DPMC), prior to the date that bids are received. Any bid submitted under the terms of New Jersey statutes not including a copy of a valid and active Pre-qualification/Classification Certificate may be rejected as being non-responsive to bid requirements.

Pursuant to N.J.S.A. 18A:18A-25, each proposal shall be accompanied by a Proposition of Surety from a Surety Company stating it will provide each bidder with separate Performance and Payment Bonds, each in the amount of 100% of the contract sum. Also, Surety agrees to furnish Bidder with a Maintenance Bond in required form. The Proposition of Surety shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance with N.J.S.A. 2A:44-143, and 2A:44-144 and with the three highest rating categories of rating companies

nationally recognized and listed as per Appendix A (go to www.nj.gov/dobi/surety.htm).

This project is subject to the New Jersey State Prevailing Wage Act, N.J.S.A. 34:11-56.27 et seq.

Pursuant to "The Public Works Contractor Registration Act", N.J.S.A. 34:11-56.48 et seq. (P.L. 199, c.238). Bidders and their subcontractors are required to be registered with the New Jersey Department of Labor and Workforce Development and to possess a current certificate by said Department indicating compliance with the Act prior to the time and date that bids are received.

All bidders must comply with the requirements Laws Against Discrimination N.J.S.A. 10:5-1 et seq., Affirmative Action Regulations, N.J.S.A. 10:5-31 et seq. (P.L. 1975, c.127), N.J.S.A. 17:27-1.1 et seq. and N.J.A.C. 6A:7-1.8. An Initial Project Workforce Report will be required from the successful bidder (Form AA-201).

No bid may be withdrawn for a period of sixty (60) days after the date set for the opening thereof. The right is reserved to reject any or all bids or to waive informality in the bidding if it is in the interest of the School District to do so.

By Order of the West Windsor-Plainsboro Board of Education
Christopher Russo, EdD, Assistant Superintendent of Finance/Board Secretary

BIDDING INFORMATION

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1.1 INVITATION TO BID

- A. All Bidders are required to prepare bids in accordance with all plans and specifications (Bid Documents) prepared by Fraytak Veisz Hopkins Duthie, P.C.
- B. **DISCLAIMER:** Bidders should only rely on original digital and paper versions of the bidding contract documents obtained directly from the Architect's office. Fraytak Veisz Hopkins Duthie, PC (FVHD) Architects-Planners is not responsible for any unauthorized copies made of the digital or paper bidding contract documents obtained from sources other than the Architect's office. All information provided by Fraytak Veisz Hopkins Duthie, PC (FVHD) Architects-Planners is intellectual property and is protected under copyright laws. It is not to be used for any purpose other than for the indicated project. Any other use or manipulation of the information is strictly prohibited.
- C. Proposals for Contracts as listed in the Advertisement for Bids or Invitation to Bid as hereinafter described, will be received for the performance of the Project. The bids shall cover all cost of any nature, incident to and growing out of the work. In explanation but not in limitation thereof, these costs shall include the cost of all work, labor, materials, equipment, transportation and cost of all else necessary to perform and complete the Project in the manner and within the time required, all incidental expenses in connection therewith, all costs on account of loss by damage or destruction of the Project to the extent that the cost of such loss is not recovered from insurance carried by the Owner and the Contractor, and any additional expenses for unforeseen difficulties encountered, for settlement of damages and for replacement of defective work and materials.
- D. Before submitting a Proposal, the Bidder shall become familiar with the Drawings, Specifications and other documents that will form the Contract, shall investigate the site of the Project and make such examination thereof as may be necessary to determine the character and amount of work involved. The Bidder shall also determine that they can secure the necessary labor and equipment and that the materials proposed to use will comply with the requirements specified therefore and can be obtained by the bidder in the quantities and at the time required.
 - 1. **Roofing Projects: The Bidder shall review Section 07500 regarding the requirement for the Contractor to engage and pay for the services of a qualified independent Roofing Inspection Firm (RIF).**
- E. The Owner reserves the right to accept or reject all bids including Alternate Bids, if any, pursuant to applicable law under any Contract for a period up to sixty (60) days after receipt of bids.

1.2 OBLIGATION OF BIDDER

- A. At the time of the opening of bids each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Drawings and other Contract

Documents, including all Addenda and Bulletins. The failure or omission of any Bidder to receive or examine any form, instrument or document or to visit the site and acquaint themselves with conditions there existing, shall not relieve Bidder from any obligation with respect to their bid.

- B. Any and all discrepancies between the drawings and specifications or between trades shall be brought to the attention of the Architect prior to the Contractor(s) bid submission.

1.3 PREQUALIFICATION OF BIDDERS (CONTRACTORS AND SUBCONTRACTORS)

- A. Pursuant to N.J.S.A. 18A:18A-26-33 et seq., as amended, and N.J.A.C. 17:19-2.1 through N.J.A.C. 17:19-2.7, Bidders on any Contract on public work for a Board of Education in the State of New Jersey in which the entire cost of the Contract exceeds \$20,000.00, must be prequalified by the Division of Property Management and Construction (DPMC), as to character and amount of public work on which they may submit bids. Prequalified bidder must submit with the Proposal, a "Notice of Classification" setting forth the type of work and the amount of work for which the bidder has been qualified, that there has been no material adverse change in their qualification information, the total amount of uncompleted work on contracts at the time and the date of the bid due date. Any bid submitted under the terms of New Jersey Statutes not including a copy of a valid and active Prequalification/Classification Certificate may be rejected as being nonresponsive to bid requirements. (Forms for this purpose are available from the Director of the Division of Property Management and Construction - DPMC, Trenton, New Jersey 08625.)

- 1. Each classified bidder's aggregate rating shall be calculated in accordance with formula prescribed by N.J.A.C. 17:19-2.8.

- a. Calculations shall be based on Bidder's base bid amount at time of bid or total amount of base bid and accepted Alternate Bids at time of Award.

- B. In accordance with N.J.S.A. 34:11-56.48 et seq. and N.J.S.A. 18A:7G-37, each bidder must be properly registered with the New Jersey Department of Labor at the time of the bid. The Contractor shall enter into subcontracts only with subcontractors who are registered pursuant to N.J.S.A. 34:11-56.48 et seq.

- 1. No Contractor/Subcontractor will be permitted to bid on or engage in any contract for public work, as defined in "The Public Works Contractor Registration Act," N.J.S.A. 34:11-56.48 et seq. (P.L. 1999, c.238), unless that Contractor/ Subcontractor is registered with the New Jersey Department of Labor and Workforce Development at the time of the bid.

- C. The Owner may make such additional investigations as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that they are properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

1.4 CHANGES TO BID DOCUMENTS, INTERPRETATIONS AND ADDENDA

- A. Changes to the Bid Documents may be required to be issued via Addenda. FVHD will issue notice of the publication of all Addenda to prospective bidders, who have obtained bid documents from FVHD
1. All Addenda issued become a part of the Bid Documents and will be part of the Contract Documents as though originally incorporated into the Project Manual.
 2. Bidder will be responsible to download the applicable Addendum(s) from the Architects website at www.fvhdp.com/bids/bidlisting.aspx.
 3. Bidders must acknowledge receipt of all Addenda on the Bid Proposal Form or the bid may be deemed non-responsive by the Owner's Attorney.
- B. Pre-bid Request for Information: No oral interpretations will be made to any Bidder as to the meaning of the drawings and specifications. Every request for such an interpretation shall be made in writing, addressed and forwarded by mail or facsimile transmission to the Architect's office no later than ten (10) business days prior to the bid opening date (not including Federal or State Holidays). All requests must state Pre-Bid Request for Clarification; include the project name and number to the attention of:

Fraytak Veisz Hopkins Duthie, P.C.

Architects / Planners

Nelson Hemstreet, AIA, Project Manager

1515 Lower Ferry Rd., Trenton, NJ 08618

Electronic Facsimile (609) 883-2694

FVHD Project No. 5063M

1. Every interpretation made to a Bidder will be in the form of an Addendum. During the bidding period, the Architect may furnish Addenda for additions to or alterations of the drawings and specifications, which shall be included in the work covered by the Bid Proposal(s).
2. Addenda, when issued, will be made available no later than seven (7) business days prior to the date for receiving bid proposals, Saturday, Sunday or holidays excepted, to all persons who have obtained Bid Documents from the Architect.
3. Addenda will also be available for examination at the Architect's office.
4. It shall be the responsibility of the Bidder to ascertain that they have received and examined all Addenda and Bulletins issued, prior to submitting their bid. Failure of the Bidder to download and examine all Addenda shall not relieve the Bidder from any of the requirements of the Bid Documents.

1.5 PREPARATION OF BIDS

- A. Bid Proposal shall be submitted in duplicated (one original and one copy) in a sealed envelope addressed to the Owner, bearing the name and address of the bidder written on the face of the envelope.
- B. Proposals shall be submitted on the form of proposal furnished by the Architect, properly filled out and duly executed. Proposal forms shall not be altered or added to in any way. Lump Sum Bid or Base Bid prices shall be filled in, in ink or typewritten, in both words and figures. In case of discrepancy, the amount described in words shall govern.
 - 1. Bids containing any conditions, omissions, unexplained erasure or alteration, items not called for in the Bid Proposal Form, attachment of additive information not required by the Specifications, or irregularities of any kind may be rejected by the Owner.
 - 2. **Any changes, white-outs, strike-outs, etc. on the Proposal Form must be initialed in ink by the person responsible for signing the Bid Proposal.**
- C. When the proposal is made by an individual, their post office address shall be stated and they shall sign the proposal. When made by a firm or partnership, its name and post office address shall be stated and the proposal shall be signed by one or more of the partners. When made by a corporation, its name and principal post office address shall be stated, and the proposal shall be signed by an authorized official of the corporation.
- D. Alternate Bids and Unit Prices for the various portions of work or Contracts shall be as stated in other Sections of the Specifications.
 - 1. Attention is called particularly to the requirements for filling in all Alternate Bids called for on the Proposal Form, as the Owner reserves the right to award a Contract based upon the possible inclusion of one or more such Alternate Bids.
 - 2. The amounts of the Alternate Bids shall include any and all modifications to related, adjacent or surrounding work made necessary by use of such Alternate Bids.
 - 3. The Alternate Bids must be stated as additions to or deductions from the Base Bid, unless otherwise noted.
 - 4. **The term "No Bid" shall not be used with respect to Alternate Bids and Unit Prices requested on the Proposal Forms. The Bidder who does not desire to make a change from the Base Bid under a particular Alternate Bid shall so indicate by using the words "No Change." Failure to bid or use of the term "No Bid" on any Alternate may cause rejection of entire bid.**
 - 5. Bidders must bid on every alternate bid. Additions to, or deductions from, the base bid shall be indicated in the appropriate blanks on the proposal form with additions to or deductions from the base bid filled in as appropriate. If a particular alternate bid does not result in an addition to or deduction from the base bid, the words "No Change" or N/C" shall be written in the blank for "No Change" on the proposal form,

and the words "No Change" shall be written in the blank provided for the purpose of stating the numeric amount in words. Failure to bid on every alternate bid shall render the bid nonresponsive and cause the bid to be rejected.

- E. Conditions, limitations or provisos attached by the Bidder to the Proposal may cause its rejection.

1.6 PROPOSAL GUARANTEE

- A. The Proposal, when submitted, shall be accompanied by a Proposal Guarantee in the form of a Certified Check, Cashier's Check or acceptable Bid Bond made payable unconditionally to the Owner, in the sum of ten percent (10%) of the Bid Proposal, but in no case in excess of \$20,000.00 and as per Bid Bond Form included:
 - 1. Bid Bond Form: Bid Bond shall be as per bid form included and shall include an effective and current Power of Attorney authorizing the Attorney-in Fact to bind the surety, on Bid Date and Time, for the full amount of the Bond.
 - 2. Proposal shall be accompanied by a Proposition of Surety in accordance with paragraph 1.7
- B. Pursuant to N.J.S.A. 18A:18A-36, all Proposal Guarantees, except those of the three apparent lowest responsive bidders, will be returned, if requested, after ten (10) days from opening of bids, Sundays and holidays excepted. Within three (3) days after the awarding of the contract and the approval of the Contractor's performance bond and payment bond, the bid security of the remaining unsuccessful bidders will be returned, Sundays and holidays excepted.
- C. The Proposal Guarantee shall be forfeited if successful Bidder fails to execute the Agreement between Owner and Contractor identified in paragraph 1.9 hereof and furnish the Performance-Payment Bond within ten (10) calendar days after Notice of Award of Contract to them.
 - 1. Any failure by the successful bidder to perform its obligations regarding the time, manner, and substance of compliance with Bidding Documents in relation to the Award of a Contract, shall constitute an Event of Default, entitling the Owner to:
 - a. Demand, from said guarantor, immediate payment of the entire Bid Bond amount, as liquidated damages, not as a penalty, for the delay which is acknowledged and agreed that the Owner will sustain in connection with said Default; and in addition thereto,
 - b. Recovery of any and all other Losses incurred by the Owner, to which the Owner shall, to the fullest extent permitted by Applicable Law, be entitled to recover, including without limitation Special Damages.

1.7 CONTRACT BONDS

- A. Pursuant to N.J.S.A. 18A:18A-25, Proposals shall be accompanied by a Proposition of Surety in form as bound in these documents, assuring that satisfactory arrangements have been made between the surety and the Bidder by which surety agrees to furnish Bidder with a Performance Bond and Payment Bond; each in the amount of 100% of the amount bid. Also surety agrees to furnish Bidder with a Maintenance Bond in form as bound herein.
1. The Proposition of Surety shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance with N.J.S.A. 2A:44-143 and 2A:44-144, and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A (go to www.nj.gov/dobi/surety.htm).
- B. The Bidder to whom the Contract has been awarded shall, within ten (10) calendar days after Notice of Award of contract to the Bidder, furnish and deliver a Performance Bond and Payment Bond, each equal to one hundred percent (100%) of the Contract Amount.
1. If, at any time after execution and approval of a Contract and Performance-Payment Bond required by Contract Documents, such Bond shall cease to be adequate security for the Owner, the Contractor shall, within five (5) business days after notice to do so, furnish a new or additional Bond, in form, sum and signed by such Sureties as shall be satisfactory to the Owner. No further payment shall be deemed due nor shall any further payment be made to the Contractor unless and until such new or additional Bond shall be furnished and approved.
- C. Prior to start of guarantee period and before the final payment is made, the Contractor shall provide the Owner with a Maintenance Bond in the amount of ten percent (10%) of Final Contract Amount, to insure the replacement or repair of defective materials or workmanship during the **two-year** guarantee period.
- D. The cost of all Bonds shall be paid for by the Contractor and shall be included as a part of Contractor's bid price.

1.8 POWER OF ATTORNEY

- A. Attorneys-in-fact who sign Bid Bonds, Performance and Payment Bonds, Maintenance Bonds and Proposition of Surety forms must accompany each bond or proposition with a certified and effectively dated copy of their power-of-attorney.

1.9 FORM OF AGREEMENT

- A. The form of agreement shall be AIA Document A132 Standard Form of Agreement between Owner and Contractor, Construction Manager as Adviser Edition 2009 Edition, and in accordance with AIA Document A232 General Conditions of the Contract, Construction Manager as Adviser Edition 2009 as amended, and all other documents referenced herein.

1.10 AWARD OF CONTRACT

- A. Award, if made, will be to the lowest responsive and responsible bidder for the Single Overall Building Contract selected to include Alternate Bids, if any, which the Owner chooses to accept, that results in the lowest aggregate total sum pursuant to N.J.S.A. 18A:18A-4.
- B. Award made to a Bidder not a resident of the State of New Jersey is conditioned upon Bidder designating a proper agent in the State of New Jersey on whom service can be made in the event of litigation.
- C. If the successful Bidder is a corporation not organized under the laws of New Jersey, the award of Contract and payment of consideration thereunder shall be conditioned upon Corporation promptly filing a certificate of doing business in the State of New Jersey pursuant to N.J.S.A. 14A:13-2 and complying with the provisions of N.J.S.A.14A:13-4. Failure to submit a proof of registration with a bid may not be fatal and advice on appropriate action to take should be solicited from the School Board attorney. Note: Under no circumstance should a Business Registration Certificate be submitted after award of a contract.
- D. The Owner reserves the right to reject all bids, or to waive minor informalities or non-material exceptions in a bid, pursuant to applicable law, if it is in the interest of the Owner to do so.
- E. In accordance with requirements of the N.J.S.A. 18A:18A-36b, execution of the Contract by all parties will be done within 21 days of the notification of the award date.
 - 1. The Bidder to whom the contract is awarded shall be required to execute said Contract within twenty (20) days of the Notice of Award.

1.11 BIDDING DOCUMENTS

- A. The Bidding Documents consist of, but are not limited to, the following:
 - 1. Instructions to Bidders in accordance with this Section,
 - 2. General Conditions, AIA Document A232, and as supplemented in the Supplementary General Conditions; Section 00800,
 - 3. Proposal Form including attachments as per Bidder's Checklist,
 - 4. Erratum, Addenda, if issued,
 - 5. Specifications: As outlined in the "Index" included in the Project Manual,
 - 6. Drawings: As per List of Drawings indicated on Project Title Sheet and in accordance with Section 00850,
 - 7. Agreement Between Owner & Contractor, AIA Document A132 and as amended by the Project Specifications.
- B. Note: The above list is not intended to establish an order of precedence.

1.12 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Refer to Section 01800, "Time of Completion and Liquidated Damages."

1.13 LISTING OF STOCKHOLDERS OR PARTNERS

- A. Pursuant to N.J.S.A. 52:25-24.2, no corporation, partnership, or limited liability company shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, the cost of which is to be paid with or out of any public funds, by the State, or any county, municipality or school district, or any subsidiary or agency of the State, or of any county, municipality or school district, or by any authority, board, or commission which exercises governmental functions, unless prior to the receipt of the bid or accompanying the bid, of said corporation, said partnership, or said limited liability company there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. If one or more such stockholder or partner or member is itself a corporation or partnership or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every noncorporate stockholder, and individual partner, and member, exceeding the 10 percent ownership criteria established in this act, has been listed.
- B. To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest.

1.14 NON-COLLUSION AFFIDAVIT

- A. Pursuant to N.J.S.A. 52:34-15, bidder shall submit with their bid Non-Collusion Affidavit on form as bound herein.

1.15 CONTRACT

- A. As indicated in the Advertisement for Bids, it is intended to receive sealed bids and to award and administrate contract for the work required by the Contract Documents as follows:

Single Overall Contract

- B. The Bidder shall be a firm classified by the State of New Jersey - Division of Property Management and Construction for the following classification(s):

Prime General Contractor

C008 - General Construction

OR

C009 - General Construction/Alterations and Additions

and have subcontractor(s) for the following classification(s) of work:

Subcontractors:

C029 - Structural Steel and Ornamental Iron

C030 - Plumbing

C032 - HVACR

C047 - Electrical

- C. **The Bidder shall be in possession of the required DPMC Classification(s) for the specified work. If they possess the DPMC Classification(s) in one category, but not in all of the required categories, the Contractor must list the Prime Subcontractor(s) bidding the scope of work for the other categories. The Subcontractor must possess the DPMC Classification(s) in that category.**
- C. Each Bidder shall include name of the Subcontractor for **Sprinkler Systems Work (C045)**, if applicable, and shall submit evidence that the bidder or their subcontractor is qualified for in accordance with N.J.S.A. 18A:18A-26 for Sprinkler System Work.

END OF SECTION 00100

BIDDER'S CHECKLIST

THE FOLLOWING DOCUMENTS AND CHECKLIST MUST BE SIGNED AND SUBMITTED WITH THE BID PACKAGE TO THE OWNER AS PART OF THE BID DOCUMENTS.

ITEM

REVIEWED THE CONTRACT DOCUMENTS (INCLUDING THE PERMITS OBTAINED BY THE BOARD), WORK SITE, LOCALITY, AND ALL LOCAL CONDITIONS AND LAWS AND REGULATIONS THAT IN ANY MANNER MAY AFFECT COST, PROGRESS, PERFORMANCE OR FURNISHING OF WORK

REVIEWED GENERAL BOND REQUIREMENTS

REVIEWED AGREEMENT (OWNER/CONTRACTOR)

(*) BIDDER'S PROPOSAL

(*) BID BOND, CERTIFIED CHECK, CASHIER'S CHECK OR ANY COMBINATION THEREOF IN AN AMOUNT NO LESS THAN TEN PERCENT (10%) OF THE TOTAL AMOUNT OF BID, NOT TO EXCEED \$20,000 (TWENTY THOUSAND DOLLARS)

(*) CONSENT OF SURETY (CONTRACTOR)

(*) CONSENT OF SURETY (SUBCONTRACTOR)

If surety is being provided for subcontractors by bidder, please indicate here. ____ initial

(*) SUBCONTRACTOR IDENTIFICATION STATEMENT

(*) OWNERSHIP DISCLOSURE CERTIFICATION

(*) DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN (P.L. 2012, c.25)

PERFORMANCE RECORD CERTIFICATION

COMPLIANCE WITH NEW JERSEY PREVAILING WAGE ACT

NON COLLUSION AFFIDAVIT

CERTIFICATE OF EQUAL OPPORTUNITY

AFFIRMATIVE ACTION COMPLIANCE NOTICE

CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES - CONTRACTOR

CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES - SUBCONTRACTOR

POLITICAL CONTRIBUTION DISCLOSURE FORM

CERTIFICATION OF INSURANCE STATEMENT

BIDDER'S CHECKLIST

CONTRACTOR CERTIFICATION OF QUALIFICATIONS AND CREDENTIALS AFFIDAVIT AND CERTIFICATION FOR ALL PRIME SUBCONTRACTORS REQUIRED TO BE NAMED UNDER (N.J.S.A. 18A:7G-1 ET SEQ. (P.L. 2000, C.72)), WHERE APPLICABLE

CURRENT NEW JERSEY DEPARTMENT OF LABOR PUBLIC WORKS CONTRACTOR REGISTRATION ACT CERTIFICATE (P.L. 1999 C. 238) OR COPY OF APPLICATION AND CHECK - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S)

BUSINESS REGISTRATION CERTIFICATE - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S) ENCOURAGED TO SUBMIT WITH BID BUT PRIOR TO CONTRACT AWARD

(*) CURRENT NOTICE OF CLASSIFICATION/PRE-QUALIFICATION CERTIFICATE(S) DPMC CLASSIFICATION CERTIFICATE(S) - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S)

DIVISION OF PROPERTY MANAGEMENT & CONSTRUCTION (DPMC) FORM 701 - TOTAL AMOUNT OF UNCOMPLETED CONTRACTS - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S)

STATUS OF PRESENT CONTRACTS

TRADE LICENSE

HVACR MASTER LICENSE (HVACR CONTRACTORS)

NOTE: (*) FAILURE TO SUBMIT THESE DOCUMENTS SHALL BE AUTOMATIC CAUSE FOR REJECTION OF THE BID.

By signing below, I acknowledge having read and fully understand all the requirements of each of the documents referenced herein.

BIDDER (Signature)

Dated: _____

BIDDER (Print Name)

BID BOND

THE UNDERSIGNED BIDDER and "**Surety**", a corporation duly authorized to transact business in the State of New Jersey, are held and firmly bound unto _____
_____ (the "**OWNER**") for the full and just sum of:
_____ Dollars (\$_____),
(10% of the Bid Price not to exceed \$20,000.00: words) (figures)

The payment of which sum the **BIDDER** has submitted a Bid to perform certain Work described in Bidding Documents entitled:

CONTRACT NO.: _____

TITLE: _____

The **Surety** hereby agrees to pay the full face value of this Bond to the **OWNER**, as Liquidated Damages, and not as a penalty, unless this Bond is void.

This Bond shall only be void if the **BIDDER** well, truly and faithfully performs all requirements contained in the Bidding/Contract Documents incident to an Award of the Contract including, but not limited to, proper execution and submission of the Contract Forms and all other required documentation.

On this _____ day of _____ 20____, the **BIDDER** and **Surety** hereby bind themselves herein:

FOR THE BIDDER:

FOR THE SURETY:

(Name of **BIDDER**)

(Name of **Surety**)

By: _____
(Print Name-**BIDDER's** Authorized Representative)

By: _____
(Print Name of Attorney-in-Fact)

By: _____
(Signature-**BIDDER's** Authorized Representative)

By: _____
(Signature of Attorney-in-Fact)

IMPORTANT – ATTACH AND SUBMIT WITH THE BID: A POWER OF ATTORNEY FOR THE ATTORNEY-IN-FACT WHICH IS CURRENTLY DATED AND VALID FOR THE ENTIRE AMOUNT OF THE BOND

END OF DOCUMENT

FORM OF CONSENT OF SURETY

PERFORMANCE BOND, PAYMENT BOND and MAINTENANCE BOND

For and in consideration of the sum of one dollar (\$1.00) lawful money of the United States, the receipt is hereby acknowledged, paid to the undersigned surety, and for other valuable consideration, the undersigned surety, authorized to transact business in the State of _____, certifies and agrees that if the Contract entitled: _____

CONTRACT _____,
(NUMBER) (TITLE)

is awarded to: _____
(BIDDER'S NAME)

the undersigned hereby warrants that it is in all respects qualified to provide the required Bonds as set forth in the Contract Documents, and that it will provide and execute the **Performance Bond** in the full amount of awarded contract in the event that said contractor is awarded a contract for the above project, the **Payment Bond**, and the **Maintenance Bond** in the form and as otherwise required by the Contract Documents.

(Print Name of Surety)

(Print Name of Attorney-in-Fact)

(Signature of Attorney-in-Fact)

ATTACH AND SUBMIT WITH THE BID: A POWER OF ATTORNEY FOR THE ATTORNEY -IN-FACT WHICH IS CURRENTLY DATED AND VALID FOR THE TOTAL AMOUNT OF ALL BONDS.

Consent of Surety must be signed by an authorized agent or representative of a surety company and not by the individual or company representative submitting the bid.

NOTE: IF SUBCONTRACTORS ARE LISTED ON BID FORM, N.J.S.A. 18A:18A-18 REQUIRES THAT EVIDENCE OF PERFORMANCE SECURITY AS TO SUBCONTRACTORS BE SUBMITTED WITH THE BID, EITHER BE THE BIDDER ON ITS OWN BEHALF AND ON BEHALF OF ALL LISTED SUBCONTRACTORS, OR BY EACH SUBCONTRACTOR, OR ANY COMBINATION THEREOF, PROVIDED THAT THE PERFORMANCE SECURITY IN TOTAL EQUALS, BUT DOES NOT EXCEED, THE TOTAL AMOUNT OF THE BID.

SUBCONTRACTOR IDENTIFICATION STATEMENT

The following information is to be provided in the case of all subcontractors who will furnish labor of the various trades governed by N.J.S.A. 18A:18A-18 (b) (**General Construction, Steel, Plumbing, HVAC, Electric, and all DPMC Specialty Trades**, where applicable).

TRADE	Contractor's Name/Address/Telephone	NJ License No.

If work of the types designated by the above referenced law will be performed by the Bidder, the Bidder shall state below and shall enclose copies of licenses covering each trade.

TRADE	N.J. License No.

BIDDER _____

STATEMENT OF OWNERSHIP
(OWNERSHIP DISCLOSURE CERTIFICATION)

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

**This Statement Shall Be Included with
All Bid and Proposal Submissions**

Name of Business: _____

Address of Business: _____

Name of person completing this form: _____

N.J.S.A. 52:25-24.2:

"No corporation, partnership, or limited liability company shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, unless prior to the receipt of the bid or proposal, or accompanying the bid or proposal of said corporation, said partnership, or said limited liability company there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be.

If one or more such stockholder or partner or member is itself a corporation or partnership or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, and member, exceeding the 10 percent ownership criteria established in this act, has been listed.

To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest."

The Attorney General has advised that the provisions of N.J.S.A. 52:25-24.2, which refer to corporations and partnerships, apply to limited partnerships, limited liability partnerships, and Subchapter S corporations.

This Ownership Disclosure Certification form shall be completed, signed and notarized.

Failure of the bidder/proposer to submit the required information is cause for automatic rejection of the bid or proposal

Part I

Check the box that represents the type of business organization:

- Sole Proprietorship (skip Parts II and III, sign and notarize at the end)
- Non-Profit Corporation (skip Parts II and III, sign and notarize at the end)
- Partnership Limited Partnership Limited Liability Partnership
- Limited Liability Company
- For-profit Corporation (including Subchapters C and S or Professional Corporation)
- Other (be specific): _____

Part II

- I certify that the list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be.

OR

- I certify that no one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or that no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be.

Sign and notarize the form below, and, if necessary, complete the list below. (Please attach additional sheets if more space is needed):

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Name: _____

Address: _____

Part III - Any Direct or Indirect Parent Entity Which is Publicly Traded:

“To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest.”

Pages attached with name and address of each publicly traded entity as well as the name and address of each person that holds a 10 percent or greater beneficial interest.

OR

Submit here the links to the Websites (URLs) containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent.

AND

Submit here the relevant page numbers of the filings containing the information on each person holding a 10 percent or greater beneficial interest.

Subscribed and sworn before me this ____ day of _____, 20_____.

(Affiant)

(Notary Public)

My Commission expires:

(Print name of affiant and title if applicable)

(Corporate Seal if a Corporation)

PERFORMANCE RECORD

How many years has your organization been in business as a Contractor under your present business name? _____

How many years experience in construction work has your organization had:

(a) As a Prime contractor? _____ (b) As a subcontractor? _____

What is the construction experience of the principal individuals of your organization?

Individual's Name	Present Position or Office	Years of Constr. Experience	Magnitude and Type of Work	In What Capacity

Have you ever failed to complete any work contracted to you? _____

If so, where and why? _____

Has any officer or partner of your organization ever failed to complete a construction contract handled in its own name?

If so, state name of individual, name of owner, location and type of project and reason for the failure to complete.

COMPLIANCE WITH NEW JERSEY PREVAILING WAGE ACT

Title of Bid: _____

Date: _____

Bidder's Past Record under the New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25, inclusive) and all acts amendatory thereof and supplemental hereto.

Answer each question with a "yes" or "no" entered in the space provided and furnish additional information when required.

1. I certify that our company understands that this project requires prevailing wages to be paid in full accordance with the law.
2. I further certify that all subcontractors named in this bid understand that this project requires the subcontract to pay prevailing wages in full accordance with the law.
3. Has the Bidder been notified by the Commissioner of Labor and Industry by notice issued pursuant to N.J.S.A. 34:11-56:37 that it has been found to be in violation for failure to pay prevailing wages as required by the New Jersey Prevailing Wages Act? _____
4. Has any person having an "Interest" in the Bidder within the meaning of N.J.S.A. 34:11-56:38 been found to be in violation of the New Jersey Prevailing Wage Act as aforesaid? _____
5. Has any person having an "Interest" in the Bidder with the meaning of N.J.S.A. 34:11-56:38 had an "Interest" as aforesaid in any firm, corporation, or partnership which has been found to be in violation of the New Jersey Prevailing Wage Act as aforesaid? _____
6. If the answer to any of the aforesaid questions is "Yes," annex a full statement showing the date of the action taken by the Commissioner of Labor and Industry, the subsequent action, if any, taken with respect to such action of the Commissioner, the name of the person, firm corporation or partnership debarred by the commissioner, and the nature, character and extent of the interest existing between the Bidder and the name which was debarred as aforesaid.

Name of Company:

Authorized Agent:

Authorized Signature:

NON-COLLUSION AFFIDAVIT

STATE OF NEW JERSEY/ _____
(Specify, if Other)

COUNTY OF _____

I, _____, of the (City, Town, Borough) of _____ State of _____, of full age, being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____, the Bidder making the Proposal for the above named Projects, and that I executed the said Proposal with full authority to do so; that said Bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named Project; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge, and the State of New Jersey relies upon the truth of the statements contained in this affidavit in awarding the contract for the said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by _____. (Name of Contractor)

(N.J.S.A. 52:34-15)

By: _____
(Signature of Authorized Representative)

Subscribed and sworn to before me
this _____ day of _____, 20____.

(Seal) Notary Public of New Jersey/

Specify Other State

My Commission Expires _____, 20 ____.

THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED, AND SUBMITTED WITH BID

CERTIFICATE OF EQUAL OPPORTUNITY

Name of Bidder

Project No.

INSTRUCTIONS

This certification is required pursuant to executive order 11246, Part II, 203(B), (30 F.R. 12319-25). Each Bidder is required to state in its Bid whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable filing requirements.

CONTRACTOR'S CERTIFICATE

Contractor's Name:

Address: _____

1. Bidder has participated in previous contract or subcontract subject to the equal opportunity clause. Yes _____ No _____
2. Compliance reports were required to be filed in connection with such contract or subcontract. Yes _____ No _____
If Yes, state what reports were filed and with what agency.
3. Bidder has filed all compliance reports due under applicable instructions. Yes _____ No _____
4. If answer to Item 3 is "No", please explain in detail on reverse side of this certification.

Certification: The information above is true and complete to the best of my knowledge and belief. A willfully false statement is punishable by law. (U.S.Code, Title 17, Section 1001.)

(Name and Title of Signer - Please Type

(Signature)

Date: _____

AFFIRMATIVE ACTION QUESTIONNAIRE

COMPANY NAME _____

1. Our company has a federal Affirmative Action Plan approval.

YES _____ NO _____

2. Our company has a New Jersey State Certificate of Approval

YES _____ NO _____

A. If yes, a copy of the New Jersey State Certificate shall be submitted to the board of education within seven (7) working days of the notice of intent to award the contract or the signing of the contract.

3. If you answered NO to both questions above, you will need to complete an Affirmative Action Employee Information Report (AA-302) and forward to the Affirmative Action Office, Department of Treasury, Division of Purchase & Property, Contract Compliance Audit Unit, EEO Monitoring Program P.O. Box 206, Trenton, NJ 08625. A copy shall be submitted to the board of education within seven (7) days of the notice of the intent to award the contract or the signing of the contraction.

I certify that the above information is correct to the best of my knowledge.

AUTHORIZED BIDDER _____
(Print or Type)

TITLE _____ DATE _____
(Print or Type)

SIGNATURE _____

CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES

Bidder's Name: _____

Address: _____

1. A statement as to the financial ability, adequacy of plant equipment, organization and prior experience of the Bidder, as required by N.J.S.A. 18A:18A-28 has been submitted to the Department of Treasury within the last twelve (12) months preceding the date of opening of bids for this contract.

2. I certify, as required by N.J.S.A. 18A:18A-32, that there has been no material adverse change in the qualification except:

(Name and Title of Signer - Please print or type)

(Signature)

(Date)

STATUS OF PRESENT CONTRACTS

PURSUANT TO N.J.A.C. 17:19-2.13, BIDDER DECLARES THE FOLLOWING WITH RESPECT TO ITS UNCOMPLETED CONTRACTS, ON ALL WORK, FROM WHATEVER SOURCE (PUBLIC AND PRIVATE), BOTH IN NEW JERSEY AND FROM OTHER GOVERNMENTAL JURISDICTIONS.

- Each classified bidder's aggregate rating shall be calculated in accordance with formula prescribed by N.J.A.C. 17:19-2.8.
- Calculations shall be based on Bidder's base bid amount only at time of bid or total amount of base bid and accepted Alternate Bids at time of Award.

Entity	Project Title	Original Contract Amount	Uncompleted Amount As of Bid Opening Date	Name and Telephone Number of Party To Be Contacted From Entity For Verification

Sworn and Subscribed to before me
 this _____ day of _____, 20____

BIDDER

Notary Public _____

 (Print and Signature)

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Required Pursuant To N.J.S.A. 19:44A-20.26

**This form or its permitted facsimile must be submitted to the local unit
no later than 10 days prior to the award of the contract.**

Part I – Vendor Information

Vendor Name:			
Address:			
City:	State:	Zip:	

The undersigned being authorized to certify, hereby certifies that the submission provided herein represents compliance with the provisions of N.J.S.A. 19:44A-20.26 and as represented by the Instructions accompanying this form.

Signature	Printed Name	Title
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Part II – Contribution Disclosure

Disclosure requirement: Pursuant to N.J.S.A. 19:44A-20.26 this disclosure must include all reportable political contributions (more than \$300 per election cycle) over the 12 months prior to submission to the committees of the government entities listed on the form provided by the local unit.

Check here if disclosure is provided in electronic form.

Contributor Name	Recipient Name	Date	Dollar Amount
			\$

Check here if the information is continued on subsequent page(s)

STATE OF NEW JERSEY -- DIVISION OF PURCHASE AND PROPERTY
DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

Quote Number: _____

Bidder/Offeror: _____

PART 1: CERTIFICATION

BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

FAILURE TO CHECK ONE OF THE BOXES WILL RENDER THE PROPOSAL NON-RESPONSIVE.

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at <http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>. Bidders **must** review this list prior to completing the below certification. **Failure to complete the certification will render a bidder's proposal non-responsive.** If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party

PLEASE CHECK THE APPROPRIATE BOX:

I certify, pursuant to Public Law 2012, c. 25, that neither the bidder listed above nor any of the bidder's parents, subsidiaries, or affiliates is listed on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. **I will skip Part 2 and sign and complete the Certification below.**

OR

I am unable to certify as above because the bidder and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

PART 2: PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN

You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes below.

EACH BOX WILL PROMPT YOU TO PROVIDE INFORMATION RELATIVE TO THE ABOVE QUESTIONS. PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION. IF YOU NEED TO MAKE ADDITIONAL ENTRIES, CLICK THE "ADD AN ADDITIONAL ACTIVITIES ENTRY" BUTTON.

Name _____	Relationship to Bidder/Offeror _____
Description of Activities _____ _____	
Duration of Engagement _____	Anticipated Cessation Date _____
Bidder/Offeror Contact Name _____	Contact Phone Number _____

Delete

ADD AN ADDITIONAL ACTIVITIES ENTRY

Certification: I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder; that the State of New Jersey is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with the State to notify the State in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the State, permitting the State to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): _____ Signature: _____

Do Not Enter PIN as a Signature

Title: _____ Date: _____

CERTIFICATION OF INSURANCE STATEMENT

The Bidder fully understands the Owner's insurance requirements as stated in the Supplementary Conditions and agrees to provide all insurance required by these documents at award of contract.

COMPANY NAME

BIDDER (Signature)

BIDDER (Print Name)

Note: Failure to sign this document may result in the rejection of your Proposal.

CERTIFICATION OF INSURANCE STATEMENT

**CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF
QUALIFICATIONS AND CREDENTIALS**

CONTRACTOR

STATE OF NEW JERSEY/ _____
(Specify, if Other)

COUNTY OF _____

I, _____, of the (City, Town, Borough) of
_____ State of _____, of full age,

being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____ the
Bidder making the Proposal for the above named Projects, or a Subcontractor to the Bidder required
to be named under (N.J.S.A. 18A:7G-1 et al. and N.J.S.A. 18A:18A-18), and that I executed the said
Proposal with full authority to do so. Pursuant to N.J.S.A. 18A:7G-37, the firm of
_____ possess the following qualifications and credentials:

- (1) A current, valid Certificate of Registration from the Department of Labor issued pursuant to "The Public Works Contractor Registration Act," P.L.1999, c. 238 (C.34: 11-56.48 et seq.), a copy of which is attached hereto.
- (2) A current, valid "Certificate of Authority to perform work in New Jersey"/Notice of Classification issued by the Department of the Treasury, a copy of which is attached hereto.
- (3) A current, valid Contractor or Trade License required under applicable New Jersey law for any trade or specialty area in which the firm seeks to perform work, a copy of which is attached hereto.
- (4) A suitable quality control and quality assurance program, as well as an appropriate safety and health plan that the firm will have in place during the term of construction of the School Facilities Project.

- (5) An executed Affidavit, attached hereto, demonstrating that the amount of the firm's Bid Proposal and the value of all of its outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit, as well as a certified copy of Department of the Treasury Form DPMC 701.

Name of Contractor

By: _____
(Signature of Authorized Representative)

Subscribed and sworn to before
me this ____ day of _____, 20 ____.

(Seal) Notary Public of New Jersey/
Specify Other State
My Commission Expires _____ 20 ____.

**THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED,
AND SUBMITTED WITH BID**

**CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF
QUALIFICATIONS AND CREDENTIALS**

SUBCONTRACTOR

STATE OF NEW JERSEY/_____

Specify, if Other

COUNTY OF _____

I, _____, of the (City, Town, Borough) of
_____ State of _____, of full age,

being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____ the Bidder
making the Proposal for the above named Projects, or a Subcontractor to the Bidder required to be
named under (N.J.S.A. 18A:7G-1 et al. and N.J.S.A. 18A:18A-18), and that I executed the said
Proposal with full authority to do so. Pursuant to N.J.S.A. 18A:7G-37, the firm of

_____ possess the following qualifications and credentials:

- (1) A current, valid Certificate of Registration from the Department of Labor issued pursuant to "The Public Works Contractor Registration Act," P.L.1999, c. 238 (C.34: 11-56.48 et seq.), a copy of which is attached hereto.
- (2) A current, valid "Certificate of Authority to perform work in New Jersey"/Notice of Classification issued by the Department of the Treasury, a copy of which is attached hereto.
- (3) A current, valid Contractor or Trade License required under applicable New Jersey law for any trade or specialty area in which the firm seeks to perform work, a copy of which is attached hereto.
- (4) A suitable quality control and quality assurance program, as well as an appropriate safety and health plan that the firm will have in place during the term of construction of the School Facilities Project.

- (5) An executed Affidavit, attached hereto, demonstrating that the amount of the firm's Bid Proposal and the value of all of its outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit, as well as a certified copy of Department of the Treasury Form DPMC 701.

Name of Contractor

By: _____
(Signature of Authorized Representative)

Subscribed and sworn to before
me this ____ day of _____, 20 ____ .

(Seal) Notary Public of New Jersey/
Specify Other State
My Commission Expires _____ 20 ____ .

**THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED,
AND SUBMITTED WITH BID**

CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF
QUALIFICATIONS AND CREDENTIALS FORM

EXHIBIT B
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L.1975, c.127)
N.J.A.C. 17:27-1.1 et seq.
CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affection or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B, and C, as long as the Dept. of LWD, construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

- (A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as supplemented and amended from time to time and the American with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

EXHIBIT B (Continued)

- (B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:
- 1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;
 - 2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;
 - 3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;
 - 4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;
 - 5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and nondiscrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;
 - 6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:
 - i. The contractor or subcontractor shall interview the referred minority or women worker.
 - ii. If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.
 - iii. The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.
 - iv. If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.
 - 7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program upon request.
- (C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which

EXHIBIT B (Continued)

result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ration established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

- (D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to N.J.A.C. 17:27-1.1 et seq.

(Revised: January, 2016)

Reviewed By: _____

Title: _____

Company: _____

Date: _____

Signature: _____



AIA[®] Document A312[™] – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

CONSTRUCTION CONTRACT

Date:
Amount: \$
Description:
(Name and location)
Sample

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

BOND

Date:
(Not earlier than Construction Contract Date)

Amount: \$
Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Init.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

Init.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____
(Corporate Seal)

SURETY

Company: _____
(Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____

Signature: _____

Name and Title: _____

Address: _____



AIA[®] Document A312[™] – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

Sample

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond:

None

See Section 18

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

Init.

User Notes:

(892497972)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

Init.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company: _____
(Corporate Seal)

Company: _____
(Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

Signature: _____
Name and Title: _____
Address: _____

Init.

User Notes:

(892497972)

TWO YEAR MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, _____

as principal, and _____

a Corporation organized and existing under the laws of the state of _____

and duly authorized to do business in the State of New Jersey, as Surety,

are held and firmly bound unto the _____

as Owner, in the penal sum of _____

(10% of the Final Contract Amount)

for payment of which, well and truly to be made, we hereby, jointly, and severally, bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That whereas

the above named principal did on the _____ day of _____, 20____,

enter into a Contract with the Owner for _____

(Project Name)

which said Contract is made a part of this bond the same as though set forth herein.

NOW, if the said principal shall remedy without cost to the Owner any defects which may develop during the one (2) year Maintenance Period of the work performed under the said Contract, provided such defects, in the judgment of the Owner are caused by defective or inferior materials or workmanship, then this obligation shall be void, otherwise it shall be and remain in full force and effect. The one (2) year period shall commence on the date established in the Certificate of Substantial Completion.

The said Surety hereby stipulates and agrees that no modifications, deletions or additions in or to the terms of the said Contract or the plans or specifications therefor shall in any way affect its obligations on this bond.

Signed and Sealed this _____ day of _____, 20____.

(Principal) (Seal)

(Witness)

(Title)

(Surety) (Seal)

(Witness)

(Title)



STATE OF NEW JERSEY
Department of Labor and Workforce Development
Division of Wage and Hour Compliance - Public Contracts Section
PO Box 389
Trenton, NJ 08625-0389

PREVAILING WAGE RATE DETERMINATION

The New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq.) requires that the Department of Labor and Workforce Development establish and enforce a prevailing wage level for workers engaged in public works in order to safeguard their efficiency and general well being and to protect them as well as their employers from the effects of serious and unfair competition.

Prevailing wage rates are wage and fringe benefit rates based on the collective bargaining agreements established for a particular craft or trade in the locality in which the public work is performed. In New Jersey, these rates vary by county and by the type of work performed.

Applicable prevailing wage rates are those wages and fringe benefits in effect on the date the contract is awarded. All pre-determined rate increases listed at the time the contract is awarded must also be paid, beginning on the dates specified. Rates that have expired will remain in effect until new rates are posted.

Prevailing Wage Rate

The prevailing wage rate for each craft will list the effective date of the rate and the following information:

W = Wage Rate per Hour **B** = Fringe Benefit Rate per Hour* **T** = Total Rate per Hour

* Fringe benefits are an integral part of the prevailing wage rate. Employers not providing such benefits must pay the fringe benefit amount directly to the employee each payday. Employers providing benefits worth less than the fringe benefit amount must pay the balance directly to the employee each payday.

Unless otherwise stated in the Prevailing Wage Rate Determination, the fringe benefit rate for overtime hours remains at the straight time rate.

When the Overtime Notes in the Prevailing Wage Rate Determination state that the overtime rates are "inclusive of benefits," the benefit rate is increased by the same factor as the wage rate (i.e. multiplied by 1.5 for time and one-half, multiplied by 2 for double time, etc.).

Apprentice Rate Schedule

An "apprentice" is an individual who is registered with the United States Department of Labor - Office of Apprenticeship and enrolled in a certified apprenticeship program during the period in which they are working on the public works project.

The apprentice wage rate is a percentage of the journeyman wage rate, unless otherwise indicated. The apprentice benefit rate is the full journeyman benefit rate, unless otherwise indicated.

If there is no apprentice rate schedule listed, the individual must be paid at least the journeyman rate even if that individual is in a certified apprentice program for that trade.

If there is no ratio of apprentices to journeymen listed for a particular craft, then the ratio shall be one (1) apprentice to every four (4) journeymen.

Comments/Notes

For each craft listed there will be comments/notes that cover the definition of the regular workday, shift differentials, overtime, recognized holidays, and any other relevant information.

Public Works Contractor Registration

The Public Works Contractor Registration Act (N.J.S.A. 34:11-56.48, et seq.) requires that **all** contractors, subcontractors, or lower tier subcontractors who are working on or who bid on public works projects register with the Department of Labor and Workforce Development. Applications are available at www.nj.gov/labor (click on Wage & Hour and then go to Registration & Permits).

Pursuant to N.J.S.A. 34:11-56.51:

No contractor shall bid on any contract for public work as defined in section 2 of P.L.1963, c. 150 (C.34:11-56.26) unless the contractor is registered pursuant to this act. No contractor shall list a subcontractor in a bid proposal for the contract unless the subcontractor is registered pursuant to P.L.1999, c.238 (C.34:11-56.48 et seq.) at the time the bid is made. No contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall engage in the performance of any public work subject to the contract, unless the contractor or subcontractor is registered pursuant to that act.

Snow Plowing

Snow plowing contracts are not subject to the New Jersey Prevailing Wage Act or the Public Works Contractor Registration Act.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Air Conditioning & Refrigeration - Service and Repair

PREVAILING WAGE RATE

	05/10/19
Journeyman (Mechanic)	W39.08 B24.87 T63.95

Craft: Air Conditioning & Refrigeration - Service and Repair

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	Mo. 1-3	Mo. 4-12	2nd Year	3rd Year	4th Year	5th Year		Wage = %	of Jnymn	Wage
As Shown										
Wage and Bene	50%	55%	60%	65%	75%	85%		Bene = %	of Jnymn	Bene

Ratio of Apprentices to Journeymen - 1:4

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES ENTERING PROGRAM AFTER 3-1-13:

INTERVAL	PERIOD AND RATES							
As Shown	1st Year	2nd Year	3rd Year	4th Year	5th Year		Wage =% of Jnymn Wage	
Wage and Benefit	40%	50%	60%	70%	80%		Bene. =% of Jnymn Bene	

Craft: Air Conditioning & Refrigeration - Service and Repair

COMMENTS/NOTES

THESE RATES MAY BE USED FOR THE FOLLOWING:

- Service/Repair/Maintenance Work to EXISTING facilities.
- Replacement or Installation of air conditioning and refrigeration equipment when the combined tonnage does not exceed 15 tons for refrigeration, or 25 tons for air conditioning.
- Replacement or Installation of "packaged" or "unitary" rooftop-type units when the combined tonnage of the units does not exceed 75 tons.

NOTE: These rates may NOT be used for any work in new construction (including work on new additions).

The regular workday shall consist of 8 hours, starting between 6:00 AM and 10:00 AM, Monday through Friday.

SHIFT DIFFERENTIALS:

- The second and third shifts shall be paid an additional 15% of the hourly rate.
- All shifts must run for a minimum of 5 consecutive days.

OVERTIME:

Hours worked in excess of 8 per day or before or after the regular workday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Boilermaker PREVAILING WAGE RATE

	01/01/19
Foreman	W49.72 B44.34 T94.06
General Foreman	W51.72 B45.34 T97.06
Journeyman	W44.72 B42.70 T87.42

Craft: Boilermaker APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	65%	70%	75%	80%	85%	90%	95%			
Benefit =	36.36	37.26	38.18	39.07	39.39	40.89	41.79			

Ratio of Apprentices to Journeymen - *

* 1 apprentice will be allowed for the first 5 journeymen, 1 apprentice for the next 10 journeymen and 1 apprentice for each succeeding 20 journeymen up to a maximum of 5 apprentices per contractor on any one job.

Craft: Boilermaker COMMENTS/NOTES

HIGH WORK: All apprentices working on the erection, repair, or dismantling of smoke stacks, standpipes, or water towers shall be paid the Journeyman rate.

The regular workday shall consist of 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall work 7½ hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 10%.
- The third shift shall work 7 hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 20%.
- For "Municipal Water Works" projects only, the following shall apply: Two, four day, 10 hour shifts may be worked at straight time Monday through Thursday. The day shift shall work four days, at 10 hours, for 10 hours pay. The second shift shall work four days, at nine and a half hours, for 10 hours pay, plus 10% the hourly rate for new work and .25 cents on repair work. Friday may be used as a make-up day at straight time, due to weather conditions, holiday or any other circumstances beyond the employer's control.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.
- If any other craft employed by the same contractor, or a subcontractor thereof, receives double time in lieu of time and one-half, then the Boilermaker shall receive double time in lieu of time and one-half.
- For "Municipal Water Works" projects only, the following shall apply: Four 10 hour days may be worked Monday through Thursday at straight time. Friday may be used as a make-up day for a day lost to inclement weather, holiday or other conditions beyond the control of the employer. Overtime shall be paid for any hours that exceed 10 hours per day or 40 hours per week.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Boilermaker - Minor Repairs

PREVAILING WAGE RATE

	01/01/19
Foreman	W32.80 B16.37 T49.17
General Foreman	W33.30 B16.37 T49.67
Mechanic	W31.30 B16.37 T47.67

Craft: Boilermaker - Minor Repairs

COMMENTS/NOTES

NOTE: These rates apply to MINOR REPAIR WORK ONLY (repair work in the field for which the contract amount does not exceed \$125,000.00).

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Bricklayer, Stone Mason

PREVAILING WAGE RATE

	05/01/19
Deputy Foreman	W46.20 B33.03 T79.23
Foreman	W49.20 B33.03 T82.23
Journeyman	W43.20 B33.03 T76.23

Craft: Bricklayer, Stone Mason

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	50%	55%	60%	65%	70%	75%	80%		
6 Months										
Benefits	3.86	4.83	5.31	5.80	21.83	23.27	24.72	26.15		

Ratio of Apprentices to Journeymen - 1:5

Craft: Bricklayer, Stone Mason

COMMENTS/NOTES

The regular workday shall consist of 8 hours, between 6:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the first, or day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 10%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When an irregular shift must be established, this shift shall receive the regular rate plus 10%, inclusive of benefits.

OVERTIME:

- The first 2 hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. The first 10 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday may be used as a make-up day for hours lost to inclement weather.
- When Bricklayers/Stone Masons work on Saturday with Laborers, and no other crafts are working on the project for the day, benefits may be paid at straight time. If other crafts are present, the applicable overtime rate for benefits shall be paid.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Carpenter PREVAILING WAGE RATE

	05/10/19	05/01/20
Foreman	W58.00 B33.64 T91.64	W60.27 B34.98 T95.25
Journeyman	W50.43 B29.33 T79.76	W51.36 B29.90 T81.26

Craft: Carpenter APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	57% of	Appren	tice	Wage	for all	intervals	+ \$0.59			

Ratio of Apprentices to Journeymen - 1:3

Craft: Carpenter COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 5-1-20:

INTERVAL PERIOD AND RATES
 Yearly 40% 55% 65% 80% 90%
 Benefit 57% of apprentice wage rate for all intervals + \$0.63

FOREMAN REQUIREMENTS:

- When there are 2 or more Carpenters on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Carpenters on a job, 2 shall be designated as Foremen.

The regular workday shall consist of 8 hours, starting between 7:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.

OVERTIME:

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Carpenter - Resilient Flooring

PREVAILING WAGE RATE

	05/10/19
Foreman	W58.00 B33.55 T91.55
Journeyman	W50.43 B29.24 T79.67

Craft: Carpenter - Resilient Flooring

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	57%	of	Appren	tice	Wage	for all	intervals	+ \$0.49		
					Rate					

Ratio of Apprentices to Journeymen - *

* 1 apprentice shall be allowed to every 2 journeymen or major fraction thereof. No more than 3 apprentices on any one job or project.

Craft: Carpenter - Resilient Flooring

COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- On any job where there are 4 or more Carpenters of Resilient Flooring, 1 must be designated a Foreman.

FOR SYNTHETIC TURF INSTALLATION ONLY:

- The rate shall be 90% of the wage and benefit rate.

The regular workday consists of 8 hours, starting between 6:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular wage rate plus 15%.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular wage rate, the second shift shall receive the regular wage rate plus 15% and the third shift shall receive the regular wage rate plus 20%.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular wage rate plus 15% and the third shift shall receive the regular wage rate plus 20%.

OVERTIME:

- Hours in excess of 8 per day or 40 per week, or before or after the regular workday, Monday through Friday, shall be paid at time and one-half the wage rate. Saturday may be used as a make-up day, at straight time, up to 8 hours, for hours lost to reasons beyond the control of the employer, up to a total of 40 hours per week; hours in excess of 8 on Saturday shall then be paid at time and one-half the wage rate. If Saturday is not a make-up day, all hours on Saturday shall be paid at time and one-half the wage rate. All hours on Sundays and holidays shall be paid at double the wage rate.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for hours lost to reasons beyond the control of the employer. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the wage rate.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Cement Mason

PREVAILING WAGE RATE

See "Bricklayer, Stone Mason" Rates

Craft: Cement Mason

COMMENTS/NOTES

See " Bricklayer, Stone Mason" Rates

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT

PREVAILING WAGE RATE DETERMINATION

County - MERCER

Craft: Diver PREVAILING WAGE RATE

	06/18/19	05/01/20
Diver	W59.74	W0.00
	B47.47	B0.00
	T107.21	T108.71
Tender	W48.00	W0.00
	B47.47	B0.00
	T95.47	T96.97

Craft: Diver COMMENTS/NOTES

NOTE: All dive crews must consist of a Tender, a Diver, and a standby Diver (standby Diver is the same rate as a Diver).

DEPTH & PENETRATION RATES: Divers shall be paid the following depth and penetration rates, in addition to the regular hourly rate, when applicable:

AIR DIVES:

0-59 feet: No additional wage
 60-74 feet: + \$0.25 per foot
 75-125 feet: + \$0.78 per foot

MIXED GAS DIVES:

0-74 feet: No additional wage
 75-125 feet: + \$1.00 per foot
 126-200 feet: + \$2.00 per foot

PENETRATION DIVES:

126-200 feet: + \$1.50 per foot
 201-275 feet: + \$1.75 per foot
 276-350 feet: + \$2.00 per foot
 351-425 feet: + \$2.50 per foot

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Veterans' Day may be switched with the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Dockbuilder PREVAILING WAGE RATE

	06/18/19	05/01/20
Foreman	W55.20 B47.47 T102.67	W0.00 B0.00 T104.17
Foreman (Concrete Form Work)	W54.40 B34.36 T88.76	W0.00 B0.00 T90.26
Journeyman	W48.00 B47.47 T95.47	W0.00 B0.00 T96.97
Journeyman (Concrete Form Work)	W47.30 B34.36 T81.66	W0.00 B0.00 T83.16

Craft: Dockbuilder APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	19.20	24.00	31.20	38.40						
Benefit	31.56	for all	intervals							

Ratio of Apprentices to Journeymen - *

* When there are 4 or fewer Dockbuilders on a job, no more than 1 may be an apprentice. When there are 5 or more Dockbuilders, there may be 1 apprentice for every 5 Dockbuilders.

Craft: Dockbuilder COMMENTS/NOTES

APPRENTICE RATE SCHEDULE FOR CONCRETE FORM WORK ONLY:

INTERVAL	PERIOD AND RATES			
Yearly	18.92	23.65	30.75	37.84
Benefits	23.60 for all intervals			

CREOSOTE HANDLING:

When handling creosote products on land piling, floating marine construction, and construction of wharves, the worker shall receive an additional \$0.25 per hour.

HAZARDOUS WASTE WORK:

- Hazardous waste removal work on a state or federally designated hazardous waste site where Level A, B, or C personal protection is required: an additional 20% of the hourly rate, per hour.
- Hazardous waste removal work in Level D, or where personal protection is not required: an additional \$1.00 per hour.

CERTIFIED WELDER: When required on the job by the project owner, a Certified Welder shall receive an additional \$1.00 per hour.

FOREMAN REQUIREMENTS:

The first Dockbuilder on the job shall be designated a Foreman.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Veterans' Day may be switched with the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Drywall Finisher

PREVAILING WAGE RATE

	11/01/18
Foreman	W43.95 B24.40 T68.35
General Foreman	W45.94 B24.40 T70.34
Journeyman	W39.95 B24.40 T64.35

Craft: Drywall Finisher

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	50%		60%	70%		80%	90%		
6 Months										
Benefits	Intervals	1 to 2 =	10.65	Intervals	3 to 4 =	13.17	Intervals	5 to 6 =	16.25	

Ratio of Apprentices to Journeymen - 1:4

Craft: Drywall Finisher

COMMENTS/NOTES

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.
- Shift work must run for a minimum of 5 consecutive workdays.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician

PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Asst. General Foreman	W59.00 B37.42 T96.42	W0.00 B0.00 T98.42	W0.00 B0.00 T100.42
Crane Operator, High Voltage Splicer, Welder	W53.83 B34.19 T88.02	W0.00 B0.00 T90.02	W0.00 B0.00 T92.02
Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
General Foreman	W64.10 B40.60 T104.70	W0.00 B0.00 T106.70	W0.00 B0.00 T108.70
Journeyman	W51.27 B32.59 T83.86	W0.00 B0.00 T85.86	W0.00 B0.00 T87.86

Craft: Electrician

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	15.06	17.57	20.08	25.10	35.14					
Benefits	62.48% of	Apprentic	Wage	Rate	+ \$0.31					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES				
Yearly	15.38	17.94	20.51	25.64	35.89
Benefits	62.48% of Apprentice Wage Rate + \$0.56				

FOREMAN REQUIREMENTS:

- When there are 2 or more electricians on the job, 1 shall be designated a Foreman.
- 1 additional Foreman shall be designated for every 10 additional electricians.
- When there are 2 or more Foremen on the job, 1 shall be designated a General Foreman.

The regular workday is 8 hours between 7:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.
- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate,

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

- The first 4 hours in excess of 8 per day, and hours before or after the regular workday that are not shift work, Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, Monday through Friday, in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

- Four 10-hour days may be worked at straight time, Monday through Thursday or Tuesday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician - Teledata (15 Instruments and Less)

PREVAILING WAGE RATE

	01/01/19
Assistant General Foreman	W49.19 B31.29 T80.48
Foreman	W44.86 B28.58 T73.44
General Foreman	W51.16 B32.52 T83.68
Journeyman Technician	W39.35 B25.14 T64.49
Lead Foreman	W46.83 B29.81 T76.64
Working Foreman	W42.89 B27.35 T70.24

Craft: Electrician - Teledata (15 Instruments and Less)

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	19.28	22.82	28.73	33.84						
Benefits	62.48% of	Apprentic	Wage	Rate	+ \$0.56					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician - Teledata (15 Instruments and Less)

COMMENTS/NOTES

NOTE: These rates are for service, maintenance, moves and/or changes affecting 15 instruments or less. These rates may NOT be used for any new construction or any fiber optic work.

FOREMAN REQUIREMENTS:

- 1 to 10 workers- 1 Working Foreman
- 11 to 20 workers- 1 Working Foreman and 1 Foreman
- 21 to 30 workers- 1 Working Foreman, 1 Foreman and 1 Lead Foreman
- 31 to 40 workers- 1 Working Foreman, 2 Foremen and 1 General Foreman
- 41 to 50 workers- 1 Working Foreman, 4 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 51 to 60 workers- 1 Working Foreman, 5 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 61 to 70 workers- 1 Working Foreman, 6 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 71 to 80 workers- 1 Working Foreman, 7 Foremen, 2 Assistant General Foremen and 1 General Foreman
- 81 to 90 workers- 1 Working Foreman, 8 Foremen, 2 Assistant General Foremen and 1 General Foreman

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

91 to 100 workers- 1 Working Foreman, 9 Foremen, 2 Assistant General Foremen and 1 General Foreman.

HEIGHT WORK (40 feet above ground or floor):

Workers shall be paid an additional 10% of the regular rate, inclusive of benefits.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.

- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate, per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician - Teledata (16 Instruments & More)

PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Assistant General Foreman	W59.00 B37.42 T96.42	W0.00 B0.00 T98.42	W0.00 B0.00 T100.42
Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
General Foreman	W64.10 B40.60 T104.70	W0.00 B0.00 T106.70	W0.00 B0.00 T108.70
Journeyman Technician	W51.27 B32.59 T83.86	W0.00 B0.00 T85.86	W0.00 B0.00 T87.86
Lead Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
Working Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19

Craft: Electrician - Teledata (16 Instruments & More)

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	15.06	17.57	20.08	25.10	35.14					
Benefits	62.48% of	Apprentic	Wage	Rate	+\$0.31					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician - Teledata (16 Instruments & More)

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL PERIOD AND RATES
 Yearly 15.38 17.94 20.51 25.64 35.89
 Benefits 62.48% of Apprentice Wage Rate + \$0.56

NOTES:

1) These rates are for service, maintenance, moves and/or changes affecting 16 or more instruments, and fiber optic work. These rates may NOT be used for any new construction.

2) The number of electricians on the jobsite is the determining factor for which Foreman Category applies.

FOREMAN REQUIREMENTS:

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

1 to 10 workers- 1 Working Foreman
11 to 20 workers- 1 Working Foreman and 1 Foreman
21 to 30 workers- 1 Working Foreman, 1 Foreman and 1 Lead Foreman
31 to 40 workers- 1 Working Foreman, 2 Foremen and 1 General Foreman
41 to 50 workers- 1 Working Foreman, 4 Foremen, 1 Assistant General Foreman and 1 General Foreman
51 to 60 workers- 1 Working Foreman, 5 Foremen, 1 Assistant General Foreman and 1 General Foreman
61 to 70 workers- 1 Working Foreman, 6 Foremen, 1 Assistant General Foreman and 1 General Foreman
71 to 80 workers- 1 Working Foreman, 7 Foremen, 2 Assistant General Foremen and 1 General Foreman
81 to 90 workers- 1 Working Foreman, 8 Foremen, 2 Assistant General Foremen and 1 General Foreman
91 to 100 workers- 1 Working Foreman, 9 Foremen, 2 Assistant General Foremen and 1 General Foreman.

HEIGHT WORK (40 feet above ground or floor):

Workers shall be paid an additional 10% of the regular rate, inclusive of benefits.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.

- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate, per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician- Outside Commercial

PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Assistant General Foreman	W59.00 B37.09 T96.09	W0.00 B0.00 T98.09	W0.00 B0.00 T100.09
Crane Operator, High Voltage Splicer, Welder	W53.83 B33.89 T87.72	W0.00 B0.00 T89.72	W0.00 B0.00 T91.72
Foreman	W56.40 B35.48 T91.88	W0.00 B0.00 T93.88	W0.00 B0.00 T95.88
General Foreman	W64.10 B40.25 T104.35	W0.00 B0.00 T106.35	W0.00 B0.00 T108.35
Groundman, Truck & Winch Operator- Level I	W15.38 B10.08 T25.46	W0.00 B0.00 T27.46	W0.00 B0.00 T29.46
Groundman, Truck & Winch Operator- Level II	W20.51 B13.26 T33.77	W0.00 B0.00 T35.77	W0.00 B0.00 T37.77
Groundman, Truck & Winch Operator- Level III	W25.64 B16.43 T42.07	W0.00 B0.00 T44.07	W0.00 B0.00 T46.07
Groundman, Truck & Winch Operator- Level IV	W33.33 B21.20 T54.53	W0.00 B0.00 T56.33	W0.00 B0.00 T58.33
Groundman, Truck & Winch Operator- Level V	W41.02 B25.96 T66.98	W0.00 B0.00 T68.98	W0.00 B0.00 T70.98
Heavy Equipment Operator	W51.27 B32.31 T83.58	W0.00 B0.00 T85.58	W0.00 B0.00 T87.58
Journeyman Lineman	W51.27 B32.31 T83.58	W0.00 B0.00 T85.58	W0.00 B0.00 T87.58

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician- Outside Commercial

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	30.12	32.63	35.14	37.65	40.16	42.67	45.18			
Benefits	61.93% of	Apprentic	Wage	Rate	+ \$0.31					

Craft: Electrician- Outside Commercial

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES									
6 Months	30.76	33.33	35.89	38.45	40.02	43.58	46.14			
Benefits	61.93% of Apprentice Wage Rate + \$0.56									

* FOR UTILITY WORK PLEASE SEE STATEWIDE RATES

The regular workday is 8 hours between 7:00 AM and 4:30 pm.

SHIFT DIFFERENTIALS:

2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the regular rate, inclusive of benefits.

3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the regular rate per hour, inclusive benefits.

FOREMAN REQUIREMENTS:

When there are 2 or more electricians on the job, 1 shall be designated a Foreman.
 1 additional Foreman shall be designated for every 10 additional electricians.
 When there are 2 or more Foremen on the job, 1 shall be designated a General Foreman.
 An Assistant General Foreman shall be designated for every 50 electricians working on the job.

OVERTIME:

The first 4 hours in excess of 8 per day, and hours before or after the regular workday that are not shift work, Monday through Friday, and the first 8 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits.

Four 10-hour days may be worked at straight time, Monday through Thursday or Tuesday through Friday.

RECOGNIZED HOLIDAYS:

New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day and Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician-Utility Work (North)

PREVAILING WAGE RATE

Rates are located in the "Statewide" rate package

Craft: Electrician-Utility Work (North)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
* 6 Months	60%	65%	70%	75%	80%	85%	90%			
Benefits	67% of	Appren	tice	Wage	Rate	for all	intervals			

Craft: Electrician-Utility Work (North)

COMMENTS/NOTES

Electrician-Utility Work (North) rates are located in the "Statewide" rate package.

* The apprentice wage rate is paid at the percentage of the Journeyman Lineman wage rate located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician-Utility Work (South)

PREVAILING WAGE RATE

Rates are located in the "Statewide" rate package

Craft: Electrician-Utility Work (South)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	28.53	30.91	33.29	35.66	38.04	40.42	42.80			
Benefits	25.01	26.41	27.83	29.24	30.65	32.05	33.47			

Craft: Electrician-Utility Work (South)

COMMENTS/NOTES

Electrician-Utility Work (South) rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Elevator Constructor

PREVAILING WAGE RATE

	01/01/19
Helper-Over 5 Years	W40.28 B37.34 T77.62
Helper-Under 5 Years	W40.28 B36.53 T76.81
Mechanic (Journeyman) over 5 years	W57.55 B38.72 T96.27
Mechanic (Journeyman) under 5 years	W57.55 B37.57 T95.12
Mechanic in Charge (Foreman) over 5 years	W64.74 B39.29 T104.03
Mechanic in Charge (Foreman) under 5 years	W64.74 B38.00 T102.74
Probationary Helper (1st 6 months)	W28.78 B35.84 T64.62

Craft: Elevator Constructor

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	55%	65%	70%	80%						
Benefits	full	journeyma	benefit	rate for	all	intervals				

Ratio of Apprentices to Journeymen - *

* Total number of helpers and apprentices shall not exceed the number of mechanics on the job , except where 2 teams are working, 1 additional helper or apprentice may be employed for first 2 teams and an extra helper or apprentice for each additional 3 teams. Further, the employer may use as many helpers or apprentices as needed, under the direction of a mechanic in wrecking old plants,handling and hoisting material, and on foundation work. When replacing cables on existing elevators, employer may use 2 helpers or apprentices to 1 mechanic.

Craft: Elevator Constructor

COMMENTS/NOTES

SHIFT DIFFERENTIALS:

- 2nd Shift (4:30 PM to 12:30 AM) shall be established on the basis of 7.5 hours of work for 8 hours of pay, plus an additional 10% per hour.
- 3rd Shift (12:30 AM to 8:00 AM) shall be established on the basis of 7 hours of work for 8 hours of pay, plus an additional 15% per hour.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday to Thursday or Tuesday to Friday, at straight time. When working a 4-10 hour day schedule, all hours worked on a day other than the days established for the 4-10 hour schedule shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and day after, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Glazier PREVAILING WAGE RATE

	05/01/19
* Leadman	W49.11 B25.06 T74.17
Foreman	W52.81 B23.62 T76.43
General Foreman	W54.81 B23.75 T78.56
Journeyman	W48.81 B23.36 T72.17

Craft: Glazier APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
6 Months	50%	55%		60%	65%		70%	75%		
Benefits	Intervals	1 to 2 =	9.11	Intervals	3 to 4 =	11.71	Intervals	5 to 6 =	13.20	

Ratio of Apprentices to Journeymen - 1:4

Craft: Glazier COMMENTS/NOTES

Hazard/Height Pay: +\$1.00 per hour

* When there are three (3) men working on a jobsite for three (3) days or longer, 1 Journeyman may be designated as a Leadman for the duration of the job, provided he has his OSHA certification.

FOREMAN REQUIREMENTS:

- When there are 4 or more Glaziers on a job, 1 must be designated a Foreman.
- When there are 15 or more Glaziers on a job, 1 must be designated a General Foreman.

The regular workday shall consist of 8 hours, between 7:00 AM and 5:30 PM, Monday to Friday.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Heat & Frost Insulator **PREVAILING WAGE RATE**

	07/08/19	07/01/20
Foreman	W47.62	W0.00
	B36.13	B0.00
	T83.75	T87.00
Journeyman	W46.12	W0.00
	B36.13	B0.00
	T82.25	T85.50

Craft: Heat & Frost Insulator **APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	Yearly	45%	55%	65%	75%	80%				
Benefit	32.88	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* Ratio = 1:4 on a "company-wide" basis (i.e. the total number of apprentices and journeymen employed by the company). There is no limit to the number of apprentices allowed on any one job, provided there is at least 1 journeyman on the job.

Craft: Heat & Frost Insulator **COMMENTS/NOTES**

FOREMAN REQUIREMENTS:

- If there is only 1 Insulator on the job, he must be designated a Foreman.
- If there are 2 to 10 Insulators on the job, 1 must be designated a Foreman.
- If there are 11 or more Insulators on the job, 1 must be designated a General Foreman and receive the following additional pay (% above Journeyman wage rate):
 - 11 - 20 Insulators on site: 10%; 21 - 30 Insulators on site: 15%;
 - 31 - 40 Insulators on site: 20%; 41 - 50 Insulators on site: 25%

The regular workday shall be 8 hours between 7:00 AM and 3:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of two (2) consecutive days and a minimum of two (2) shifts per day must be worked. Additionally, no less than two (2) employees may work on any one (1) shift. If these requirements are not met then shift work would not apply and the applicable overtime rate shall be paid.
- 1st Shift- Monday through Friday (7:00 AM- 3:00 PM).
- 2nd Shift- Monday through Friday (3:00 PM -11:00 PM): additional 15% of the regular rate, inclusive of benefits.
- 3rd Shift- Monday through Friday (11:00 PM -7:00 AM): additional 20% of the regular rate, inclusive of benefits.
- When a single night shift is established by the project owner for work not accessible during the day (due to the building being occupied), Monday through Friday, work performed during a second shift (3:00 PM-11:00 PM) shall be paid an additional 20% of the regular rate, inclusive of benefits, and work performed during a third shift (11:00 PM-7:00 AM) shall be paid an additional 25% of the regular rate, inclusive of benefits.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, that are not shift work, and all hours on Saturday, shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Heat & Frost Insulator - Asbestos Worker

PREVAILING WAGE RATE

	07/08/19	07/01/20
Foreman	W47.62	W0.00
	B36.13	B0.00
	T83.75	T87.00
Journeyman	W46.12	W0.00
	B36.13	B0.00
	T82.25	T85.50

Craft: Heat & Frost Insulator - Asbestos Worker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	Heat &	Frost	Insulator						

Craft: Heat & Frost Insulator - Asbestos Worker

COMMENTS/NOTES

NOTE: These rates apply only to the REMOVAL of insulation materials/asbestos from mechanical systems, including containment erection and demolition, and placing material in appropriate containers.

FOREMAN REQUIREMENTS:

- If there is only 1 Asbestos Worker on the job, he must be designated an Abatement Foreman.
- If there are 2 to 10 Asbestos Workers on the job, 1 must be designated an Abatement Foreman.
- If there are 11 or more Asbestos Workers on the job, 1 must be designated a General Foreman and receive the following additional pay (% above Abatement Mechanic wage rate):
 - 11 - 20 Insulators on site: 10%; 21 - 30 Insulators on site: 15%;
 - 31 - 40 Insulators on site: 20%; 41 - 50 Insulators on site: 25%

MECHANIC-TO-APPRENTICE RATIO:

- Maximum of 5 Apprentices for each Abatement Mechanic on the job.

OVERTIME:

- Hours in excess of 8 per day, and all hours on Saturday, shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Ironworker

PREVAILING WAGE RATE

	07/01/19
Foreman-Fence and Guardrail	W53.54 B30.79 T84.33
Foreman-Rod/Mesh	W54.62 B30.79 T85.41
Foreman-Structural	W55.70 B30.79 T86.49
Journeyman-Fence and Guardrail	W49.57 B30.79 T80.36
Journeyman-Rod/Mesh	W50.57 B30.79 T81.36
Journeyman-Structural	W51.57 B30.79 T82.36

Craft: Ironworker

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	60%	75%	85%							

Ratio of Apprentices to Journeymen - *

* On all work EXCEPT Ornamental Iron and Bridge Cable Spinning Work 1:4; On Ornamental Iron and Bridge Cable Spinning Work 1:1.

Craft: Ironworker

COMMENTS/NOTES

Note: For work on hazardous waste sites, workers shall receive an additional \$3.00 per hour.

The regular workday shall consist of 8 hours between 7:00 AM and 5:00 PM.

SHIFT DIFFERENTIALS:

- Second shift shall receive an additional 10% per hour.
- Third shift shall receive an additional 15% per hour.

OVERTIME:

- Time and one-half the wage rate for hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and for all hours on Saturdays. Double the wage rate for all hours on Sundays and holidays.
- Employees may work four 10-hour days, Monday to Thursday, at straight time. Friday may be used as a make-up day

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

for a day lost to inclement weather. If Friday is not a make-up day, all hours worked on Friday shall be paid at time and one-half the wage rate.

- Benefits on overtime hours shall be paid at the following rates:

When wages are time and one-half, benefits = \$35.06.

When wages are double, benefits = \$39.33.

RECOGNIZED HOLIDAYS: New Year's Eve, New Year's Day, Memorial Day, July 4th, Labor Day, General and Presidential Election Day, Thanksgiving Day, Christmas Eve, Christmas Day. Saturday holidays observed the preceding Friday. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer - Asbestos & Hazardous Waste Removal

PREVAILING WAGE RATE

	08/01/18
Journeyman (Handler)	W31.48 B22.31 T53.79

Craft: Laborer - Asbestos & Hazardous Waste Removal

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	18.89	22.04	25.18	28.33						
Benefit	20.66	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

Craft: Laborer - Asbestos & Hazardous Waste Removal

COMMENTS/NOTES

NOTE: These rates apply to work in connection with Asbestos, Radiation, Hazardous Waste, Lead, Chemical, Biological, Mold Remediation and Abatement.

The regular workday shall be 8 hours.

OVERTIME:

- Hours in excess of 8 per day, Monday through Saturday, and all hours on Sunday and holidays shall be paid at time and one-half the regular rate.
- Benefits on ALL overtime hours shall be paid at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Good Friday, Easter, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. (Holidays start at 12:00 am).

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

on the basis of 8 hours pay for 7 hours worked. The day shift shall receive the regular rate, the second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

- When a second or third shift is worked with no day shift, the second or third shift shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

OVERTIME:

- Hours in excess of 8 per day, or outside the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. Saturday may be used as a make-up day (paid at straight time) for a day lost to inclement weather, or for a holiday that is observed during the work week, Monday through Friday. All hours on Sundays and holidays shall be paid at double the regular rate.

- Four 10-hour days may be worked Monday to Thursday, at straight time, with Friday used a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the regular rate.

- Benefits on ALL overtime hours shall be paid at time and one-half.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer - Heavy & General

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Laborer - Heavy & General

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	60%	70%	80%	90%						
Benefit	20.28	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* No more than 1 apprentice for the first journeyman and no more than 1 apprentice for each additional 3 journeymen.

Craft: Laborer - Heavy & General

COMMENTS/NOTES

As of 3-1-19, benefits shall be \$21.03.

As of 3-1-20, benefits shall be \$21.78.

Heavy & General Laborer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer-Residential and Modular Construction

PREVAILING WAGE RATE

	05/03/19	04/01/20
* Skilled Tradesman (only applies to Modular Construction)	W26.20 B5.45 T31.65	W26.55 B5.45 T32.00
Foreman (person directing crew, regardless of his skill classification)	W30.20 B5.45 T35.65	W30.55 B5.45 T36.00
Laborer	W22.20 B5.45 T27.65	W22.55 B5.45 T28.00
Laborer (for single family and stand-alone duplex owned by single owner)	W16.70 B2.95 T19.65	W17.05 B2.95 T20.00

Craft: Laborer-Residential and Modular Construction

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
	As shown	800 hours	600 hours	600 hours						
wage & benefits	70%	80%	90%							

Ratio of Apprentices to Journeymen-

One (1) apprentice shall be allowed for the first journeyman on site and no more than one (1) additional apprentice for each additional three (3) journeymen on site.

Craft: Laborer-Residential and Modular Construction

COMMENTS/NOTES

*** SKILLED TRADESMAN-**

any worker doing work not typically done by a Building Laborer. Some examples are installing interior doors, sheet rock, hooking up appliances, installing light fixtures, installing railing systems, etc. Please note where local building codes require that certain work be performed under the supervision of a licensed tradesman (i.e. Plumber, Electrician, etc.) Laborers shall work under such supervision.

RESIDENTIAL CONSTRUCTION- All residential construction (not commercial), single-family, stand-alone duplex houses, townhouses and multi-family buildings of not more than four (4) floors. Each housing unit must be fully and independently functional; each housing unit must have its own kitchen and bathroom. The definition includes all incidental items such as site work, parking areas, utilities, streets and sidewalks. Please note the construction must be Residential in nature. A First Floor at or below grade may contain commercial space not to exceed 50% square footage of the floor; at least 50% of the First Floor must contain living accommodations or related nonresidential uses (e.g. laundry space, recreation/hobby rooms, and/or corridor space). Basement stories below grade used for storage, parking, mechanical systems/equipment, etc., are considered basement stories which are not used in determining the building's height. An attic is an unfinished space located immediately below the roof. Such space is not used in determining a building's height even if used for storage purposes. In addition, barracks and dormitories are not considered residential projects.

MODULAR RESIDENTIAL CONSTRUCTION- all aspects of modular residential construction (not commercial) at the site of installation of structures of no more than four (4) stories, including all excavation and site preparation, footings and

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

foundation systems whether poured on-site or prefabricated, all underground waterproofing, underground utilities, concrete slabs, sidewalks, driveways, paving, hardscape and landscaping. Please note the construction must be Residential as defined above. All work performed by the Set Crew (the crew of workers who set the modular boxes on the foundation), including the rigging, setting, attaching and assembly of all modules and structural members, preparation of the foundation to accept modules, such as sill plates, connection of all in-module and under-module connections including, but not limited to, plumbing, electrical, HVAC, fire suppression, CATS, telephone, television/internet, and fiber optic, the building or installation of any porches or decks regardless of material or method of construction, the on-site installation of, or completion of any roof system, doors, windows and fenestrations, including flashing, gutter and soffit systems, waterproofing, insulation and interior and exterior trim work, and painting. Please note that modular construction does not include on-site stick built construction, tip up construction or panel built construction.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

OVERTIME:

Hours worked in excess of 8 per day/40 per week, Monday through Saturday, and all hours worked on Sunday and holidays shall be paid at time and one-half the hourly rate.

RECOGNIZED HOILDAYS:

New Year's Day, Martin Luther King Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Millwright PREVAILING WAGE RATE

	05/01/19
Foreman	W58.26 B34.39 T92.65
Journeyman	W50.66 B29.99 T80.65

Craft: Millwright APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%
Benefits	58% of	Appren	tice	Wage	Rate	for all	intervals	+ \$.60		

Ratio of Apprentices to Journeymen - 1:3

Craft: Millwright COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- When there are 2 or more Millwrights on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Millwrights on a job, 2 shall be designated as Foremen.

The regular workday shall consist of 8 hours, starting between 7:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.

OVERTIME:

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Operating Engineer PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Operating Engineer APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	60%	70%	80%	90%						

Ratio of Apprentices to Journeymen - *

* 1 apprentice for each piece of heavy equipment. At least 10 pieces of heavy equipment or a minimum of 5 Operating Engineers must be on site.

Craft: Operating Engineer COMMENTS/NOTES

Operating Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Operating Engineer - Field Engineer

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Operating Engineer - Field Engineer

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	70%	75%	of Rod/	Chainman	Wage					
Yearly			80%	90%	Transit/	Instrument	man	Wage		

Ratio of Apprentices to Journeymen - *

* No more than 1 Field Engineer Apprentice per Survey Crew.

Craft: Operating Engineer - Field Engineer

COMMENTS/NOTES

Operating Engineer - Field Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter - Bridges

PREVAILING WAGE RATE

	05/03/19
Foreman	W59.81 B28.74 T88.55
General Foreman	W61.81 B28.74 T90.55
Journeyman	W54.81 B28.74 T83.55

Craft: Painter - Bridges

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	50%			60%	70%		80%	90%	
6 Months										
Benefits	Intervals	1 to 2 =	10.00	Intervals	3 to 4 =	12.27	Intervals	5 to 6 =	15.28	

Ratio of Apprentices to Journeymen - 1:4

Craft: Painter - Bridges

COMMENTS/NOTES

These rates apply to: All bridges that span waterways, roadways, railways and canyons. All tunnels, overpasses, viaducts and all appurtenances.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter - Line Striping

PREVAILING WAGE RATE

	05/03/19
Apprentice (1st year)	W26.44 B11.65 T38.09
Apprentice (2nd year)	W30.44 B19.16 T49.60
Foreman (Charge Person)	W39.09 B19.94 T59.03
Journeyman 1 (at least 1 year of working exp. as a journeyman)	W34.32 B19.94 T54.26
Journeyman 2 (at least 2 years of working exp. as a journeyman)	W38.09 B19.94 T58.03

Craft: Painter - Line Striping

COMMENTS/NOTES

OVERTIME:

Hours in excess of 8 per day, Monday through Saturday, and all hours on Sundays and holidays shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day. Veterans Day may be substituted for the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter - New Construction

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W45.45 B24.35 T69.80	W47.45 B24.35 T71.80
General Foreman	W49.43 B24.67 T74.10	W51.43 B24.67 T76.10
Journeyman	W41.47 B24.04 T65.51	W43.47 B24.04 T67.51

Craft: Painter - New Construction

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	45%	55%	65%	70%	75%	80%	80%		
6 Months										
Benefits	8.05	8.05	10.05	10.05	11.05	11.05	14.05	14.05		

Ratio of Apprentices to Journeymen - 1:4

Craft: Painter - New Construction

COMMENTS/NOTES

Spraying, sandblasting, lead abatement, work on tanks or stacks, work performed above 3 stories or 30 feet in height, or using swing scaffolds requires an additional 10% of the wage rate.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

County - MERCER

Craft: Painter- Containment

PREVAILING WAGE RATE

	05/04/17
Journeyman	W35.18 B24.75 T59.93

Craft: Painter- Containment

COMMENTS/NOTES

NOTE: These rates shall require no painting, but used in a supporting capacity only, such as wrapping, boxing, fencing, etc. on tanks.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate..

- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter-Elevated Water Tanks

PREVAILING WAGE RATE

	05/04/17
Foreman	W48.92 B24.92 T73.84
General Foreman	W50.92 B24.92 T75.84
Journeyman	W43.92 B24.92 T68.84

Craft: Painter-Elevated Water Tanks

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	BRIDGES							

Craft: Painter-Elevated Water Tanks

COMMENTS/NOTES

These rates apply to: All new and repaint elevated water tanks (interior and exterior).

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter-Structural Steel

PREVAILING WAGE RATE

	05/04/17
Foreman	W47.87 B25.27 T73.14
General Foreman	W49.87 B25.27 T75.14
Journeyman	W42.87 B25.27 T68.14

Craft: Painter-Structural Steel

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	BRIDGES							

Craft: Painter-Structural Steel

COMMENTS/NOTES

These rates apply to: All work in power plants (any aspect). On steeples, on dams, on hangers, transformers, substations, etc. and on open steel, whether new or repaint. All new work (excluding traditional commercial painting work) in refineries, tank farms, water/sewerage treatment facilities and on pipelines.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Paperhanger - New Construction

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W46.75 B24.11 T70.86	W47.68 B24.11 T71.79
Journeyman	W41.68 B24.11 T65.79	W42.61 B24.11 T66.72

Craft: Paperhanger - New Construction

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	NEW	CONSTR	TION					
				UC						

Ratio of Apprentices to Journeymen - 1:4

Craft: Paperhanger - New Construction

COMMENTS/NOTES

FOREMEN REQUIREMENTS:

- When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Paperhanger - Renovation

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W34.13 B19.81 T53.94	W35.15 B19.81 T54.96
Journeyman	W31.03 B19.81 T50.84	W31.96 B19.81 T51.77

Craft: Paperhanger - Renovation

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
		SEE	PAINTER	NEW	CONSTR	TION				
					UC					

Ratio of Apprentices to Journeymen - 1:4

Craft: Paperhanger - Renovation

COMMENTS/NOTES

NOTE: These rates may only be used on jobs where no major alterations occur, and where not more than 3 other trades are present on the job, but may NOT, under any circumstances, be used for work on bridges, stacks, elevated tanks, or generating stations.

FOREMEN REQUIREMENTS:

- When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

OVERTIME:

- Hours in excess of 8 per day and 40 per week shall be paid at time and one-half the regular rate.

- Four 10-hour days may be worked, at straight time, Monday through Sunday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Pipefitter

PREVAILING WAGE RATE

Craft: Pipefitter

COMMENTS/NOTES

See PLUMBERS Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Plasterer

PREVAILING WAGE RATE

See "Cement Mason" Rates

Craft: Plasterer

COMMENTS/NOTES

See CEMENT MASON Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Plumber PREVAILING WAGE RATE

	07/02/19
Assistant General Foreman	W54.71 B39.65 T94.36
Foreman	W54.21 B39.65 T93.86
General Foreman	W57.22 B39.65 T96.87
Journeyman	W50.19 B39.65 T89.84

Craft: Plumber APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	35%	45%	55%	65%	75%					
Benefits	24.84	27.11	29.41	31.68	33.96					

Ratio of Apprentices to Journeymen - 1:4

Craft: Plumber COMMENTS/NOTES

The regular workday shall consist of 8 hours between 6:00 AM and 4:30 PM.

FOREMAN REQUIREMENTS (number of Plumbers on site):

- (1 to 8)- 1 Foreman
- (9 to 16)- 1 Foreman and 1 Assistant General Foreman
- (17 to 40)- 1 Foreman for every (1 to 8 Plumbers) and 1 Assistant General Foreman every (1 to 5 gangs). One note, a "gang" is a group of 8 men.
- (41 and more)- 1 Foreman for every (1 to 8 Plumbers), 1 Assistant General Foreman every (1 to 5 gangs) and 1 General Foreman. One note, for every additional Assistant General Foreman over five designated, the General Foreman shall receive an additional 10 cents per hour.

SHIFT DIFFERENTIALS:

- The second shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the hourly rate plus 25%, inclusive of benefits.
- When a third shift is worked, the third shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the hourly rate plus 30%, inclusive of benefits.
- A second shift may be established without a first shift, provided the second shift starts at 1:00 PM or later.

OVERTIME:

- Hours in excess of 8 per day, or before of after the regular workday, Monday through Friday, that are not shift work, and the first 10 hours on Saturdays, shall be paid at time and one-half, inclusive of benefits. Hours in excess of 10 on

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Saturdays, and all hours on Sundays and holidays, shall be paid at double time, inclusive of benefits.

- Four 10-hour days may be worked, Mon to Thurs, at straight time, with Friday used as a make-up day for a day lost due to inclement weather. If Fri. is not a make-up day, the first 10 hours shall be paid at time and one-half, and hours in excess of 10 at double time, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Roofer PREVAILING WAGE RATE

	07/01/19
Foreman (5 workers or less)	W40.35 B31.80 T72.15
Foreman (6 workers or more)	W40.85 B31.80 T72.65
Journeyman	W38.35 B31.80 T70.15

Craft: Roofer APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	52%	55%	60%	75%						
Benefits	22.32	25.07	31.80	31.80						

Ratio of Apprentices to Journeymen - *

* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

Craft: Roofer COMMENTS/NOTES

NOTE: Mopper, Operator of Felt Laying Machine or Slag Dispenser shall receive an additional \$.50 per hour.

FOREMAN REQUIREMENTS:

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

The regular workday is 8 hours between 5:00 AM and 4:30 PM.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Roofer - Shingle, Slate & Tile

PREVAILING WAGE RATE

	07/01/19
Foreman (3 workers or less)	W28.75 B20.87 T49.62
Foreman (4 workers or more)	W29.50 B20.87 T50.37
Helper	W14.25 B20.87 T35.12
Journeyman (shingle work)	W28.50 B20.87 T49.37

Craft: Roofer - Shingle, Slate & Tile

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	60%	70%	80%							

Ratio of Apprentices to Journeymen - *

* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

Craft: Roofer - Shingle, Slate & Tile

COMMENTS/NOTES

NOTE: Above rates are for Shingle work only. Slate and Tile work rates are an additional \$3.00 per hour.

HELPER RATIO: 1 Helper to 1 Journeyman

FOREMAN REQUIREMENTS:

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Sheet Metal Sign Installation

PREVAILING WAGE RATE

	07/17/19
Foreman	W29.50 B23.01 T52.51
Journeyman	W27.50 B23.01 T50.51

Craft: Sheet Metal Sign Installation

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	40%	45%	50%	55%	60%	65%	70%	75%	80%	90%
Benefits	22.53	22.57	22.61	22.65	22.69	22.73	22.77	22.81	22.85	22.96

Ratio of Apprentices to Journeymen - 1:2

Craft: Sheet Metal Sign Installation

COMMENTS/NOTES

HAZARDOUS DUTY:

Sign Installers working from a bosun's chair or outside swinging scaffold at a height of 60 feet or more: + \$5.00 per hour.

FOREMAN REQUIREMENTS:

When there are 3 or more Sign Installers on a job, one must be designated a Foreman.

The regular workday shall be 8 hours, between 8:00 AM and 5:00 PM.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at time and one-half the regular rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

hours on Saturday, shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Benefits on overtime hours are as follows:

Time and one-half = \$48.17.

Double-time = \$55.19.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Sprinkler Fitter PREVAILING WAGE RATE

	08/13/19
Foreman	W60.70 B28.32 T89.02
Journeyman	W57.20 B28.32 T85.52

Craft: Sprinkler Fitter APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	17.16	17.16	20.02	22.88	25.74	31.46	37.18	40.04	42.90	45.76
Benefits	11.57	11.57	14.57	21.17	21.67	22.17	22.17	22.67	23.17	24.17

Ratio of Apprentices to Journeymen - 1:4

Craft: Sprinkler Fitter COMMENTS/NOTES

The regular workday shall be 8 hours, between 7:00 AM and 4:30 PM

SHIFT DIFFERENTIALS:

-Second and third shifts shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours outside of the regular workday, and the first 2 hours in excess of 8 per day (9th and 10th hours), Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day, Monday through Friday, hours in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days at straight time, Monday through Friday, between 7:00 AM and 6:30 PM. The first 2 hours in excess of 10 per day (11th and 12th hours), the first 10 hours on the fifth day, and the first 10 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 12 per day, Monday through Friday, and all hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, the day after Thanksgiving, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Tile Finisher-Marble

PREVAILING WAGE RATE

	07/01/19
Finisher	W47.41 B34.64 T82.05

Craft: Tile Finisher-Marble

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%

Ratio of Apprentices to Journeymen - 1:4

Craft: Tile Finisher-Marble

COMMENTS/NOTES

OVERTIME:

Hours in excess of 7 per day, Monday through Friday, and the first 7 hours on Saturdays shall be paid at time and one half the regular rate, inclusive of benefits. Hours in excess of 7 on Saturdays and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and the day after, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Tile Setter - Marble

PREVAILING WAGE RATE

	07/01/19
Tile Setter	W59.44 B36.88 T96.32

Craft: Tile Setter - Marble

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%

Ratio of Apprentices to Journeymen - 1:4

Craft: Tile Setter - Marble

COMMENTS/NOTES

OVERTIME:

Hours in excess of 7 per day, Monday through Friday, and the first 7 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 7 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and the day after, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Tile Setter - Mosaic & Terrazzo

PREVAILING WAGE RATE

	07/01/19
Grinder or Assistant	W54.81 B36.42 T91.23
Mechanic	W56.41 B36.44 T92.85
Terrazzo Resinous Worker	W47.10 B29.47 T76.57

Craft: Tile Setter - Mosaic & Terrazzo

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	50%	55%	60%	65%	70%	75%	85%	95%	100%	

Ratio of Apprentices to Journeymen - 1:5

Craft: Tile Setter - Mosaic & Terrazzo

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES ENTERING PROGRAM AFTER 7-1-17:

INTERVAL	PERIOD AND RATES						
1500 Hours	35%	45%	60%	70%	80%	90%	100%

The regular workday consists of 7 hours, between 8:00 AM and 3:30 PM.

OVERTIME:

- Hours in excess of 7 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Monday after Easter, Memorial Day, July 4th, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and the day after, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Truck Driver

PREVAILING WAGE RATE

	06/25/19	05/01/20
Bucket, Utility, Pick-up, Fuel Delivery trucks	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Dump truck (single axle), Asphalt Distributor, Tack Spreader	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Euclid-type vehicles (large off-road equipment)	W42.00 B33.23 T75.23	W0.00 B0.00 T77.13
Helper on Asphalt Distributor truck	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Slurry Seal, Seeding/Fertilizing/Mulchi ng truck	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Straight 3-axle trucks, Dump Truck (3-axle), Dump Truck (tandem)	W41.90 B33.23 T75.13	W0.00 B0.00 T77.03
Tractor-Trailer truck (all types)	W42.00 B33.23 T75.23	W0.00 B0.00 T77.13
Vacuum or Vac-All truck (entire unit)	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Winch Trailer Driver	W42.10 B33.23 T75.33	W0.00 B0.00 T77.23

Craft: Truck Driver

COMMENTS/NOTES

Foreman: + \$.75 cents per hour. Overtime rate shall be increased accordingly.

HAZARDOUS WASTE REMOVAL WORK:

- On a hazardous waste site requiring Level A, B, or C personal protection for any worker: + \$3.00 per hour.
- On a hazardous waste site not designated Level A, B, or C: + \$1.00 per hour.

The regular workday consists of 8 hours starting between 6:00 AM and 8:00 AM.

SHIFT DIFFERENTIAL:

Any shift starting at a time other than 6:00 AM or 8:00 AM shall receive an additional \$3.00 per hour.

BLENDED RATE:

- When a truck driver is performing work on site and also serving as a material delivery driver, the driver shall be paid a

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

"blended rate" which shall be 80% of the above-listed wage rates, plus the full benefit rate. This rate shall be used when the driver "round robins" for a minimum of 6 hours during the work day.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

- Benefits on overtime shall be \$38.91.

- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day. Veteran's Day may be substituted for the day after Thanksgiving. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Truck Driver-Material Delivery Driver

PREVAILING WAGE RATE

	06/25/19	05/01/20
Driver	W33.91 B33.23 T67.14	W0.00 B0.00 T69.04
New Hires: 1st Year	W33.91 B33.23 T67.14	W0.00 B0.00 T69.04

Craft: Truck Driver-Material Delivery Driver

COMMENTS/NOTES

NOTE: These rates may only be used for the delivery of *materials TO the job site (*building materials that will become a permanent part of the job site, such as sand, stone, aggregates, asphalt, sheetrock, 2x4's, etc.). In addition, only the following types of truck may be used for such deliveries (Dump Truck or Flat-bed truck). Please note that this rate does not apply to material suppliers or their employees (who do not perform services at the job site), and for the delivery of equipment and/or items that will not become a permanent part of the job site.

OVERTIME: Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate. Benefits on overtime shall be \$38.91.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veterans's Day, Thanksgiving Day, Christmas Day. Veteran's Day may be substituted for the day after Thanksgiving. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Welder

PREVAILING WAGE RATE

Welder

Craft: Welder

COMMENTS/NOTES

Welders rate is the same as the craft to which the welding is incidental .



STATE OF NEW JERSEY
Department of Labor and Workforce Development
Division of Wage and Hour Compliance - Public Contracts Section
PO Box 389
Trenton, NJ 08625-0389

PREVAILING WAGE RATE DETERMINATION

The New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq.) requires that the Department of Labor and Workforce Development establish and enforce a prevailing wage level for workers engaged in public works in order to safeguard their efficiency and general well being and to protect them as well as their employers from the effects of serious and unfair competition.

Prevailing wage rates are wage and fringe benefit rates based on the collective bargaining agreements established for a particular craft or trade in the locality in which the public work is performed. In New Jersey, these rates vary by county and by the type of work performed.

Applicable prevailing wage rates are those wages and fringe benefits in effect on the date the contract is awarded. All pre-determined rate increases listed at the time the contract is awarded must also be paid, beginning on the dates specified. Rates that have expired will remain in effect until new rates are posted.

Prevailing Wage Rate

The prevailing wage rate for each craft will list the effective date of the rate and the following information:

W = Wage Rate per Hour **B** = Fringe Benefit Rate per Hour* **T** = Total Rate per Hour

* Fringe benefits are an integral part of the prevailing wage rate. Employers not providing such benefits must pay the fringe benefit amount directly to the employee each payday. Employers providing benefits worth less than the fringe benefit amount must pay the balance directly to the employee each payday.

Unless otherwise stated in the Prevailing Wage Rate Determination, the fringe benefit rate for overtime hours remains at the straight time rate.

When the Overtime Notes in the Prevailing Wage Rate Determination state that the overtime rates are "inclusive of benefits," the benefit rate is increased by the same factor as the wage rate (i.e. multiplied by 1.5 for time and one-half, multiplied by 2 for double time, etc.).

Apprentice Rate Schedule

An "apprentice" is an individual who is registered with the United States Department of Labor - Office of Apprenticeship and enrolled in a certified apprenticeship program during the period in which they are working on the public works project.

The apprentice wage rate is a percentage of the journeyman wage rate, unless otherwise indicated. The apprentice benefit rate is the full journeyman benefit rate, unless otherwise indicated.

If there is no apprentice rate schedule listed, the individual must be paid at least the journeyman rate even if that individual is in a certified apprentice program for that trade.

If there is no ratio of apprentices to journeymen listed for a particular craft, then the ratio shall be one (1) apprentice to every four (4) journeymen.

Comments/Notes

For each craft listed there will be comments/notes that cover the definition of the regular workday, shift differentials, overtime, recognized holidays, and any other relevant information.

Public Works Contractor Registration

The Public Works Contractor Registration Act (N.J.S.A. 34:11-56.48, et seq.) requires that **all** contractors, subcontractors, or lower tier subcontractors who are working on or who bid on public works projects register with the Department of Labor and Workforce Development. Applications are available at www.nj.gov/labor (click on Wage & Hour and then go to Registration & Permits).

Pursuant to N.J.S.A. 34:11-56.51:

No contractor shall bid on any contract for public work as defined in section 2 of P.L.1963, c. 150 (C.34:11-56.26) unless the contractor is registered pursuant to this act. No contractor shall list a subcontractor in a bid proposal for the contract unless the subcontractor is registered pursuant to P.L.1999, c.238 (C.34:11-56.48 et seq.) at the time the bid is made. No contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall engage in the performance of any public work subject to the contract, unless the contractor or subcontractor is registered pursuant to that act.

Snow Plowing

Snow plowing contracts are not subject to the New Jersey Prevailing Wage Act or the Public Works Contractor Registration Act.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Air Conditioning & Refrigeration - Service and Repair

PREVAILING WAGE RATE

	05/10/19
Journeyman (Mechanic)	W39.08 B24.87 T63.95

Craft: Air Conditioning & Refrigeration - Service and Repair

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	Mo. 1-3	Mo. 4-12	2nd Year	3rd Year	4th Year	5th Year		Wage = %	of Jnymn	Wage
As Shown										
Wage and Bene	50%	55%	60%	65%	75%	85%		Bene = %	of Jnymn	Bene

Ratio of Apprentices to Journeymen - 1:4

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES ENTERING PROGRAM AFTER 3-1-13:

INTERVAL	PERIOD AND RATES							
As Shown	1st Year	2nd Year	3rd Year	4th Year	5th Year		Wage =% of Jnymn Wage	
Wage and Benefit	40%	50%	60%	70%	80%		Bene. =% of Jnymn Bene	

Craft: Air Conditioning & Refrigeration - Service and Repair

COMMENTS/NOTES

THESE RATES MAY BE USED FOR THE FOLLOWING:

- Service/Repair/Maintenance Work to EXISTING facilities.
- Replacement or Installation of air conditioning and refrigeration equipment when the combined tonnage does not exceed 15 tons for refrigeration, or 25 tons for air conditioning.
- Replacement or Installation of "packaged" or "unitary" rooftop-type units when the combined tonnage of the units does not exceed 75 tons.

NOTE: These rates may NOT be used for any work in new construction (including work on new additions).

The regular workday shall consist of 8 hours, starting between 6:00 AM and 10:00 AM, Monday through Friday.

SHIFT DIFFERENTIALS:

- The second and third shifts shall be paid an additional 15% of the hourly rate.
- All shifts must run for a minimum of 5 consecutive days.

OVERTIME:

Hours worked in excess of 8 per day or before or after the regular workday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Boilermaker PREVAILING WAGE RATE

	01/01/19
Foreman	W49.72 B44.34 T94.06
General Foreman	W51.72 B45.34 T97.06
Journeyman	W44.72 B42.70 T87.42

Craft: Boilermaker APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	65%	70%	75%	80%	85%	90%	95%			
Benefit =	36.36	37.26	38.18	39.07	39.39	40.89	41.79			

Ratio of Apprentices to Journeymen - *

* 1 apprentice will be allowed for the first 5 journeymen, 1 apprentice for the next 10 journeymen and 1 apprentice for each succeeding 20 journeymen up to a maximum of 5 apprentices per contractor on any one job.

Craft: Boilermaker COMMENTS/NOTES

HIGH WORK: All apprentices working on the erection, repair, or dismantling of smoke stacks, standpipes, or water towers shall be paid the Journeyman rate.

The regular workday shall consist of 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall work 7½ hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 10%.
- The third shift shall work 7 hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 20%.
- For "Municipal Water Works" projects only, the following shall apply: Two, four day, 10 hour shifts may be worked at straight time Monday through Thursday. The day shift shall work four days, at 10 hours, for 10 hours pay. The second shift shall work four days, at nine and a half hours, for 10 hours pay, plus 10% the hourly rate for new work and .25 cents on repair work. Friday may be used as a make-up day at straight time, due to weather conditions, holiday or any other circumstances beyond the employer's control.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.
- If any other craft employed by the same contractor, or a subcontractor thereof, receives double time in lieu of time and one-half, then the Boilermaker shall receive double time in lieu of time and one-half.
- For "Municipal Water Works" projects only, the following shall apply: Four 10 hour days may be worked Monday through Thursday at straight time. Friday may be used as a make-up day for a day lost to inclement weather, holiday or other conditions beyond the control of the employer. Overtime shall be paid for any hours that exceed 10 hours per day or 40 hours per week.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Boilermaker - Minor Repairs

PREVAILING WAGE RATE

	01/01/19
Foreman	W32.80 B16.37 T49.17
General Foreman	W33.30 B16.37 T49.67
Mechanic	W31.30 B16.37 T47.67

Craft: Boilermaker - Minor Repairs

COMMENTS/NOTES

NOTE: These rates apply to MINOR REPAIR WORK ONLY (repair work in the field for which the contract amount does not exceed \$125,000.00).

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Bricklayer, Stone Mason

PREVAILING WAGE RATE

	05/01/19
Deputy Foreman	W46.20 B33.03 T79.23
Foreman	W49.20 B33.03 T82.23
Journeyman	W43.20 B33.03 T76.23

Craft: Bricklayer, Stone Mason

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	50%	55%	60%	65%	70%	75%	80%		
6 Months										
Benefits	3.86	4.83	5.31	5.80	21.83	23.27	24.72	26.15		

Ratio of Apprentices to Journeymen - 1:5

Craft: Bricklayer, Stone Mason

COMMENTS/NOTES

The regular workday shall consist of 8 hours, between 6:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the first, or day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 10%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When an irregular shift must be established, this shift shall receive the regular rate plus 10%, inclusive of benefits.

OVERTIME:

- The first 2 hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. The first 10 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday may be used as a make-up day for hours lost to inclement weather.
- When Bricklayers/Stone Masons work on Saturday with Laborers, and no other crafts are working on the project for the day, benefits may be paid at straight time. If other crafts are present, the applicable overtime rate for benefits shall be paid.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Carpenter PREVAILING WAGE RATE

	05/10/19	05/01/20
Foreman	W58.00 B33.64 T91.64	W60.27 B34.98 T95.25
Journeyman	W50.43 B29.33 T79.76	W51.36 B29.90 T81.26

Craft: Carpenter APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	57% of	Appren	tice	Wage	for all	intervals	+ \$0.59			

Ratio of Apprentices to Journeymen - 1:3

Craft: Carpenter COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 5-1-20:

INTERVAL PERIOD AND RATES
 Yearly 40% 55% 65% 80% 90%
 Benefit 57% of apprentice wage rate for all intervals + \$0.63

FOREMAN REQUIREMENTS:

- When there are 2 or more Carpenters on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Carpenters on a job, 2 shall be designated as Foremen.

The regular workday shall consist of 8 hours, starting between 7:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.

OVERTIME:

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - **MERCER**

Craft: Carpenter - Resilient Flooring

PREVAILING WAGE RATE

	05/10/19
Foreman	W58.00 B33.55 T91.55
Journeyman	W50.43 B29.24 T79.67

Craft: Carpenter - Resilient Flooring

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	57%	of	Appren	tice	Wage	for all	intervals	+ \$0.49		
					Rate					

Ratio of Apprentices to Journeymen - *

* 1 apprentice shall be allowed to every 2 journeymen or major fraction thereof. No more than 3 apprentices on any one job or project.

Craft: Carpenter - Resilient Flooring

COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- On any job where there are 4 or more Carpenters of Resilient Flooring, 1 must be designated a Foreman.

FOR SYNTHETIC TURF INSTALLATION ONLY:

- The rate shall be 90% of the wage and benefit rate.

The regular workday consists of 8 hours, starting between 6:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular wage rate plus 15%.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular wage rate, the second shift shall receive the regular wage rate plus 15% and the third shift shall receive the regular wage rate plus 20%.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular wage rate plus 15% and the third shift shall receive the regular wage rate plus 20%.

OVERTIME:

- Hours in excess of 8 per day or 40 per week, or before or after the regular workday, Monday through Friday, shall be paid at time and one-half the wage rate. Saturday may be used as a make-up day, at straight time, up to 8 hours, for hours lost to reasons beyond the control of the employer, up to a total of 40 hours per week; hours in excess of 8 on Saturday shall then be paid at time and one-half the wage rate. If Saturday is not a make-up day, all hours on Saturday shall be paid at time and one-half the wage rate. All hours on Sundays and holidays shall be paid at double the wage rate.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for hours lost to reasons beyond the control of the employer. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the wage rate.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Cement Mason

PREVAILING WAGE RATE

See "Bricklayer, Stone Mason" Rates

Craft: Cement Mason

COMMENTS/NOTES

See " Bricklayer, Stone Mason" Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Dockbuilder PREVAILING WAGE RATE

	06/18/19	05/01/20
Foreman	W55.20 B47.47 T102.67	W0.00 B0.00 T104.17
Foreman (Concrete Form Work)	W54.40 B34.36 T88.76	W0.00 B0.00 T90.26
Journeyman	W48.00 B47.47 T95.47	W0.00 B0.00 T96.97
Journeyman (Concrete Form Work)	W47.30 B34.36 T81.66	W0.00 B0.00 T83.16

Craft: Dockbuilder APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	19.20	24.00	31.20	38.40						
Benefit	31.56	for all	intervals							

Ratio of Apprentices to Journeymen - *

* When there are 4 or fewer Dockbuilders on a job, no more than 1 may be an apprentice. When there are 5 or more Dockbuilders, there may be 1 apprentice for every 5 Dockbuilders.

Craft: Dockbuilder COMMENTS/NOTES

APPRENTICE RATE SCHEDULE FOR CONCRETE FORM WORK ONLY:

INTERVAL	PERIOD AND RATES			
Yearly	18.92	23.65	30.75	37.84
Benefits	23.60 for all intervals			

CREOSOTE HANDLING:

When handling creosote products on land piling, floating marine construction, and construction of wharves, the worker shall receive an additional \$0.25 per hour.

HAZARDOUS WASTE WORK:

- Hazardous waste removal work on a state or federally designated hazardous waste site where Level A, B, or C personal protection is required: an additional 20% of the hourly rate, per hour.
- Hazardous waste removal work in Level D, or where personal protection is not required: an additional \$1.00 per hour.

CERTIFIED WELDER: When required on the job by the project owner, a Certified Welder shall receive an additional \$1.00 per hour.

FOREMAN REQUIREMENTS:

The first Dockbuilder on the job shall be designated a Foreman.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Veterans' Day may be switched with the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Drywall Finisher

PREVAILING WAGE RATE

	11/01/18
Foreman	W43.95 B24.40 T68.35
General Foreman	W45.94 B24.40 T70.34
Journeyman	W39.95 B24.40 T64.35

Craft: Drywall Finisher

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	50%		60%	70%		80%	90%		
6 Months										
Benefits	Intervals	1 to 2 =	10.65	Intervals	3 to 4 =	13.17	Intervals	5 to 6 =	16.25	

Ratio of Apprentices to Journeymen - 1:4

Craft: Drywall Finisher

COMMENTS/NOTES

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.
- Shift work must run for a minimum of 5 consecutive workdays.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Asst. General Foreman	W59.00 B37.42 T96.42	W0.00 B0.00 T98.42	W0.00 B0.00 T100.42
Crane Operator, High Voltage Splicer, Welder	W53.83 B34.19 T88.02	W0.00 B0.00 T90.02	W0.00 B0.00 T92.02
Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
General Foreman	W64.10 B40.60 T104.70	W0.00 B0.00 T106.70	W0.00 B0.00 T108.70
Journeyman	W51.27 B32.59 T83.86	W0.00 B0.00 T85.86	W0.00 B0.00 T87.86

Craft: Electrician APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	15.06	17.57	20.08	25.10	35.14					
Benefits	62.48% of	Apprentic	Wage	Rate	+ \$0.31					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES				
Yearly	15.38	17.94	20.51	25.64	35.89
Benefits	62.48% of Apprentice Wage Rate + \$0.56				

FOREMAN REQUIREMENTS:

- When there are 2 or more electricians on the job, 1 shall be designated a Foreman.
- 1 additional Foreman shall be designated for every 10 additional electricians.
- When there are 2 or more Foremen on the job, 1 shall be designated a General Foreman.

The regular workday is 8 hours between 7:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.
- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate,

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

- The first 4 hours in excess of 8 per day, and hours before or after the regular workday that are not shift work, Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, Monday through Friday, in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

- Four 10-hour days may be worked at straight time, Monday through Thursday or Tuesday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician - Teledata (15 Instruments and Less)

PREVAILING WAGE RATE

	01/01/19
Assistant General Foreman	W49.19 B31.29 T80.48
Foreman	W44.86 B28.58 T73.44
General Foreman	W51.16 B32.52 T83.68
Journeyman Technician	W39.35 B25.14 T64.49
Lead Foreman	W46.83 B29.81 T76.64
Working Foreman	W42.89 B27.35 T70.24

Craft: Electrician - Teledata (15 Instruments and Less)

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	19.28	22.82	28.73	33.84						
Benefits	62.48% of	Apprentic	Wage	Rate	+\$0.56					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician - Teledata (15 Instruments and Less)

COMMENTS/NOTES

NOTE: These rates are for service, maintenance, moves and/or changes affecting 15 instruments or less. These rates may NOT be used for any new construction or any fiber optic work.

FOREMAN REQUIREMENTS:

- 1 to 10 workers- 1 Working Foreman
- 11 to 20 workers- 1 Working Foreman and 1 Foreman
- 21 to 30 workers- 1 Working Foreman, 1 Foreman and 1 Lead Foreman
- 31 to 40 workers- 1 Working Foreman, 2 Foremen and 1 General Foreman
- 41 to 50 workers- 1 Working Foreman, 4 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 51 to 60 workers- 1 Working Foreman, 5 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 61 to 70 workers- 1 Working Foreman, 6 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 71 to 80 workers- 1 Working Foreman, 7 Foremen, 2 Assistant General Foremen and 1 General Foreman
- 81 to 90 workers- 1 Working Foreman, 8 Foremen, 2 Assistant General Foremen and 1 General Foreman

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

91 to 100 workers- 1 Working Foreman, 9 Foremen, 2 Assistant General Foremen and 1 General Foreman.

HEIGHT WORK (40 feet above ground or floor):

Workers shall be paid an additional 10% of the regular rate, inclusive of benefits.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.

- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate, per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician - Teledata (16 Instruments & More)

PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Assistant General Foreman	W59.00 B37.42 T96.42	W0.00 B0.00 T98.42	W0.00 B0.00 T100.42
Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
General Foreman	W64.10 B40.60 T104.70	W0.00 B0.00 T106.70	W0.00 B0.00 T108.70
Journeyman Technician	W51.27 B32.59 T83.86	W0.00 B0.00 T85.86	W0.00 B0.00 T87.86
Lead Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
Working Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19

Craft: Electrician - Teledata (16 Instruments & More)

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	15.06	17.57	20.08	25.10	35.14					
Benefits	62.48% of	Apprentic	Wage	Rate	+ \$0.31					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician - Teledata (16 Instruments & More)

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL PERIOD AND RATES
 Yearly 15.38 17.94 20.51 25.64 35.89
 Benefits 62.48% of Apprentice Wage Rate + \$0.56

NOTES:

1) These rates are for service, maintenance, moves and/or changes affecting 16 or more instruments, and fiber optic work. These rates may NOT be used for any new construction.

2) The number of electricians on the jobsite is the determining factor for which Foreman Category applies.

FOREMAN REQUIREMENTS:

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

1 to 10 workers- 1 Working Foreman
11 to 20 workers- 1 Working Foreman and 1 Foreman
21 to 30 workers- 1 Working Foreman, 1 Foreman and 1 Lead Foreman
31 to 40 workers- 1 Working Foreman, 2 Foremen and 1 General Foreman
41 to 50 workers- 1 Working Foreman, 4 Foremen, 1 Assistant General Foreman and 1 General Foreman
51 to 60 workers- 1 Working Foreman, 5 Foremen, 1 Assistant General Foreman and 1 General Foreman
61 to 70 workers- 1 Working Foreman, 6 Foremen, 1 Assistant General Foreman and 1 General Foreman
71 to 80 workers- 1 Working Foreman, 7 Foremen, 2 Assistant General Foremen and 1 General Foreman
81 to 90 workers- 1 Working Foreman, 8 Foremen, 2 Assistant General Foremen and 1 General Foreman
91 to 100 workers- 1 Working Foreman, 9 Foremen, 2 Assistant General Foremen and 1 General Foreman.

HEIGHT WORK (40 feet above ground or floor):

Workers shall be paid an additional 10% of the regular rate, inclusive of benefits.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.

- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate, per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician- Outside Commercial

PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Assistant General Foreman	W59.00 B37.09 T96.09	W0.00 B0.00 T98.09	W0.00 B0.00 T100.09
Crane Operator, High Voltage Splicer, Welder	W53.83 B33.89 T87.72	W0.00 B0.00 T89.72	W0.00 B0.00 T91.72
Foreman	W56.40 B35.48 T91.88	W0.00 B0.00 T93.88	W0.00 B0.00 T95.88
General Foreman	W64.10 B40.25 T104.35	W0.00 B0.00 T106.35	W0.00 B0.00 T108.35
Groundman, Truck & Winch Operator- Level I	W15.38 B10.08 T25.46	W0.00 B0.00 T27.46	W0.00 B0.00 T29.46
Groundman, Truck & Winch Operator- Level II	W20.51 B13.26 T33.77	W0.00 B0.00 T35.77	W0.00 B0.00 T37.77
Groundman, Truck & Winch Operator- Level III	W25.64 B16.43 T42.07	W0.00 B0.00 T44.07	W0.00 B0.00 T46.07
Groundman, Truck & Winch Operator- Level IV	W33.33 B21.20 T54.53	W0.00 B0.00 T56.33	W0.00 B0.00 T58.33
Groundman, Truck & Winch Operator- Level V	W41.02 B25.96 T66.98	W0.00 B0.00 T68.98	W0.00 B0.00 T70.98
Heavy Equipment Operator	W51.27 B32.31 T83.58	W0.00 B0.00 T85.58	W0.00 B0.00 T87.58
Journeyman Lineman	W51.27 B32.31 T83.58	W0.00 B0.00 T85.58	W0.00 B0.00 T87.58

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician- Outside Commercial

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	30.12	32.63	35.14	37.65	40.16	42.67	45.18			
Benefits	61.93% of	Apprentic	Wage	Rate	+ \$0.31					

Craft: Electrician- Outside Commercial

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES									
6 Months	30.76	33.33	35.89	38.45	40.02	43.58	46.14			
Benefits	61.93% of Apprentice Wage Rate + \$0.56									

* FOR UTILITY WORK PLEASE SEE STATEWIDE RATES

The regular workday is 8 hours between 7:00 AM and 4:30 pm.

SHIFT DIFFERENTIALS:

2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the regular rate, inclusive of benefits.

3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the regular rate per hour, inclusive benefits.

FOREMAN REQUIREMENTS:

When there are 2 or more electricians on the job, 1 shall be designated a Foreman.
 1 additional Foreman shall be designated for every 10 additional electricians.
 When there are 2 or more Foremen on the job, 1 shall be designated a General Foreman.
 An Assistant General Foreman shall be designated for every 50 electricians working on the job.

OVERTIME:

The first 4 hours in excess of 8 per day, and hours before or after the regular workday that are not shift work, Monday through Friday, and the first 8 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits.

Four 10-hour days may be worked at straight time, Monday through Thursday or Tuesday through Friday.

RECOGNIZED HOLIDAYS:

New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day and Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician-Utility Work (North)

PREVAILING WAGE RATE

Rates are located in the "Statewide" rate package

Craft: Electrician-Utility Work (North)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
* 6 Months	60%	65%	70%	75%	80%	85%	90%			
Benefits	67% of	Appren	tice	Wage	Rate	for all	intervals			

Craft: Electrician-Utility Work (North)

COMMENTS/NOTES

Electrician-Utility Work (North) rates are located in the "Statewide" rate package.

* The apprentice wage rate is paid at the percentage of the Journeyman Lineman wage rate located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Electrician-Utility Work (South)

PREVAILING WAGE RATE

Rates are located in the "Statewide" rate package

Craft: Electrician-Utility Work (South)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	28.53	30.91	33.29	35.66	38.04	40.42	42.80			
Benefits	25.01	26.41	27.83	29.24	30.65	32.05	33.47			

Craft: Electrician-Utility Work (South)

COMMENTS/NOTES

Electrician-Utility Work (South) rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Elevator Constructor

PREVAILING WAGE RATE

	01/01/19
Helper-Over 5 Years	W40.28 B37.34 T77.62
Helper-Under 5 Years	W40.28 B36.53 T76.81
Mechanic (Journeyman) over 5 years	W57.55 B38.72 T96.27
Mechanic (Journeyman) under 5 years	W57.55 B37.57 T95.12
Mechanic in Charge (Foreman) over 5 years	W64.74 B39.29 T104.03
Mechanic in Charge (Foreman) under 5 years	W64.74 B38.00 T102.74
Probationary Helper (1st 6 months)	W28.78 B35.84 T64.62

Craft: Elevator Constructor

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	55%	65%	70%	80%						
Benefits	full	journeyma	benefit	rate for	all	intervals				

Ratio of Apprentices to Journeymen - *

* Total number of helpers and apprentices shall not exceed the number of mechanics on the job , except where 2 teams are working, 1 additional helper or apprentice may be employed for first 2 teams and an extra helper or apprentice for each additional 3 teams. Further, the employer may use as many helpers or apprentices as needed, under the direction of a mechanic in wrecking old plants, handling and hoisting material, and on foundation work. When replacing cables on existing elevators, employer may use 2 helpers or apprentices to 1 mechanic.

Craft: Elevator Constructor

COMMENTS/NOTES

SHIFT DIFFERENTIALS:

- 2nd Shift (4:30 PM to 12:30 AM) shall be established on the basis of 7.5 hours of work for 8 hours of pay, plus an additional 10% per hour.
- 3rd Shift (12:30 AM to 8:00 AM) shall be established on the basis of 7 hours of work for 8 hours of pay, plus an additional 15% per hour.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday to Thursday or Tuesday to Friday, at straight time. When working a 4-10 hour day schedule, all hours worked on a day other than the days established for the 4-10 hour schedule shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and day after, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Glazier PREVAILING WAGE RATE

	05/01/19
* Leadman	W49.11 B25.06 T74.17
Foreman	W52.81 B23.62 T76.43
General Foreman	W54.81 B23.75 T78.56
Journeyman	W48.81 B23.36 T72.17

Craft: Glazier APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
6 Months	50%	55%		60%	65%		70%	75%		
Benefits	Intervals	1 to 2 =	9.11	Intervals	3 to 4 =	11.71	Intervals	5 to 6 =	13.20	

Ratio of Apprentices to Journeymen - 1:4

Craft: Glazier COMMENTS/NOTES

Hazard/Height Pay: +\$1.00 per hour

* When there are three (3) men working on a jobsite for three (3) days or longer, 1 Journeyman may be designated as a Leadman for the duration of the job, provided he has his OSHA certification.

FOREMAN REQUIREMENTS:

- When there are 4 or more Glaziers on a job, 1 must be designated a Foreman.
- When there are 15 or more Glaziers on a job, 1 must be designated a General Foreman.

The regular workday shall consist of 8 hours, between 7:00 AM and 5:30 PM, Monday to Friday.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Heat & Frost Insulator **PREVAILING WAGE RATE**

	07/08/19	07/01/20
Foreman	W47.62	W0.00
	B36.13	B0.00
	T83.75	T87.00
Journeyman	W46.12	W0.00
	B36.13	B0.00
	T82.25	T85.50

Craft: Heat & Frost Insulator **APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	Yearly	45%	55%	65%	75%	80%				
Benefit	32.88	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* Ratio = 1:4 on a "company-wide" basis (i.e. the total number of apprentices and journeymen employed by the company). There is no limit to the number of apprentices allowed on any one job, provided there is at least 1 journeyman on the job.

Craft: Heat & Frost Insulator **COMMENTS/NOTES**

FOREMAN REQUIREMENTS:

- If there is only 1 Insulator on the job, he must be designated a Foreman.
- If there are 2 to 10 Insulators on the job, 1 must be designated a Foreman.
- If there are 11 or more Insulators on the job, 1 must be designated a General Foreman and receive the following additional pay (% above Journeyman wage rate):
 - 11 - 20 Insulators on site: 10%; 21 - 30 Insulators on site: 15%;
 - 31 - 40 Insulators on site: 20%; 41 - 50 Insulators on site: 25%

The regular workday shall be 8 hours between 7:00 AM and 3:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of two (2) consecutive days and a minimum of two (2) shifts per day must be worked. Additionally, no less than two (2) employees may work on any one (1) shift. If these requirements are not met then shift work would not apply and the applicable overtime rate shall be paid.
- 1st Shift- Monday through Friday (7:00 AM- 3:00 PM).
- 2nd Shift- Monday through Friday (3:00 PM -11:00 PM): additional 15% of the regular rate, inclusive of benefits.
- 3rd Shift- Monday through Friday (11:00 PM -7:00 AM): additional 20% of the regular rate, inclusive of benefits.
- When a single night shift is established by the project owner for work not accessible during the day (due to the building being occupied), Monday through Friday, work performed during a second shift (3:00 PM-11:00 PM) shall be paid an additional 20% of the regular rate, inclusive of benefits, and work performed during a third shift (11:00 PM-7:00 AM) shall be paid an additional 25% of the regular rate, inclusive of benefits.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, that are not shift work, and all hours on Saturday, shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Heat & Frost Insulator - Asbestos Worker

PREVAILING WAGE RATE

	07/08/19	07/01/20
Foreman	W47.62	W0.00
	B36.13	B0.00
	T83.75	T87.00
Journeyman	W46.12	W0.00
	B36.13	B0.00
	T82.25	T85.50

Craft: Heat & Frost Insulator - Asbestos Worker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	Heat &	Frost	Insulator						

Craft: Heat & Frost Insulator - Asbestos Worker

COMMENTS/NOTES

NOTE: These rates apply only to the REMOVAL of insulation materials/asbestos from mechanical systems, including containment erection and demolition, and placing material in appropriate containers.

FOREMAN REQUIREMENTS:

- If there is only 1 Asbestos Worker on the job, he must be designated an Abatement Foreman.
- If there are 2 to 10 Asbestos Workers on the job, 1 must be designated an Abatement Foreman.
- If there are 11 or more Asbestos Workers on the job, 1 must be designated a General Foreman and receive the following additional pay (% above Abatement Mechanic wage rate):
 - 11 - 20 Insulators on site: 10%; 21 - 30 Insulators on site: 15%;
 - 31 - 40 Insulators on site: 20%; 41 - 50 Insulators on site: 25%

MECHANIC-TO-APPRENTICE RATIO:

- Maximum of 5 Apprentices for each Abatement Mechanic on the job.

OVERTIME:

- Hours in excess of 8 per day, and all hours on Saturday, shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Ironworker

PREVAILING WAGE RATE

	07/01/19
Foreman-Fence and Guardrail	W53.54 B30.79 T84.33
Foreman-Rod/Mesh	W54.62 B30.79 T85.41
Foreman-Structural	W55.70 B30.79 T86.49
Journeyman-Fence and Guardrail	W49.57 B30.79 T80.36
Journeyman-Rod/Mesh	W50.57 B30.79 T81.36
Journeyman-Structural	W51.57 B30.79 T82.36

Craft: Ironworker

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	60%	75%	85%							

Ratio of Apprentices to Journeymen - *

* On all work EXCEPT Ornamental Iron and Bridge Cable Spinning Work 1:4; On Ornamental Iron and Bridge Cable Spinning Work 1:1.

Craft: Ironworker

COMMENTS/NOTES

Note: For work on hazardous waste sites, workers shall receive an additional \$3.00 per hour.

The regular workday shall consist of 8 hours between 7:00 AM and 5:00 PM.

SHIFT DIFFERENTIALS:

- Second shift shall receive an additional 10% per hour.
- Third shift shall receive an additional 15% per hour.

OVERTIME:

- Time and one-half the wage rate for hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and for all hours on Saturdays. Double the wage rate for all hours on Sundays and holidays.
- Employees may work four 10-hour days, Monday to Thursday, at straight time. Friday may be used as a make-up day

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

for a day lost to inclement weather. If Friday is not a make-up day, all hours worked on Friday shall be paid at time and one-half the wage rate.

- Benefits on overtime hours shall be paid at the following rates:

When wages are time and one-half, benefits = \$35.06.

When wages are double, benefits = \$39.33.

RECOGNIZED HOLIDAYS: New Year's Eve, New Year's Day, Memorial Day, July 4th, Labor Day, General and Presidential Election Day, Thanksgiving Day, Christmas Eve, Christmas Day. Saturday holidays observed the preceding Friday. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer - Asbestos & Hazardous Waste Removal

PREVAILING WAGE RATE

	08/01/18
Journeyman (Handler)	W31.48 B22.31 T53.79

Craft: Laborer - Asbestos & Hazardous Waste Removal

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	18.89	22.04	25.18	28.33						
Benefit	20.66	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

Craft: Laborer - Asbestos & Hazardous Waste Removal

COMMENTS/NOTES

NOTE: These rates apply to work in connection with Asbestos, Radiation, Hazardous Waste, Lead, Chemical, Biological, Mold Remediation and Abatement.

The regular workday shall be 8 hours.

OVERTIME:

- Hours in excess of 8 per day, Monday through Saturday, and all hours on Sunday and holidays shall be paid at time and one-half the regular rate.
- Benefits on ALL overtime hours shall be paid at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Good Friday, Easter, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. (Holidays start at 12:00 am).

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer - Building

PREVAILING WAGE RATE

	05/01/19	05/01/20
Class A Journeyman	W34.05 B29.52 T63.57	W0.00 B0.00 T64.87
Class B Journeyman	W33.55 B29.52 T63.07	W0.00 B0.00 T64.37
Class C Journeyman	W28.52 B29.52 T58.04	W0.00 B0.00 T59.34
Foreman	W38.31 B29.52 T67.83	W0.00 B0.00 T69.13
General Foreman	W42.56 B29.52 T72.08	W0.00 B0.00 T73.38

Craft: Laborer - Building

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
	60%	70%	80%	90%						
6 Months										
Benefit	26.27	26.27	26.27	26.27						

Ratio of Apprentices to Journeymen - *

* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

Craft: Laborer - Building

COMMENTS/NOTES

CLASS A: Specialist laborer including mason tender or concrete pour crew; scaffold builder (scaffolds up to 14 feet in height); operator of forklifts, Bobcats (or equivalent machinery), jack hammers, tampers, motorized tampers and compactors, vibrators, street cleaning machines, hydro demolition equipment, riding motor buggies, conveyors, burners; and nozzle men on gunite work.

CLASS B: Basic laborer - includes all laborer work not listed in Class A or Class C.

CLASS C: Janitorial-type light clean-up work associated with the TURNOVER of a project, or part of a project, to the owner. All other clean-up work is Class B.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays.
- When a 2-shift schedule is worked, including a day shift, both shifts shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%.
- When a 3-shift schedule is worked, the day shift shall be established on the basis of 8 hours pay for 8 hours worked, the second shift shall be established on the basis of 8 hours pay for 7.5 hours worked, and the third shift shall be established

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

on the basis of 8 hours pay for 7 hours worked. The day shift shall receive the regular rate, the second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

- When a second or third shift is worked with no day shift, the second or third shift shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

OVERTIME:

- Hours in excess of 8 per day, or outside the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. Saturday may be used as a make-up day (paid at straight time) for a day lost to inclement weather, or for a holiday that is observed during the work week, Monday through Friday. All hours on Sundays and holidays shall be paid at double the regular rate.

- Four 10-hour days may be worked Monday to Thursday, at straight time, with Friday used a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the regular rate.

- Benefits on ALL overtime hours shall be paid at time and one-half.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer - Heavy & General

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Laborer - Heavy & General

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	60%	70%	80%	90%						
Benefit	20.28	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* No more than 1 apprentice for the first journeyman and no more than 1 apprentice for each additional 3 journeymen.

Craft: Laborer - Heavy & General

COMMENTS/NOTES

As of 3-1-19, benefits shall be \$21.03.

As of 3-1-20, benefits shall be \$21.78.

Heavy & General Laborer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Laborer-Residential and Modular Construction

PREVAILING WAGE RATE

	05/03/19	04/01/20
* Skilled Tradesman (only applies to Modular Construction)	W26.20 B5.45 T31.65	W26.55 B5.45 T32.00
Foreman (person directing crew, regardless of his skill classification)	W30.20 B5.45 T35.65	W30.55 B5.45 T36.00
Laborer	W22.20 B5.45 T27.65	W22.55 B5.45 T28.00
Laborer (for single family and stand-alone duplex owned by single owner)	W16.70 B2.95 T19.65	W17.05 B2.95 T20.00

Craft: Laborer-Residential and Modular Construction

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
	As shown	800 hours	600 hours	600 hours						
wage & benefits	70%	80%	90%							

Ratio of Apprentices to Journeymen-

One (1) apprentice shall be allowed for the first journeyman on site and no more than one (1) additional apprentice for each additional three (3) journeymen on site.

Craft: Laborer-Residential and Modular Construction

COMMENTS/NOTES

* SKILLED TRADESMAN- any worker doing work not typically done by a Building Laborer. Some examples are installing interior doors, sheet rock, hooking up appliances, installing light fixtures, installing railing systems, etc. Please note where local building codes require that certain work be performed under the supervision of a licensed tradesman (i.e. Plumber, Electrician, etc.) Laborers shall work under such supervision.

RESIDENTIAL CONSTRUCTION- All residential construction (not commercial), single-family, stand-alone duplex houses, townhouses and multi-family buildings of not more than four (4) floors. Each housing unit must be fully and independently functional; each housing unit must have its own kitchen and bathroom. The definition includes all incidental items such as site work, parking areas, utilities, streets and sidewalks. Please note the construction must be Residential in nature. A First Floor at or below grade may contain commercial space not to exceed 50% square footage of the floor; at least 50% of the First Floor must contain living accommodations or related nonresidential uses (e.g. laundry space, recreation/hobby rooms, and/or corridor space). Basement stories below grade used for storage, parking, mechanical systems/equipment, etc., are considered basement stories which are not used in determining the building's height. An attic is an unfinished space located immediately below the roof. Such space is not used in determining a building's height even if used for storage purposes. In addition, barracks and dormitories are not considered residential projects.

MODULAR RESIDENTIAL CONSTRUCTION- all aspects of modular residential construction (not commercial) at the site of installation of structures of no more than four (4) stories, including all excavation and site preparation, footings and

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

foundation systems whether poured on-site or prefabricated, all underground waterproofing, underground utilities, concrete slabs, sidewalks, driveways, paving, hardscape and landscaping. Please note the construction must be Residential as defined above. All work performed by the Set Crew (the crew of workers who set the modular boxes on the foundation), including the rigging, setting, attaching and assembly of all modules and structural members, preparation of the foundation to accept modules, such as sill plates, connection of all in-module and under-module connections including, but not limited to, plumbing, electrical, HVAC, fire suppression, CATS, telephone, television/internet, and fiber optic, the building or installation of any porches or decks regardless of material or method of construction, the on-site installation of, or completion of any roof system, doors, windows and fenestrations, including flashing, gutter and soffit systems, waterproofing, insulation and interior and exterior trim work, and painting. Please note that modular construction does not include on-site stick built construction, tip up construction or panel built construction.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

OVERTIME:

Hours worked in excess of 8 per day/40 per week, Monday through Saturday, and all hours worked on Sunday and holidays shall be paid at time and one-half the hourly rate.

RECOGNIZED HOILDAYS:

New Year's Day, Martin Luther King Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Millwright

PREVAILING WAGE RATE

	05/01/19
Foreman	W58.26 B34.39 T92.65
Journeyman	W50.66 B29.99 T80.65

Craft: Millwright

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%
Benefits	58% of	Appren	tice	Wage	Rate	for all	intervals	+ \$.60		

Ratio of Apprentices to Journeymen - 1:3

Craft: Millwright

COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- When there are 2 or more Millwrights on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Millwrights on a job, 2 shall be designated as Foremen.

The regular workday shall consist of 8 hours, starting between 7:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.

OVERTIME:

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Operating Engineer PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Operating Engineer APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	60%	70%	80%	90%						

Ratio of Apprentices to Journeymen - *

* 1 apprentice for each piece of heavy equipment. At least 10 pieces of heavy equipment or a minimum of 5 Operating Engineers must be on site.

Craft: Operating Engineer COMMENTS/NOTES

Operating Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Operating Engineer - Field Engineer

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Operating Engineer - Field Engineer

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	70%	75%	of Rod/	Chainman	Wage					
Yearly			80%	90%	Transit/	Instrument	man	Wage		

Ratio of Apprentices to Journeymen - *

* No more than 1 Field Engineer Apprentice per Survey Crew.

Craft: Operating Engineer - Field Engineer

COMMENTS/NOTES

Operating Engineer - Field Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter - Bridges

PREVAILING WAGE RATE

	05/03/19
Foreman	W59.81 B28.74 T88.55
General Foreman	W61.81 B28.74 T90.55
Journeyman	W54.81 B28.74 T83.55

Craft: Painter - Bridges

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	50%			60%	70%		80%	90%	
6 Months										
Benefits	Intervals	1 to 2 =	10.00	Intervals	3 to 4 =	12.27	Intervals	5 to 6 =	15.28	

Ratio of Apprentices to Journeymen - 1:4

Craft: Painter - Bridges

COMMENTS/NOTES

These rates apply to: All bridges that span waterways, roadways, railways and canyons. All tunnels, overpasses, viaducts and all appurtenances.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter - Line Striping

PREVAILING WAGE RATE

	05/03/19
Apprentice (1st year)	W26.44 B11.65 T38.09
Apprentice (2nd year)	W30.44 B19.16 T49.60
Foreman (Charge Person)	W39.09 B19.94 T59.03
Journeyman 1 (at least 1 year of working exp. as a journeyman)	W34.32 B19.94 T54.26
Journeyman 2 (at least 2 years of working exp. as a journeyman)	W38.09 B19.94 T58.03

Craft: Painter - Line Striping

COMMENTS/NOTES

OVERTIME:

Hours in excess of 8 per day, Monday through Saturday, and all hours on Sundays and holidays shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day. Veterans Day may be substituted for the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter - New Construction

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W45.45 B24.35 T69.80	W47.45 B24.35 T71.80
General Foreman	W49.43 B24.67 T74.10	W51.43 B24.67 T76.10
Journeyman	W41.47 B24.04 T65.51	W43.47 B24.04 T67.51

Craft: Painter - New Construction

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	40%	45%	55%	65%	70%	75%	80%	80%		
6 Months										
Benefits	8.05	8.05	10.05	10.05	11.05	11.05	14.05	14.05		

Ratio of Apprentices to Journeymen - 1:4

Craft: Painter - New Construction

COMMENTS/NOTES

Spraying, sandblasting, lead abatement, work on tanks or stacks, work performed above 3 stories or 30 feet in height, or using swing scaffolds requires an additional 10% of the wage rate.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - **MERCER**

Craft: Painter - Repainting

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W33.07 B19.95 T53.02	W33.92 B19.95 T53.87
General Foreman	W36.00 B20.10 T56.10	W36.85 B20.10 T56.95
Journeyman	W30.14 B19.77 T49.91	W30.99 B19.77 T50.76

Craft: Painter - Repainting

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	NEW	CONSTR	TION					
				UC						

Ratio of Apprentices to Journeymen - 1:4

Craft: Painter - Repainting

COMMENTS/NOTES

NOTE: These rates may only be used on jobs where no major alterations (only doing painting and carpeting with nothing else being changed in the office or on the project) occur, and where not more than 3 other trades are present on the job, but may NOT, under any circumstances, be used for work on bridges, stacks, elevated tank, or generating stations.

Spraying, sandblasting, lead abatement, work on tanks or stacks, work performed above 3 stories or 30 feet in height, or using swing scaffolds requires an additional 10% of the wage rate.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

OVERTIME:

- Hours in excess of 8 per day and 40 per week shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
- Four 10-hour days may be worked, at straight time, Monday through Sunday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

County - MERCER

Craft: Painter- Containment

PREVAILING WAGE RATE

	05/04/17
Journeyman	W35.18 B24.75 T59.93

Craft: Painter- Containment

COMMENTS/NOTES

NOTE: These rates shall require no painting, but used in a supporting capacity only, such as wrapping, boxing, fencing, etc. on tanks.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate..

- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter-Elevated Water Tanks

PREVAILING WAGE RATE

	05/04/17
Foreman	W48.92 B24.92 T73.84
General Foreman	W50.92 B24.92 T75.84
Journeyman	W43.92 B24.92 T68.84

Craft: Painter-Elevated Water Tanks

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	BRIDGES							

Craft: Painter-Elevated Water Tanks

COMMENTS/NOTES

These rates apply to: All new and repaint elevated water tanks (interior and exterior).

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Painter-Structural Steel

PREVAILING WAGE RATE

	05/04/17
Foreman	W47.87 B25.27 T73.14
General Foreman	W49.87 B25.27 T75.14
Journeyman	W42.87 B25.27 T68.14

Craft: Painter-Structural Steel

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	BRIDGES							

Craft: Painter-Structural Steel

COMMENTS/NOTES

These rates apply to: All work in power plants (any aspect). On steeples, on dams, on hangers, transformers, substations, etc. and on open steel, whether new or repaint. All new work (excluding traditional commercial painting work) in refineries, tank farms, water/sewerage treatment facilities and on pipelines.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Paperhanger - New Construction

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W46.75	W47.68
	B24.11	B24.11
	T70.86	T71.79
Journeyman	W41.68	W42.61
	B24.11	B24.11
	T65.79	T66.72

Craft: Paperhanger - New Construction

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	NEW	CONSTR	TION					
				UC						

Ratio of Apprentices to Journeymen - 1:4

Craft: Paperhanger - New Construction

COMMENTS/NOTES

FOREMEN REQUIREMENTS:

- When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Paperhanger - Renovation

PREVAILING WAGE RATE

	05/01/19	05/01/20
Foreman	W34.13 B19.81 T53.94	W35.15 B19.81 T54.96
Journeyman	W31.03 B19.81 T50.84	W31.96 B19.81 T51.77

Craft: Paperhanger - Renovation

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
		SEE	PAINTER	NEW	CONSTR	TION				
					UC					

Ratio of Apprentices to Journeymen - 1:4

Craft: Paperhanger - Renovation

COMMENTS/NOTES

NOTE: These rates may only be used on jobs where no major alterations occur, and where not more than 3 other trades are present on the job, but may NOT, under any circumstances, be used for work on bridges, stacks, elevated tanks, or generating stations.

FOREMEN REQUIREMENTS:

- When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

OVERTIME:

- Hours in excess of 8 per day and 40 per week shall be paid at time and one-half the regular rate.

- Four 10-hour days may be worked, at straight time, Monday through Sunday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Pipefitter

PREVAILING WAGE RATE

Craft: Pipefitter

COMMENTS/NOTES

See PLUMBERS Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Plasterer

PREVAILING WAGE RATE

See "Cement Mason" Rates

Craft: Plasterer

COMMENTS/NOTES

See CEMENT MASON Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Plumber PREVAILING WAGE RATE

	07/02/19
Assistant General Foreman	W54.71 B39.65 T94.36
Foreman	W54.21 B39.65 T93.86
General Foreman	W57.22 B39.65 T96.87
Journeyman	W50.19 B39.65 T89.84

Craft: Plumber APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
	35%	45%	55%	65%	75%					
Yearly										
Benefits	24.84	27.11	29.41	31.68	33.96					

Ratio of Apprentices to Journeymen - 1:4

Craft: Plumber COMMENTS/NOTES

The regular workday shall consist of 8 hours between 6:00 AM and 4:30 PM.

FOREMAN REQUIREMENTS (number of Plumbers on site):

- (1 to 8)- 1 Foreman
- (9 to 16)- 1 Foreman and 1 Assistant General Foreman
- (17 to 40)- 1 Foreman for every (1 to 8 Plumbers) and 1 Assistant General Foreman every (1 to 5 gangs). One note, a "gang" is a group of 8 men.
- (41 and more)- 1 Foreman for every (1 to 8 Plumbers), 1 Assistant General Foreman every (1 to 5 gangs) and 1 General Foreman. One note, for every additional Assistant General Foreman over five designated, the General Foreman shall receive an additional 10 cents per hour.

SHIFT DIFFERENTIALS:

- The second shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the hourly rate plus 25%, inclusive of benefits.
- When a third shift is worked, the third shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the hourly rate plus 30%, inclusive of benefits.
- A second shift may be established without a first shift, provided the second shift starts at 1:00 PM or later.

OVERTIME:

- Hours in excess of 8 per day, or before of after the regular workday, Monday through Friday, that are not shift work, and the first 10 hours on Saturdays, shall be paid at time and one-half, inclusive of benefits. Hours in excess of 10 on

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Saturdays, and all hours on Sundays and holidays, shall be paid at double time, inclusive of benefits.

- Four 10-hour days may be worked, Mon to Thurs, at straight time, with Friday used as a make-up day for a day lost due to inclement weather. If Fri. is not a make-up day, the first 10 hours shall be paid at time and one-half, and hours in excess of 10 at double time, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Roofer PREVAILING WAGE RATE

	07/01/19
Foreman (5 workers or less)	W40.35 B31.80 T72.15
Foreman (6 workers or more)	W40.85 B31.80 T72.65
Journeyman	W38.35 B31.80 T70.15

Craft: Roofer APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	52%	55%	60%	75%						
Benefits	22.32	25.07	31.80	31.80						

Ratio of Apprentices to Journeymen - *

* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

Craft: Roofer COMMENTS/NOTES

NOTE: Mopper, Operator of Felt Laying Machine or Slag Dispenser shall receive an additional \$.50 per hour.

FOREMAN REQUIREMENTS:

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

The regular workday is 8 hours between 5:00 AM and 4:30 PM.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Roofer - Shingle, Slate & Tile

PREVAILING WAGE RATE

	07/01/19
Foreman (3 workers or less)	W28.75 B20.87 T49.62
Foreman (4 workers or more)	W29.50 B20.87 T50.37
Helper	W14.25 B20.87 T35.12
Journeyman (shingle work)	W28.50 B20.87 T49.37

Craft: Roofer - Shingle, Slate & Tile

APPRENTICE RATE SCHEDULE

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	60%	70%	80%							

Ratio of Apprentices to Journeymen - *

* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

Craft: Roofer - Shingle, Slate & Tile

COMMENTS/NOTES

NOTE: Above rates are for Shingle work only. Slate and Tile work rates are an additional \$3.00 per hour.

HELPER RATIO: 1 Helper to 1 Journeyman

FOREMAN REQUIREMENTS:

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Sheet Metal Sign Installation

PREVAILING WAGE RATE

	07/17/19
Foreman	W29.50 B23.01 T52.51
Journeyman	W27.50 B23.01 T50.51

Craft: Sheet Metal Sign Installation

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	40%	45%	50%	55%	60%	65%	70%	75%	80%	90%
Benefits	22.53	22.57	22.61	22.65	22.69	22.73	22.77	22.81	22.85	22.96

Ratio of Apprentices to Journeymen - 1:2

Craft: Sheet Metal Sign Installation

COMMENTS/NOTES

HAZARDOUS DUTY:

Sign Installers working from a bosun's chair or outside swinging scaffold at a height of 60 feet or more: + \$5.00 per hour.

FOREMAN REQUIREMENTS:

When there are 3 or more Sign Installers on a job, one must be designated a Foreman.

The regular workday shall be 8 hours, between 8:00 AM and 5:00 PM.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at time and one-half the regular rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - **MERCER**

Craft: Sheet Metal Worker PREVAILING WAGE RATE

	06/01/19	06/01/20
Foreman	W52.89	W0.00
	B41.83	B0.00
	T94.72	T98.22
Journeyman	W49.89	W0.00
	B41.83	B0.00
	T91.72	T95.22

Craft: Sheet Metal Worker APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 months	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%
Benefits	14.06	15.63	17.20	18.76	20.32	27.74	29.75	31.75	33.77	35.80

Ratio of Apprentices to Journeymen- 1:3, except for the following types of work where the ratio shall be 1:1 (architectural metal work, testing and balancing, lockers, shelving and toilet partitions).*

* For work performed in a fabrication shop, the ratio will be applied on a "company-wide" basis (i.e. the total number of apprentices and journeymen employed by the company).

Craft: Sheet Metal Worker COMMENTS/NOTES

JOB SITE FOREMAN REQUIREMENTS:

- When there are 2 to 9 Sheet Metal Workers on a jobsite, 1 must be designated a Foreman.
- When there are 10 to 16 Sheet Metal Workers on a job site, 2 must be designated Foremen.
- When there are 17 to 23 Sheet Metal Workers on a job site, 3 must be designated Foremen.
- For every 7 additional Sheet Metal Workers on a job site, there shall be 1 additional Foreman.

SHOP FOREMAN REQUIREMENTS (For custom fabrication):

- When there are 1 to 10 Sheet Metal Workers in the shop, 1 must be designated a Foreman.
- For every 10 additional Sheet Metal Workers in the shop, 1 must be designated a Foreman.

The regular workday consists of 8 hours, between 6:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays.
- There must be a day shift worked in order to have a 2nd and/or 3rd Shift.
- Shop work does not satisfy shift requirements.
- 2nd Shift (4:30 PM-12:30 AM) shall be paid an additional 15% of the regular rate per hour inclusive of benefits, and receive 8 hours pay for 7.5 hours of work.
- 3rd Shift (12:30 AM-8:00 AM) shall be paid an additional 25% of the regular rate per hour inclusive of benefits, and receive 8 hours pay for 7 hours of work.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, that are not shift work, and all

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

hours on Saturday, shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Benefits on overtime hours are as follows:

Time and one-half = \$48.17.

Double-time = \$55.19.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Sprinkler Fitter

PREVAILING WAGE RATE

	08/13/19
Foreman	W60.70 B28.32 T89.02
Journeyman	W57.20 B28.32 T85.52

Craft: Sprinkler Fitter

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	17.16	17.16	20.02	22.88	25.74	31.46	37.18	40.04	42.90	45.76
Benefits	11.57	11.57	14.57	21.17	21.67	22.17	22.17	22.67	23.17	24.17

Ratio of Apprentices to Journeymen - 1:4

Craft: Sprinkler Fitter

COMMENTS/NOTES

The regular workday shall be 8 hours, between 7:00 AM and 4:30 PM

SHIFT DIFFERENTIALS:

-Second and third shifts shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours outside of the regular workday, and the first 2 hours in excess of 8 per day (9th and 10th hours), Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day, Monday through Friday, hours in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days at straight time, Monday through Friday, between 7:00 AM and 6:30 PM. The first 2 hours in excess of 10 per day (11th and 12th hours), the first 10 hours on the fifth day, and the first 10 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 12 per day, Monday through Friday, and all hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, the day after Thanksgiving, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Tile Finisher-Marble

PREVAILING WAGE RATE

	07/01/19
Finisher	W47.41 B34.64 T82.05

Craft: Tile Finisher-Marble

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%

Ratio of Apprentices to Journeymen - 1:4

Craft: Tile Finisher-Marble

COMMENTS/NOTES

OVERTIME:

Hours in excess of 7 per day, Monday through Friday, and the first 7 hours on Saturdays shall be paid at time and one half the regular rate, inclusive of benefits. Hours in excess of 7 on Saturdays and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and the day after, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Tile Setter - Marble

PREVAILING WAGE RATE

	07/01/19
Tile Setter	W59.44 B36.88 T96.32

Craft: Tile Setter - Marble

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%

Ratio of Apprentices to Journeymen - 1:4

Craft: Tile Setter - Marble

COMMENTS/NOTES

OVERTIME:

Hours in excess of 7 per day, Monday through Friday, and the first 7 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 7 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and the day after, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Tile Setter - Mosaic & Terrazzo

PREVAILING WAGE RATE

	07/01/19
Grinder or Assistant	W54.81 B36.42 T91.23
Mechanic	W56.41 B36.44 T92.85
Terrazzo Resinous Worker	W47.10 B29.47 T76.57

Craft: Tile Setter - Mosaic & Terrazzo

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	50%	55%	60%	65%	70%	75%	85%	95%	100%	

Ratio of Apprentices to Journeymen - 1:5

Craft: Tile Setter - Mosaic & Terrazzo

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES ENTERING PROGRAM AFTER 7-1-17:

INTERVAL	PERIOD AND RATES						
1500 Hours	35%	45%	60%	70%	80%	90%	100%

The regular workday consists of 7 hours, between 8:00 AM and 3:30 PM.

OVERTIME:

- Hours in excess of 7 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Monday after Easter, Memorial Day, July 4th, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and the day after, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Truck Driver

PREVAILING WAGE RATE

	06/25/19	05/01/20
Bucket, Utility, Pick-up, Fuel Delivery trucks	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Dump truck (single axle), Asphalt Distributor, Tack Spreader	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Euclid-type vehicles (large off-road equipment)	W42.00 B33.23 T75.23	W0.00 B0.00 T77.13
Helper on Asphalt Distributor truck	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Slurry Seal, Seeding/Fertilizing/Mulchi ng truck	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Straight 3-axle trucks, Dump Truck (3-axle), Dump Truck (tandem)	W41.90 B33.23 T75.13	W0.00 B0.00 T77.03
Tractor-Trailer truck (all types)	W42.00 B33.23 T75.23	W0.00 B0.00 T77.13
Vacuum or Vac-All truck (entire unit)	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Winch Trailer Driver	W42.10 B33.23 T75.33	W0.00 B0.00 T77.23

Craft: Truck Driver

COMMENTS/NOTES

Foreman: + \$.75 cents per hour. Overtime rate shall be increased accordingly.

HAZARDOUS WASTE REMOVAL WORK:

- On a hazardous waste site requiring Level A, B, or C personal protection for any worker: + \$3.00 per hour.
- On a hazardous waste site not designated Level A, B, or C: + \$1.00 per hour.

The regular workday consists of 8 hours starting between 6:00 AM and 8:00 AM.

SHIFT DIFFERENTIAL:

Any shift starting at a time other than 6:00 AM or 8:00 AM shall receive an additional \$3.00 per hour.

BLENDED RATE:

- When a truck driver is performing work on site and also serving as a material delivery driver, the driver shall be paid a

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

"blended rate" which shall be 80% of the above-listed wage rates, plus the full benefit rate. This rate shall be used when the driver "round robins" for a minimum of 6 hours during the work day.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

- Benefits on overtime shall be \$38.91.

- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day. Veteran's Day may be substituted for the day after Thanksgiving. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Truck Driver-Material Delivery Driver

PREVAILING WAGE RATE

	06/25/19	05/01/20
Driver	W33.91 B33.23 T67.14	W0.00 B0.00 T69.04
New Hires: 1st Year	W33.91 B33.23 T67.14	W0.00 B0.00 T69.04

Craft: Truck Driver-Material Delivery Driver

COMMENTS/NOTES

NOTE: These rates may only be used for the delivery of *materials TO the job site (*building materials that will become a permanent part of the job site, such as sand, stone, aggregates, asphalt, sheetrock, 2x4's, etc.). In addition, only the following types of truck may be used for such deliveries (Dump Truck or Flat-bed truck). Please note that this rate does not apply to material suppliers or their employees (who do not perform services at the job site), and for the delivery of equipment and/or items that will not become a permanent part of the job site.

OVERTIME: Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate. Benefits on overtime shall be \$38.91.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veterans's Day, Thanksgiving Day, Christmas Day. Veteran's Day may be substituted for the day after Thanksgiving. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - MERCER

Craft: Welder

PREVAILING WAGE RATE

Welder

Craft: Welder

COMMENTS/NOTES

Welders rate is the same as the craft to which the welding is incidental .

AIA[®] Document A132[™] – 2009

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Construction Manager:
(Name, legal status, address and other information)

The Architect:
(Name, legal status, address and other information)

FRAYTAK VEISZ HOPKINS DUTHIE, P.C.
Architects/Planners
1515 Lower Ferry Road
Trenton, Mercer County, New Jersey 08618

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232[™]–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132[™]–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132[™]–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser. ^AIA Document A232[™]–2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS
- 10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

As fixed in the Notice to Proceed

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

§ 3.2

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than () days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

Portion of the Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

Liquidated Damages to be assessed in Accordance with the Specification requirements, Page 1:01800-1 - , entitled "TIME OF COMPLETION AND LIQUIDATED DAMAGES'.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

- [X] Stipulated Sum, in accordance with Section 4.2 below
[] Cost of the Work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below
[] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below. Based on the selection above, also complete either Section 5.1.4, 5.1.5 or 5.1.6 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Stipulated Sum shall be (\$), subject to additions and deletions as provided in the Contract Documents.

§ 4.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.2.3 Unit prices, if any:

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Table with 3 columns: Item, Units and Limitations, Price per Unit (\$0.00)

§ 4.2.4 Allowances included in the Stipulated Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Table with 2 columns: Item, Allowance

§ 4.3

(Paragraph deleted)

§ 4.3.2

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.3.3

§ 4.3.4

§ 4.3.5

§ 4.3.6

(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.3.7

§ 4.4

§ 4.4.1

§ 4.4.2

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.4.3 :

§ 4.4.4

§ 4.4.5

§ 4.4.6

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.4.7

§ 4.4.7.1

(Insert specific provisions if the Contractor is to participate in any savings.)

§ 4.4.7.2

§ 4.4.7.3

Init.

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User Notes:

(1882208303)

Item

Allowance

§ 4.4.7.4

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the day of the month. (Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent (%);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.4.4 The progress payment amount determined in accordance with Section 5.1.4.3 shall be further modified under the following circumstances:

- .1

- 2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.5 Reduction or limitation of retainage, if any, shall be as follows:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.5

§ 5.1.5.1

§ 5.1.5.2

§ 5.1.5.3

§ 5.1.5.4

§ 5.1.5.5

§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.6

§ 5.1.6.1

§ 5.1.6.2

§ 5.1.6.3

§ 5.1.6.4

§ 5.1.6.5

§ 5.1.6.6

§ 5.1.6.7 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232-2009, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit A, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and
- .3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232-2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker. *(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232-2009, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

- Arbitration pursuant to Section 15.4 of AIA Document A232-2009.
- Litigation in a court of competent jurisdiction.
- Other: *(Specify)* Mediation

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232-2009.

§ 7.2

§ 7.2.1

§ 7.2.2

§ 7.2.3

§ 7.2.4

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User Notes:

(1882208303)

§ 7.2.5

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2

§ 8.3

(Name, address and other information)

§ 8.4

(Name, address and other information)

§ 8.5

§ 8.6 Other provisions:

8.6.1 A condition of this Agreement is that the Contractor will comply with all applicable governmental laws and regulations including, but without limitation, those set forth in Section 00860 of the Specifications, which are hereby incorporated by reference as if set forth herein at length.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are, AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition and its revisions.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document

Title

Date

Pages

§ 9.1.4 The Specifications:

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(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages
Part 1	Contract Conditions and General Requirements		
And			
Part			

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
--------	-------	------

§ 9.1.6 The Addenda, if any:

Number	Date	Pages
--------	------	-------

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:

.1

.2

.3

.4 Other documents, if any, listed below:
(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232-2009 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

Proposal dated
Exhibit B

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232-2009.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232-2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount (\$0.00)
As per Specifications	

This Agreement is entered into as of the day and year first written above.

OWNER

OWNER (Signature)

Attest:

CONTRACTOR (Signature)

Attest

(SEAL)
(Row deleted)

(SEAL)

PART 1 - CONTRACT CONDITIONS AND GENERAL REQUIREMENTS

SECTION 00700 – AIA DOCUMENT A232 – 2009, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, *Construction Manager as Adviser Edition*



AIA[®] Document A232[™] – 2009

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:

(Name, and location or address)

Sample

THE CONSTRUCTION MANAGER:

(Name, legal status and address)

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132[™]-2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132[™]-2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132[™]-2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding requirements).

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 1.1.5 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§1.1.5.1 Construction Drawings prepared by the Architect are intended to show the scope of work, including but not limited to general arrangement of stairs, equipment, ducts, piping and other elements of the structure, and approximate locations and sizes of equipment. This does not relieve the Contractor from providing all connections and accessories necessary to make structural, mechanical and electrical work complete, ready to operate, in compliance with all applicable codes, laws and other regulations, and acceptable to the Architect. As such, they are not to serve as Shop Drawings.

§1.1.5.2 Locations and arrangements of items are designated by dimensions at less than full scale, unless otherwise noted. Such reductions of scale may vary and will be noted.

§1.1.5.3 Designs, information, reports and other materials and/or data may be performed and /or provided for the project by other than the Architect. Such designs, information, reports and other materials and/or data may include, without limitations, designs, information, reports and other materials and/or data performed and/or provided by the Contractor(s) or by sub-contractors and/or other consultants retained by the Contractor(s) and/or the Owner. Such designs, information, reports and other materials and/or data may include without limitation the locations, quantities, sizes, conditions and scope of specific items of the construction Work required to be provided for the Project. The Contractor shall immediately notify the Construction Manager and Architect in writing upon its discovery or knowledge or any errors, omissions or defects in any designs, information, reports and other materials and/or data prepared or provided by the Contractor or on the Contractor's behalf which are provided to the Architect for the

Architect's preparation of its design documentation for the Project. The Contractor shall also be required to immediately notify the Architect in writing in the event that it discovers or becomes aware of any errors, omissions or defects in any designs, information, reports or other materials or data that are provided to the Architect by others for the preparation of the Architect's design documentation. The Contractor shall also be required to immediately notify the Construction Manager and Architect in writing if it discovers or becomes aware of any discrepancies between any design documentation prepared by the Architect and any designs, information, reports or other materials and/or data provided to the Architect by the Contractor(s), the Owner, subcontractors or sub-consultants retained by the Contractor(s) or Owner, or by others. In such event, the Contractor shall promptly submit a written request for resolution of such discrepancy to the Architect and Owner.

§ 1.1.6 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect, or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the

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Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.5.3 The Contractor will be furnished free of charge two (2) sets of signed and sealed drawings and specifications. If more documents are required by the Contractors, the additional documents may be obtained at the Architect's cost.

§ 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.4.1 The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the specifications, shown on the drawings or as the same may be modified at the direction of the Architect to meet changed conditions or as a result of modification of the Contract.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

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§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made

in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.3.1 Contractor shall afford other Contractors retained by the Owner and all sub-contractors opportunity for introduction and storage of their materials and execution of their work, connect and coordinate his work with theirs and cooperate with the Architect and with other Contractors so that work shall be done at proper time, in a manner not to delay others or increase costs.

§ 3.3.1.2 During the progress of the work, Contractor and subcontractors shall build in all material and apparatus furnished and set by other Contractors and subcontractors. Contractors and Subcontractors shall familiarize themselves with the work of every Contractor and subcontractor whose work affects or ties in with his own and shall be responsible for the finishes results.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Owner shall notify Contractor or any on-site issues and may request removal of personnel in the event of conduct which is not deemed in good order.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.1 All Contractors, subcontractors, suppliers, etc. are required to pay all applicable taxes as required by law, outside of those taxes for which the Owner is exempt.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. The Contractor shall arrange for any inspections by governmental authorities needed to obtain any necessary occupancy permits.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the

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Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.9.6 The Contractor's superintendent shall be present at the job site at all times that work is being performed, including work performed during overtime.

§ 3.9.8 The Contractor shall immediately remove from the Project, whenever requested by the Owner or Construction Manager, any employee, Project Manager or Superintendent who is considered by the Owner or Construction Manager to be incompetent or disposed to be disorderly, or who, for any reason, is not satisfactory to the Owner and

the Project, and that person shall not again be employed on the Project without the consent of the Owner or Construction Manager.

§ 3.9.9 The Owner reserves the right to require the Contractor to replace any employee, project manager and/or Superintendent at no additional cost.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

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§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

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§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.13.5 The Contractor shall be responsible for obtaining proper parking permits (if required) for all vehicles which will be parked on or off site. All costs for parking permits and for fines due to improperly parked vehicles are the responsibility of the Contractor. Contractor is to assume there is no parking available on site.

§ 3.13.6 The Owner reserves the right to grant or to deny permission for the erection of signs or advertisements of any kind, including Project Sign, on the building, site enclosure or premises. The Contractor shall not display or permit to be displayed any sign, trademark, poster or other advertising devices on or about the building, site enclosure or premises, except as may be required for proper conduct of the work, as a directory of Contractors engaged in the work, for emergency, or as may be specified.

§ 3.13.7 All Contractors shall confirm their use of the premises for all purposes, to the areas occupied by the construction and related storage areas.

§ 3.13.8 The Contractor shall send proper notices, make all necessary arrangements and perform all other services required in order to protect and maintain all marked, identified or known public utilities such as fire lines and plugs, electric, gas, water lines, sewer pipes, mechanical systems and all other items of this nature, and assume all responsibility and pay all costs for which the Owner may be liable if said services are interrupted by actions of the Contractor or subcontractors. Contractor acknowledges that all public utilities or other infrastructure may not be identified or marked, and Contractor acknowledges that all public utilities or other infrastructure may not be identified or marked and that Contractor has taken all reasonable precautions to identify all known and unknown utilities or other infrastructure.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

§ 3.14.3 All work that may be cut, damaged, disturbed or otherwise interfered with during the progress of the work of the various trades shall be fully, properly and carefully patched, repaired and made good in a first class manner satisfactory to the Architect by the Contractor whose work has been cut or damaged and requires repair.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

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§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner, Architect, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.3 The Contractor's indemnity obligations under this Section 3.18 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees) and punitive damages (if any) arising out of, or in connection with, and (i) violation of or failure to comply with any law, statute, ordinance, rules, regulations, code or requirement of a public authority that bears upon the performance of the Work by the Contractor, a subcontractor or any person or entity for whom either is responsible, (ii) means, methods procedures, techniques or sequences of execution or performance of the Work, and (iii) failure to secure and pay for permits, fees, approvals, licenses and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work by the Contractor, a subcontractor or any person or entity for whom either is responsible.

§ 3.18.4 The obligations of the Contractor under this Section 3.18 shall not extend to the liability of the Construction Manager, Architect, their consultants and agents and employees of any of them arising out of (i) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (ii) the giving of or the failure to give directions or instruction by the Construction Manager, Architect, their consultants and agents and employees of any of them, provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.3 Duties, responsibilities and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Construction Manager, Architect and Contractor. Consent shall not be unreasonably withheld.

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 **Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

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§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar

required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.19 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the

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Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

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§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for

Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques,

sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor

Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and

Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 construction or operations by the Owner or other Contractors.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of

the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to

perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness. The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or

omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 **Boiler and Machinery Insurance.** The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 **Loss of Use Insurance.** The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

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§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. The Owner shall provide written notification to the Contractor of the cancellation or expiration of any insurance required by Sections 11.2 and 11.3. The Owner shall provide such written notice within five (5) business days of the date the Owner is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.3.7 **Waivers of Subrogation.** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's or authority having jurisdiction's request to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation, inspection, testing or approval and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the

Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 **If, in the opinion of the Architect and the Construction Manager, the Contractor delays Final Completion of the Work beyond a reasonable time after the Date of Substantial Completion of the Project to such extent that the period between the Date of Substantial Completion of the Project and the end of the guarantee period becomes less than eleven (11) months, the start of the guarantee period shall be the date of the Final Project Certificate of Payment in lieu of the Date of Substantial Completion of the Project.**

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Construction Manager, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.5.5 If the Construction Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in

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Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 **Claims for Consequential Damages.** The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the

demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

PART 1 - GENERAL

1.1 FUNCTION

- A. The following supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction, Construction Manager as Adviser Edition", AIA Document A232 - 2009 and the Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, AIA Document A132 - 2009. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.
- B. Refer to Sections in Division 1 "General Requirements" for additional modifications, deletions and additions to the "General Conditions of the Contract for Construction".

1.2 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISER EDITION, AIA DOCUMENT A232- 2009.

- A. Document is modified in accordance with the following paragraphs and as indicated herein after:

1.3 PARAGRAPH 1.1 - BASIC DEFINITIONS

- A. Paragraph 1.1.1 - "The Contract Documents":

Delete last sentence "Unless specifically enumerated in the Agreement, the Contract Documents do not..... bidding requirements)."

- B. Supplement Paragraph 1.1 "Basic Definitions", as follows:

1.1.9 The Project Manual. The Project Manual is a volume, or volumes, assembled for the Work that includes, or is deemed to incorporate by reference the General Conditions, Supplementary Conditions, the Bidding Requirements and Documents related thereto, the Specifications, and all addenda issued prior to the execution of the Contract."

1.1.10 Final Completion. The date the Contract has been fully performed, all the Work has been completed and a final certificate for Payment approved by the Owner has been issued by the Architect.

1.1.11 Or Approved Equal and Equal To. Shall mean products by manufacturers other than those specified in the Contract Documents in which the Contractor may submit for those specified in the Contract Documents and which may be incorporated in the Work after review and acceptance by the Architect and acceptance by the Owner.

1.4 PARAGRAPH 1.2 - CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

- A. Delete Paragraph 1.2.1 in its entirety and substitute with the following:

1.2.1 The Contract Documents include all items necessary for the proper execution and completion of the Work by the Contractor. The Work shall consist of all items specifically included in the Contract Documents as well as all additional items of work which are reasonably inferable from that which is specified in order to complete the Work in accordance with the Contract Documents. The Contract Documents are complementary, and what is required by any one Contract Document shall be as binding as if required by all. Any differences between the requirements of the Drawings and the Specifications or any differences noted within the Drawings themselves or within the Specifications themselves have been referred to the Owner, Architect and Construction Manager by Contractor prior to the submission of bids and have been clarified by an Addendum issued to all bidders.

If any such differences or conflicts were not called to the Owner's and the Architect's attention prior to submission of bids, the Architect shall decide which of the conflicting requirements will govern based upon the most stringent of the requirements, and, subject to the approval of the Owner, the Contractor shall perform the Work at no additional cost and/or time to the Owner in accordance with the Architect's decision. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results.

1.5 PRECEDENCE OF LARGE SCALE DETAILS

- A. Supplement Paragraph 1.2 "Correlation and Intent of the Contract Documents", as follows:

1.2.4 The general character of the detail work is shown on the drawings but minor modifications may be made in large scale details. Where the word "similar" occurs on the drawings it shall be used in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection to other parts of the work. Where on any drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to other like portions of the work. Where detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts in the work unless otherwise indicated. In case of differences between small and large scale drawings, the larger scale drawings shall take precedence. Dimensions given shall take precedence over scale measurements. Any discrepancies shall be referred to the Architect for adjustment before any work affected thereby has been performed.

1.2.5 During the course of the work, should any ambiguities or discrepancies be found in the Specifications or on the Drawings; or should there be found any discrepancies between the Drawings and Specifications to which the Contractor has failed to call attention before submitting his / her bid, then the Architect will interpret the intent of the Drawings and Specifications; and the Contractor hereby agrees to abide by the Architect's interpretation and to carry out the work in accordance with the decision of the Architect. It is expressly stipulated that neither the Drawings nor the Specifications shall take precedence over the other, and it is further stipulated that the Architect may interpret or construe the Drawings and Specifications so as to secure in all cases the result most consistent with the needs and requirements of the work.

1.6 PARAGRAPH 2.1 - GENERAL

- A. Delete Paragraph 2.1 in its entirety.

1.7 PARAGRAPH 2.2 - INFORMATION AND SERVICES REQUIRED OF THE OWNER

- A. Delete Paragraphs 2.2.1 through 2.2.4 in their entirety.
- B. Delete Paragraph 2.2.5 in its entirety and substitute with the following:

2.2.5 The Architect will furnish the Contractor, without charge, the following number of sets of drawings and specifications. Additional copies will be furnished at the Architect's reproduction costs.

Single Overall Contract 6 Sets

1.8 PARAGRAPH 2.3 - OWNER'S RIGHT TO STOP THE WORK

- A. Edit paragraph 2.3 as follows:

Line 1; after "Documents" add:

"or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, through, or under Contractor, or disregard the instructions of Architect, Construction Manager or Owner when based on the requirements of the Contract Documents,".

1.9 PARAGRAPH 2.4 - OWNER'S RIGHT TO CARRY OUT THE WORK

- A. Delete the last line and substitute with the following:

"the Contractor, and/or his / her surety shall pay the difference to the Owner."

1.10 PARAGRAPH 3.2 - REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

- A. Delete the second sentence in Paragraph 3.2.2 in its entirety and substitute with the following:

"If any errors, inconsistencies or omissions appear in the drawings, specifications or other Contract Documents, which should reasonably have been discovered and concerning which interpretation had not been obtained from the Architect during the Bidding Period, the Contractor shall within ten days after receiving written 'Notice of Award' notify the Architect in writing of such error, inconsistency or omission. In the event the Contractor fails to give such notice, he/she will be held responsible for the results of any such errors, inconsistencies or omissions and the cost of rectifying same. Interpretation of this procedure after the ten-day period will be made by the Architect and his / her decision will be final".

1.11 LAYOUT OF WORK

- A. Supplement Paragraph 3.3 "Supervision and Construction Procedures", as follows:

3.3.4 The Contractor shall lay out his / her own work and be responsible for all lines, elevations and measurements of the building, and other work executed by him/her under the Contract. He/She must exercise proper precaution to verify the figures shown on the drawings before laying out the work and will be held responsible for any errors resulting from his / her failure to exercise such precaution.

3.3.5 The Contractor shall coordinate his / her operations with those of all his / her subcontractors.

3.3.6 The Contractor, and including each of his / her subcontractors, shall keep fully informed of the progress and the details of the work of all subcontractors, and shall notify the CM immediately of lack of progress or defective workmanship on the part of any subcontractors.

3.3.7 Failure of any contractor to keep informed of the work progressing on or off the site, and his / her failure to give notice of lack of progress or defective workmanship by others, will be construed by Owner and by the CM as acceptance by the contractor of the status of the work as being satisfactory for proper coordination with the contractor's own work and with the work of all his / her subcontractors.

1.12 WARRANTY

- A. Supplement Paragraph 3.5 "Warranty", as follows:

3.5.1 The warranty period for all work of the Contractor shall be **two (2) years** from the date of substantial completion and acceptance by the Owner unless otherwise specified.

1.13 PARAGRAPH 3.7 - PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

- A. 3.7.3 In line 3, delete "the costs attributable to correction" and replace with "all costs attributable to the correction thereof or related thereto, including all fines and penalties."

1.14 PARAGRAPH 3.9 - SUPERINTENDENT

- A. Supplement Paragraph 3.9 "Superintendent", as follows:

3.9.4 Qualifications of superintendent proposed to be used shall be submitted to the Construction Manager and Owner's approval obtained before proceeding with work.

3.9.5 The superintendent shall be assigned to the project on a full-time basis from the inception of construction until the completion of all corrective and punch list work.

1.15 PROGRESS SCHEDULE

- A. Supplement Paragraph 3.10 "Contractor's Construction Schedule", as follows:

3.10.1.1 Within fifteen (15) days after the date of the notice to proceed the Contractor shall submit to the Architect, on forms supplied by the Architect, a bar-graph Progress Schedule upon which shall be indicated the dates for starting and the dates for completion of all contracts and all divisions of the work in a manner which will coincide with Time For Completion and other project milestone dates.

Schedule "CPM" Requirements:

- .1 General Construction Work Contractor shall include in his / her price the cost of the outsourcing CPM scheduling for entire project and all prime contractors. Utilize "Primavera-Project Planner - version 3.0 Software by Primavera Systems Inc."
- .2 CPM consultant to be approved by Architect and the Construction Manager. Initial GC. Schedule to be provided to all prime subcontractors within 15 days of Notice to Proceed.
- .3 Monthly updates will be required during construction with each payment application.
- .4 Interim Progress Updates will be required for each Job Progress Meeting.
- .5 Comply with all recommendations and instructions of the Construction Manager for preparation of Project Schedule and associated periodic reports.

3.10.1.2 This schedule will be distributed to the Prime Subcontractors for Structural Steel, Plumbing, Heating, Ventilating and Air Conditioning and Electrical Work. When approved by the Subcontractors and agreed upon by the Architect, this schedule will become one of the Contract Documents, and shall be altered thereafter only in accordance with duly authorized change orders for extensions of time in accordance with Paragraph 8.3, "Delays and Extensions of Time".

1.16 SUBMITTALS

A. Supplement Paragraph 3.12 "Shop Drawings, Product Data and Samples", as follows:

3.12.11 All fabricated work shall require shop drawings.

3.12.12 The Architect may request samples of any or all materials to be used in the work. When requested, samples shall be submitted promptly.

3.12.13 Shop drawings and other data where possible shall be submitted in the form of reproducible transparency. Catalogs and other printed matter shall be submitted in six (6) copies.

- .1 Additional prints for file, distribution and for coordination of the work with other contractors shall be provided as directed or as required.

3.12.14 Submittal Procedures: The Contractor's failure to follow proper procedures for submittals constitutes grounds for withholding of payments until such time as the Contractor is in compliance. Proper submittal procedures include all of those set forth elsewhere in this specification including the following:

- .1 All submittals shall be separate for each Project. Contractor must indicate on each transmittal the reference to the Architect's Project Number.
- .2 Failure to adhere to deadlines for completion of submittals and record/resubmittals.
- .3 Failure to provide submittals in good order as required by the Contract Documents.
- .4 Failure to provide submittals in relationship to the progress of the work.
- .5 Performance of work or part of the work, without complete approved submittals.

3.12.15 Architect / Engineer's actions for submittals shall be as follows:

- .1 Submittals returned to the Contractor marked "Approved" allow the Contractor to proceed with the work.
- .2 Submittals returned to the Contractor "Approved As Noted"; "Resubmit For Record":
 - .1 The Contractor may proceed with work, however noted items by the Architect / Engineer (or any affected portion of the submittal), must be corrected and resubmitted to the Architect's office within ten (10) working days of contractor's receipt of the original submittal. Final acceptance of all work is subject to the Contractor's compliance with requirements of the Contract Documents.
- .3 Submittals returned marked "Returned for Corrections" require the Contractor to resubmit corrected or alternate data in accordance with the corrections indicated.
 - .1 The originals of the reproducible transparencies marked "Returned for Corrections" shall be corrected until approval is obtained. The Contractor shall provide such number of prints of transparencies marked "Approved" as required for the expeditious execution of the work.
- .4 Submittals returned marked "No Action Taken":
 - .1 The Contractor may not proceed with the work. The Architect / Engineer will not review submittals so marked until the Contractor has properly completed the submittal or corrected the reasons stated thereon.
 - .2 Reasons for "No Action Taken" on a submittal include, but are not limited to the Contractor's failure to:
 - .1 Submit an approved sub-contractor or supplier.
 - .2 Indicate job specific product data such as catalog number, size, type or material on each submittal.

- .3 Submit complete data, test reports or similar information as required by the Contract Documents.
- .4 Obtain prior approval for substitution.
- .5 Submit documents in a legible or orderly fashion.
- .6 Adhere to any submittal requirements set forth in the Contract Document.
- .7 Submit only submittals which are called for in the Contract Documents, other submittals will not be reviewed by the Architect / Engineer.

3.12.16 The following submittal schedule will be mandatory; time is from date of the notice to proceed, in consecutive calendar days and also in accordance with requirements of Specification Section 01800.

All Contracts and Trades: 45 days

3.12.17 Request for Substitutions:

- .1 Substitutions may be considered Only within thirty (30) calendar days after the award of contracts. Subsequent requests will be considered Only when, through no fault of the contractor, none of the specified products are available.
- .2 Submission of request for substitution shall constitute a representation by the Contractor that he/she:
 - .1 Has investigated the proposed product and determined that it is equal to or better than the specified product.
 - .2 Will provide the same variety for the proposed product as for the specified product.
 - .3 Will coordinate the installation and make other changes which may be required for the work to be complete in all respects, including:
 - .1 Re-design.
 - .2 Additional components and capacity required by other work affected by the change.
 - .3 Waives all claims for additional costs and time extensions which subsequently may become apparent and which are caused by the change.
 - .4 Will reimburse the Owner for additional costs for evaluation of the substitution request, re-design if required, and re-approval by authorities having jurisdiction if required.
- .3 Substitutions will not be considered when acceptance would require substantial revision of the contract documents.
- .4 Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without separate written request.

- .5 Substitution requests will not be considered when submitted directly by subcontractor or supplier.
- .6 When the proposed substitution is not accepted, Contractor must provide the product (or one of the products, as the case may be) specified.
- .7 The Contractor will be notified in writing within a reasonable time, verbal acceptance will not be valid.
- .8 Acceptable substitutions will be added to the contract documents by appropriate modifications.
- .9 Requests for substitution will be reviewed by the Architect upon receipt of all the information requested in the following paragraph. Failure to provide the required information shall be cause for rejection of substitution request.
- .10 Submittal for Substitutions:
 - .1 Submit 3 copies of requests for substitutions, fully identified for product, material or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Submit the following:
 - .1 Complete product data, drawings, and descriptions of materials and methods where applicable. Provide manufacturer's name and address, trade name, and model number of product (if applicable), and name of fabricator or supplier (if applicable).
 - .2 Samples where applicable or requested.
 - .3 Detailed comparison of significant qualities (size, weight, durability, performance and similar characteristics, and including visual effect where applicable) for proposed substitution in comparison with original requirements.
 - .4 List, with addresses, of 3 projects where proposed substitution has been used previously and successfully in a similar application.
 - .5 Coordination information, indicating every required change in every other element of the work which is affected by substitution, extended to include work by Owner and (Sub)Contractor(s).
 - .6 A complete statement of effect substitution will have upon schedule of the work, including its effect (if any) on Contract Time (in comparison with compliance with requirements without approval of proposed substitution).
 - .7 Cost information, including a proposal of net change in Contract Sum (if any).
 - .8 Certification by Contractor to the effect that, in his / her opinion and after his / her thorough evaluation, proposed substitution will result in total work which is equal to or better than the work originally required by contract documents, in every respect of significance except as specifically stated in certification; and that it will perform adequately in application indicated, regardless of equality and exceptions thereto.

- .9 Include in certification, Contractor's waiver of rights to additional payment and time which may subsequently be necessitated, by failure of substitution to perform adequately and for required work to make corrections thereof.

3.12.18 Approval of Substitutions:

- .1 Requests for substitutions will be reviewed for compliance with the specifications based upon the data provided by the Contractor. Approval or rejection will be based on samples, technical data and other items submitted and will be reviewed once and only once for each such request.
- .2 Change Order Form: Submit requests for substitutions which propose a change in either the Contract Sum or Contract Time by procedures required for change order proposals.

1.17 LONG LEAD ITEMS

- A. Supplement Paragraph 3.12 "Shop Drawings, Product Data and Samples", as follows:

3.12.19 In addition to and concurrent with the submission of the "Schedule of Values" as provided under Paragraph 9.2, Contractor shall submit a list of all materials, equipment or components which are anticipated to require more than four weeks delivery, together with scheduled ordering and delivery time table. This will be discussed and reviewed regularly at the job site meetings. Upon request by the Architect, the Contractors shall be prepared to produce evidence of having placed orders for specific materials, equipment and components.

1.18 PARAGRAPH 3.13 - USE OF SITE

- A. Supplement Paragraph 3.13 "Use of Site", as follows:

3.13.3 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the project site. Protection of construction materials and equipment stored at the project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

3.13.4 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the project site without the prior written consent of the Owner.

1.19 CLEANING UP

- A. 3.15.1 Line 4, insert "promptly" before "remove." Last line, add "In addition, the Contractor shall comply with 3.15.4."
- B. 3.15.2 Last line, add "and withheld from any remaining payments."
- C. Supplement Paragraph 3.15 "Cleaning Up", as follows:

3.15.3 The Prime Contractor and Subcontractors shall frequently clean up all refuse, rubbish,

scrap, cartons, materials and debris caused by construction operations to the end that the site of the Work shall at all times present a neat, orderly and workmanlike appearance. This includes, without exception, the debris created by the work of all trades engaged under the Contract. The Prime Contractor shall remove the debris from the site and premises and dispose of it by legal means at its own expense for collecting, loading, hauling and dumping.

3.15.4 The Prime Contractor shall also perform or have performed the following immediately prior to the Architect's inspection for Substantial Completion:

- .1 Removal of all manufacturer's temporary labels from materials, equipment and fixtures.
- .2 Removal of all stains from glass and mirrors; wash, polish, inside and outside.
- .3 Removal of marks, stains, fingerprints, other soil, dust, dirt, from painted, decorated or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.
- .4 Removal of spots, plant, soil from resilient flooring.
- .5 Removal of temporary floor protections, clean, wax or otherwise treat as directed, polish all finished floors. Final vacuum all carpet.
- .6 Clean all interior finished surfaces, including doors and window frames and hardware required to have a polished finish, of oil, stains, dust, dirt, paint and the like; leave without fingerprints, blemishes.
- .7 Final site clean-up shall extend beyond the Contract Limit Lines as reasonable required to insure the complete removal of all construction debris from the entire site, including staging areas.

1.20 PARAGRAPH 3.16 - ACCESS TO WORK

A. Supplement Paragraph 3.16 "Access to Work", as follows:

3.16.1 The Contractor shall promptly notify the Architect and Construction Manager and Owner of the presence of hazardous conditions at the site, including the start of hazardous operations or the discovery or exposure of hazardous substances.

1.21 PARAGRAPH 3.18 - INDEMNIFICATION

A. Supplement Paragraph 3.18.1, "Indemnification", as follows:

- .1 Contractor, for itself, its successors and assigns, agrees to indemnify and save Owner, the individual members (past, present and future), its successors, assigns, employees, agent, architects, engineers, and the construction manager, harmless from, and against any and all claims, demands, damages, actions or causes of action together with any and all losses, costs or expenses in connection therewith or related thereto, including, but not limited to, attorney fees and costs of suit, for bodily injuries, death or property damage arising in or in any manner growing out of the work performed, or to be performed under this Contract. Contractor and

its successors and assigns agree to indemnify the Owner, its individual members (past, present and future), its successors, assigns, employees, agents, architects, engineers and/or construction manager against all fines, penalties or losses incurred for, including, but not limited to, attorney fees and costs of suit, or by reason of the violation by Contractor in the performance of this Contract, or any ordinance, regulation, rule of law of any political subdivision or duly constituted public authority. Without limiting the foregoing, the Contractor, at the request of Owner, its individual members (past and present), its successors, assigns, employees, agents, architects, or engineers and construction manager, agrees to defend at the Contractor's expense any suit or proceeding brought against Owner, its individual members (past, present and future), its successors, assigns, employees, agents, architect, engineers and /or construction manager, due to, or arising out of the work performed by the Contractor.

- .1 Contractor acknowledges and agrees that obligations and duties of the Construction Manager under the Construction Manager's agreement with the Owner are solely for the benefit of the Owner, that notwithstanding any action of the Construction Manager in connection with the Project.
- .2 The Construction Manager shall not in any respect be deemed to have assumed any duties or obligations in favor of the Contractor, and that Construction Manager is acting as an agent to the Owner to the extent provided herein.

1.22 RE-DESIGN

- A. Supplement Article 3 "Contractor", as follows:

3.19 RE-DESIGN

If the Contractor makes, or causes to be made, due to approval of substitute equipment or otherwise, any substantial change in the form, type, system and details of construction from those shown on the Drawings, he/she shall pay for all costs arising from such changes. The Contractor shall pay all Architectural and Engineering fees required to check the adequacy of such changes. Any changes or departures from the construction and details shown shall be made only after written approval from the Architect.

1.23 PARAGRAPH 4.2 - ADMINISTRATION OF THE CONTRACT

- A. Supplement Paragraph 4.2.1, as follows:

- .1 The Owner has designated **New Road Construction Management** as Construction Manager, authorized to act in the Owner's behalf to administer, coordinate, and inspect the work of this Project.
 - .1 Any and all correspondence, coordination, questions and instructions will be directed to and issued by the Construction Manager to all project participants.
 - .2 New Road Construction Management address is: 1876 Greentree Road, Cherry Hill, NJ 08003.

- B. 4.2.3 In lines 2 and 3, delete "determine in general" and replace with "endeavor to determine".
- C. 4.2.4 In the 1st line, change "Construction Manager" to "General Contractor".
- D. 4.2.9 In this Paragraph, change all references "Construction Manager" to read "Architect" and change "Architect" to read "Construction Manager".
- E. 4.2.12 After "Construction Manager" add words "and the Architect".
- F. Supplement Paragraph 4.2 "Administration of the Contract", as follows:

4.2.21 Reference in the technical provisions of the specifications to standard specifications and test methods, including those of the American Society for Testing and Materials, the American Iron and Steel Institute, the American National Standards Institute, the American Society of Mechanical Engineers, the American Society of Heating, Refrigeration and Air Conditioning Engineers, the Factory Mutual System, the National Fire Protection Association, Federal Specifications, and other similar nationally recognized technical societies and agencies shall refer to the editions and revisions current with the date of the Contract Documents.

"Any claim, dispute or other matter in question between the Contractor and the Owner referred to the Architect through the Construction Manager, except those relating to the artistic effects as provided in subparagraph 4.6.20 and those which have been waived by the making or acceptance of final payment as provided in subparagraph 9.10, inclusive, may proceed to litigation, but not before the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the tenth day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered a written decision by that date. No such claim may proceed to arbitration."

4.2.22 The Architect's decision, after consultation with Owner and Construction Manager with respect to proposed substitutions of material or equipment specified by trade name, shall be final. The Architect reserves the right, after consultation with Owner and Construction Manager, to waive specifications and to accept a proposed substitution which in his / her opinion is superior to the material or product specified, or to limit the specification to the product specified.

4.2.23 Where three or more trade names or manufacturers' names are specified, the Contractor shall furnish one of the brands specified. Where only one brand or name is specified, the Contractor may submit other brands for consideration; however, it shall be the Contractor's responsibility to prove equality.

4.2.24 Approval of substitutions shall not relieve the Contractor of responsibility for adequate fulfillment of all the various parts of the work, nor from specified guarantees and maintenance. Modification of adjacent or connecting work required due to any substitution approval shall be provided as part of the substitution.

4.2.25 Insofar as practicable, except as otherwise specified or shown, the material or product of one manufacturer shall be used throughout the work for each specified purpose.

4.2.26 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in strict accordance with the manufacturer's directions. Should such directions conflict with the Specifications, the Contractor shall request clarification from the Architect before proceeding.

1.24 SUBCONTRACTORS AND MATERIALMEN

- A. Delete subparagraph 5.2.3 and substitute with the following:

5.2.3 The names of all subcontractors and material suppliers shall be submitted for approval not later than thirty (30) calendar days after the date of the notice to proceed. The list of proposed subcontractors shall include a description of the materials and equipment each proposes to furnish and install in the work. The description shall be in sufficient detail to allow the Architect to determine general conformance to Contract requirements. Approval of the submittals required under this Article shall not relieve the Contractor from conformance to Contract requirements.

- B. Supplement subparagraph 5.2.3, as follows:

- .1 Written confirmation of award of each major subcontract shall be submitted to the Architect, in form subject to his / her approval, within seven (7) calendar days after receipt of Architect's approval of proposed subcontractor list as provided under Paragraph 5.2.3 above.

1.25 PARAGRAPH 5.3 - SUBCONTRACTUAL RELATIONS

- A. 5.3 Line 1, insert "written" between "appropriate" and "agreement." Delete "written where legally required for validity."
- B. 5.3 At lines 5, 10, 12, and 14, insert "written" before the word "agreement" or "agreements"
- C. Supplement Paragraph 5.3, as follows:

5.3.1 The Prime Contractor shall obligate each subcontractor specifically to comply with the New Jersey Plan of Affirmative Action to avoid discriminatory practice in employment.

5.3.2 The Prime Contractor shall obligate each subcontractor to comply with the applicable prevailing wage schedule of the Department of Labor of the State of New Jersey.

5.3.3 The Prime Contractor agrees that all of its contracts with subcontractors shall have provisions requiring that the subcontractors comply with the provisions of the New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.25 et seq.

1.26 PARAGRAPH 6.1 - OWNER'S RIGHT TO PERFORM CONSTRUCTION WITH OWN FORCES AND TO AWARD OTHER CONTRACTS

- A. Delete subparagraph 6.1.2 in its entirety and substitute with the following:

6.1.2 The Prime General Contractor shall provide for the coordination of the work of his / her own forces and of each of his / her separate subcontractors with work of the other

contractors, who shall cooperate therewith as provided in Paragraph 6.2.

1.27 PARAGRAPH 6.2 - MUTUAL RESPONSIBILITY

- A. 6.2.4 In line 1, delete "wrongfully."
- B. Supplement Paragraph 6.2.4, as follows:
 - .1 Should the Contractor cause damage to the work or property of any separate contractor on the project, the Contractor shall, upon due notice, promptly settle with such other contractor by agreement or otherwise resolve the dispute. If such separate contractor sues or institutes an arbitration proceeding against the Owner on account of any damage alleged to have been so sustained, the Contractor shall defend such proceeding at his / her own expense, and if any judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for any attorney's fees and court costs which the Owner has incurred.

1.28 ARTICLE 7 - CHANGES IN THE WORK

- A. Supplement Paragraph 7.1 "General", as follows:
 - 7.2.1 A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time and the Contractor shall have no claim in regard thereto unless it shall, prior to complying with same and in no event no later than 10 business days from the date such direction or order was given, submit to the Owner for the Owner's approval its change proposal.
 - 7.2.2 When submitting its change proposal, the Contractor shall include and set forth in clear and precise detail breakdowns of labor and materials for all trades involved and the estimated impact on the construction schedule. The Contractor shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets, if requested, of any subcontractors.
- B. 7.1.2 Add to the end of Subparagraph 7.1.2, "Neither this Contract nor the Work to be performed hereunder can be changed by oral agreement. No course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claims that the Owner has been unjustly enriched by any alteration or addition to the Work, whether there is, in fact, any unjust enrichment to the Work, shall be the basis for any alleged implied agreement by the Owner to the change or any increase in any amounts due under the Contract or a change in any time period provided for in the Contract Documents."
- C. Supplement Paragraph 7.1, as follows:
 - 7.1.4 A directive or order from the Owner, Architect or Construction Manager, other than a Change Order, a Construction Change Directive or any Order for a minor change pursuant to this Article 7, shall not be recognized as having any impact on the Contract Sum or the Contract Time and the Contractor shall have no claim therefor. If the Contractor believes that a directive or order would require to perform work not required by the Contract Documents, the Contractor shall so inform the Owner, Architect or Construction Manager in writing prior

to complying with the same and in no event any later than five (5) business days from the day such direction or order was given, and shall submit to the Owner, Architect or Construction Manager for their approval its change proposal.

1.29 ALLOWANCE FOR CHANGE ORDER OVERHEAD AND PROFIT

A. Supplement Paragraph 7.2 "Change Orders" as follows:

7.2.4 For any extra work or portion thereof performed by the Prime Contractor, the cost to the Owner shall include the cost of the extra work plus a maximum allowance of fifteen percent (15%) for overhead and profit.

- .1 For any extra work or portion thereof performed by a Subcontractor(s), the cost to the Owner shall include the cost of the extra work to the Subcontractor plus a maximum allowance of ten percent (10%) for overhead and profit, plus the Prime Contractor's overhead and profit not to exceed five percent (5%) of the Subcontractor's cost.

7.2.5 Change Order shall include all costs, including cost of preparation of the change order, all impact and ripple costs associated with modifications or delays to the work, and all costs associated with modifications to other work.

- .1 The Prime Contractor shall furnish all necessary documentation to support the additional cost, including but not limited to the following:
 - .1 Copy of subcontractor's proposal.
 - .2 Complete breakdown for all costs for labor and material.
 - .3 Complete breakdown of related costs.
 - .4 Other information as may be requested by the Architect / Construction Manager.

7.2.6 The overall cost of the Change Order shall be inclusive and once accepted by the Owner it shall be considered full and final.

7.2.7 No additional time will be granted to the Contractor for minor change orders unless each individual change order totals more than \$100,000.

1.30 PARAGRAPH 8.2 - PROGRESS AND COMPLETION

A. 8.2.2 Delete "knowingly" in line 1.

1.31 TIME OF COMMENCEMENT

A. Supplement Paragraph 8.2 "Progress and Completion", as follows:

8.2.4 Work shall commence within ten (10) business days from the date of the Notice to Proceed (NTP).

1.32 EXTENSION OF TIME

- A. Supplement Paragraph 8.3 "Delays and Extensions of Time", as follows:

8.3.4 Where the cause of delay is due to weather conditions, extension of time shall be granted only for unusually severe weather, as determined by reference to historical data. The term "historical data" as used in the preceding sentence shall be construed according to this formula: Average rainfall (or snow or low temperature) for the past five (5) years for the month in question, plus 10 percent. In other words, weather is not deemed to be unusually severe unless it is more than 10 percent worse than the average for that month over the last five years.

8.3.5 If the Contractor is delayed in completion of the work by any act or neglect of the Owner, Architect, or of any other Contractor employed by the Owner, or by changes ordered in the work, or by strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties, or any cause beyond the Contractor's control or by any cause which the Architect / Construction Manager shall decide to justify the delay, then for all such delays and suspensions the Contractor shall be allowed one day additional to the time limitations herein stated for each and every day of such delay so caused in the completion of the work, the same to be ascertained solely by the Architect / Construction Manager, and a similar allowance of extra time will be made for such delays as the Architect / Construction Manager may find to have been caused by the Owner.

- .1 No such extensions of time shall be made for any one or more delays unless within ten (10) business days after the beginning of such delays a written request for additional time shall be filed with the Architect / Construction Manager. In case of a continuing cause of delay, only one request is necessary.

8.3.6 The Contractor agrees that the Owner can deduct from the Contract Price, any wages paid by the Owner to any Inspector or Inspectors necessarily employed by the Owner for any number of days in excess of the number of days allowed in specifications section 01800, for completion of the work.

1.33 PARAGRAPH 9.2 - SCHEDULE OF VALUES

- A. Supplement Paragraph 9.2 "Schedule of Values", as follows:

9.2.1 The Schedule of Values shall include bonds and insurance and shall include copies of invoices and / or cancelled checks from bonding and insurance agents for the additional cost of the coverage for the project being billed.

- .1 The Prime Contractor must provide draft copies of the Schedule of Values, within fifteen (15) business days from Notice to Proceed. Submit two (2) copies to the Architect.
 - .1 Schedule of Values shall include separate costs for work at the / each School Project referenced with Architect's Project Number.
 - .2 Schedule of Values shall also include each type of work, materials and installation, in accordance with each specification sections, as listed in the Index and / or as shown on drawings.

- .3 The Prime Contractor shall include separate line items for the following:
 - .1 Bonds,
 - .2 Insurance,
 - .3 Mobilization,
 - .4 General Conditions,
 - .5 Submittals,
 - .6 As-Built drawings, as per Section 01700,
 - .7 Punch list items,
 - .8 CPM Schedule,
 - .9 Closeout Documents.

1.34 STORED MATERIALS

A. Supplement Paragraph 9.3.2, as follows:

- .1 To encourage early purchase, Owner will pay for stored materials and equipment. The following procedures must be followed in order to obtain payment.
 - .1 A certificate of insurance naming the Owner as loss beneficiary for the full dollar amount representing the materials stored.
 - .2 A consent of surety in the amount being requisitioned, said surety being the bonding company of the prime contractor.
 - .3 Materials to be stored in warehouse must be inspected by the Construction Manager and Contractor will not receive extra compensation for storage costs.
 - .4 Any time and traveling expenses for the Construction Manager to visit and inspect equipment stored will be borne by the contractor making the off-site storage request.
 - .5 Payment invoices for materials stored off site shall be so noted.
 - .6 After the receipt of the above, the Construction Manager will endorse same and forward to the Owner for their approval.
 - .7 Payment invoices not following the above format will be rejected in total.
 - .8 There will be no storage space available in existing buildings. Space in new building may be used for storage only if approved in writing by Construction Manager and all contractors having work in the area.
 - .9 The Contractor will be paid for stored materials no more than the actual or replacement value of the materials. The Contractor will furnish vendors price lists, priced inventories or other documentation to support claims for payment of materials stored on or off site.

1.35 PARAGRAPH 9.3 - APPLICATIONS FOR PAYMENT

- A. Supplement Paragraph 9.3 "Applications for Payment", as follows:

9.3.4 Applications for payment which include billing for bonds and insurance shall enclose copies of invoices or cancelled checks from bonding and insurance agents for the additional cost of the coverage for the project being billed.

1.36 PARAGRAPH 9.5 - DECISIONS TO WITHHOLD CERTIFICATION

- A. 9.5.1.6 In the first line, delete "and" and substitute "or".

- B. 9.5.1.7 Delete "repeated".

- C. Supplement Paragraph 9.5.1, as follows:

.8 Deliberate delay in the submission for approval of names of subcontractors, materialmen, sources of supply, shop drawings and samples.

.9 Failure to maintain the site in a safe and satisfactory condition in accordance with good construction practices.

.10 Failure of mechanical trades or electrical trades subcontractors to comply with mandatory requirements for maintaining record drawings. The Contractor shall be required to check record drawings each month. Written confirmation that the record drawings are up-to-date shall be required by the Architect before approval of the Contractor's monthly payment requisition will be considered.

1.37 PARAGRAPH 9.6 - PROGRESS PAYMENTS

- A. Supplement Paragraph 9.6 "Progress Payments", as follows:

9.6.8 In making progress payments, on Contracts totaling more than \$100,000 dollars there shall be retained two percent (2%) of the approved amount when the outstanding balance of the contract exceeds \$500,000, and five percent (5%) of the amount due on each partial payment when the outstanding balance of the contract is \$500,000 or less, until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items.

9.6.9 In making progress payments, on Contracts totaling less than \$100,000 dollars there shall be retained ten percent (10%) of the approved amount until seventy-five percent (75%) of the Contract Price has been paid at which time the retainage for that seventy-five percent (75%) will be reduced to five percent (5%) if in the judgment of the Architect the work is progressing satisfactorily, and on progress payments thereafter there shall be retained ten percent (10%) of the approved amounts until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items. The Contractor will be required to provide a Consent of Surety to Reduction in or Partial Release of Retainage (AIA Document G707A), before reduction in retainage will be considered.

9.6.10 Final payment will be made provided the work has been completed, the contract fully performed and a final certificate for payment has been reviewed and approved by Architect and Construction Manager.

1.38 PARAGRAPH 9.7 - FAILURE OF PAYMENT

- A. In the fourth / fifth lines, delete "or awarded by binding dispute resolution".

1.39 PARAGRAPH 9.8 - SUBSTANTIAL COMPLETION

- A. 9.8.1 Modify as follows:

Add at the end of the Subparagraph: "The Work will not be considered substantially complete until all project systems included in the Work are operational as designed and scheduled, all designated or required inspections, certifications, permits, approvals, licenses and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial use and occupancy Project are received, designated instruction of Owner's personnel has been completed, and all final finished within the Contract are in place. In general, the only remaining Work shall be minor in nature so that the Owner can occupy the building on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's (or those claiming by, through or under the Owner) normal operations. Contractor recognizes that normal operations require the use and occupancy of the Work by students and faculty without interruption and that any punchlist or corrective work shall be done at times when the Work is not so occupied. As a further condition of substantial completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty (30) consecutive calendar days or as agreed upon following the date of substantial completion.

- B. Supplement Paragraph 9.8.2, as follows:

.1 The Architect's Certificate of Substantial Completion shall be subject to the Owner's final approval.

- C. Supplement Paragraph 9.8.3, as follows:

.1 The Contractor shall complete all items attached to the "Certificate of Substantial Completion" within thirty (30) calendar days of issuance of same. If not completed, the Owner may proceed to carry out the work in accordance with Paragraph 2.4 of the General Conditions. The Owner will suffer financial loss if the project is not substantially complete on the date set forth in the Contract Documents. The Contractor (and the Contractor's Surety) shall be liable for and pay to the Owner the sums hereinafter stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the work is substantially complete.

1.40 PARAGRAPH 9.10 - FINAL COMPLETION AND FINAL PAYMENT

- A. 9.10.1 Add the following at the end of the Paragraph:

All warranties and guarantees required pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Owner as part of the final application for

payment. The final Certificate for Payment will not be issued by the Architect until all warranties and guaranties have been received and accepted by the Owner.

B. Supplement Paragraph 9.10.1, as follows:

.1 The Architect's Certificate of Final Completion shall be subject to the Owner's final approval.

1.41 GENERAL CONTRACTOR AS OWNER'S SAFETY REPRESENTATIVE

A. Supplement Paragraph 10.1 "Safety Precautions and Programs", as follows:

10.1.1 The Prime General Contractor shall provide all necessary temporary enclosures, guard rails, barricades etc. to adequately protect all workmen and public from possible injury.

10.1.2 The Steel Subcontractor shall provide and install 2 rows of ½" diameter steel cable around perimeter of all floors above first floor, mounted and marked in accordance with OSHA safety. Steel columns shall be punched for installation of cable. The Steel Subcontractor shall remove cables after enclosing walls have been installed.

10.1.3 The Prime General Contractor shall be responsible for the general safeguarding of the Project, for gaining compliance with the safety requirements from all other contractors and parties engaged in operations at the site, and shall act as the Owner's representative with regard to all safety inspections required and shall perform all necessary functions for this purpose. The Contractor shall designate a "Site Safety Officer".

1.42 PARAGRAPH 10.2 - SAFETY OF PERSONS AND PROPERTY

A. Supplement Paragraph 10.2.8, as follows:

.1 The Prime Contractor shall promptly report in writing to the Owner, Architect and Construction Manager all accidents arising out of or in connection with the Work which caused death, personal injury or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injury or serious property damage is caused, the accident shall be reported immediately by telephone or messenger to the Owner, Architect and Construction Manager.

B. Supplement Paragraph 10.2 "Safety of Persons and Property", as follows:

10.2.9 Prime Contractor is required to follow and enforce the work rules set forth below. Failure to comply with or enforce any of these rules will be grounds for suspension and / or termination of the Subcontractor:

.1 No use of alcoholic beverages prior to or during working hours. Anyone found impaired will be escorted from the Project site.

.2 No use of illegal drugs or prescription medications which could induce drowsiness or otherwise impair perception or performance. Use of illegal drugs may result in prosecution to the fullest extent of the law. Any warning associated with use of prescription drugs must be complied with, particularly warning against

operation of machinery and equipment.

- .3 No horseplay or rough-housing will be allowed.
- .4 No sexual, racial, ethnic harassment, or similar conduct will be tolerated.
- .5 All employees shall use proper sanitation habits, including use of toilet facilities and garbage cans.
- .6 All employees shall dress in clothing appropriate for the work they are to perform. All personnel are to wear hardhats, safety shoes, glasses, gloves, masks or respirators, noise protection devices, and other protective clothing and equipment as required by OSHA standards.
- .7 All equipment is to be properly stored and / or secured at the end of the work day if it is to remain idle for greater than one hour.
- .8 All personnel are to be made aware of the availability of Safety Data Sheets (SDS) for materials used at the Project site. This information is available from the Contractor using the product. The Contractor shall maintain a copy of all SDS forms at the construction site office for all personnel to review.

1.43 LOST OR STOLEN ITEMS

- A. Supplement Article 10 "Protection of Persons and Property", as follows:

10.5 Lost or Stolen Materials

The (Sub)Contractor shall protect all materials and equipment for which he/she is responsible, which is stored at the Project Site for incorporation in the work, or which has been incorporated into the work. He/She shall replace all such materials and equipment which may be lost, stolen or damaged at his/her expense, whether or not such materials or equipment have been entirely or partially paid for by the Owner.

1.44 INSURANCE

- A. Supplement Paragraph 11.1.4, as follows:

- .1 Certificate of Insurance shall be submitted within ten (10) business days upon notification of award of Contract.

- B. Supplement Paragraph 11.1 "Contractor's Liability Insurance", as follows:

11.1.5 Contractor's liability insurance must be maintained until the final Certificate of Payment is issued pursuant to Paragraph 9.10.1 and Completed Operations Insurance is in effect.

11.1.6 Insurance specified to be provided by the Prime Contractor under Paragraph 11.1 shall be on an occurrence basis, as follows:

- .1 Commercial General Liability Insurance: The Prime Contractor shall take out and maintain during the life of this Contract commercial general liability insurance, covering any and all bodily injury, including accidental death, as well as claims for property damage arising out of or in connection with the Work performed hereunder, whether such Work be performed by the Prime Contractor or by any Subcontractor or by anyone directly or indirectly employed by either of them.
 - .1 The policy shall include coverage for contract liability, products/completed, operations explosion and collapse and underground operations in an amount not less than \$3 million.
 - .2 Together with such excess coverage or umbrella coverage with the same terms and conditions as the underlying coverage, in an amount such that the commercial general liability insurance and excess/umbrella equals \$5 million.
 - .3 The policy shall name the Owner, the Architect, the Construction Manager and their consultants and agents and employees as additional insureds.
- .2 Comprehensive Automobile Liability Insurance The Contractor shall take out and maintain comprehensive automobile liability insurance, including coverage for all owned, non-owned and hired vehicles, covering bodily injury and property damage.
 - .1 Such coverage shall be in the amount of \$1,000,000 combined single limit;
 - .2 \$50,000 for one person in any one occurrence; \$500,000 for two or more persons in any one occurrence;
 - .3 and \$100,000 for property damage in any one occurrence.
 - .4 The policy shall name the Owner, the Architect, the Construction Manager and their consultants and agents and employees as additional insureds.
- .3 Contractual liability insurance as applicable to the Contractor's obligations under Paragraph 3.18 of the AIA General Conditions.
- .4 Workers' Compensation Insurance of not less than statutory limits.
- .5 Completed Operations Insurance written to the limits specified for liability insurance specified under Subparagraph .1 above. Coverage shall be required from the date of the start of Beneficial Occupancy until one year after the issuance date of Final Certificate for Payment.
- .6 Certificates of insurance must be submitted on the ACORD Form, Certificate of Insurance. Contractor's ACORD Certificate of Insurance must state "Contractual Liability Included" or it will be rejected.
- .7 The Prime Contractor shall either:
 - .1 require each of his/her Subcontractors to procure and to maintain during the life of their subcontracts, Subcontractor's Public Liability and Property Damage, of the type and in the same amounts as specified in the preceding paragraph, or
 - .2 insure the activities of their Subcontractors under their respective policies.

1.45 PARAGRAPH 11.3 - PROPERTY INSURANCE

- A. 11.3.3 "Loss of Use Insurance", delete the second sentence.
- B. Delete Paragraph 11.3.9 and substitute the following:

11.3.9 Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of the Owner's duties. The Owner shall deposit in a separate account, any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate change order."

- C. Delete Paragraph 11.3.10 and substitute the following:

11.3.10 The Owner, as trustee, shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five (5) business days after the occurrence of loss to the Owner's exercise of this power.

- D. Supplement Paragraph 11.3 "Property Insurance", as follows:

11.3.11 The Property Insurance obtained by the Owner shall include coverage for risks specified in Subparagraph 11.3.1, including collapse and water damage, to the extent covered by the Owner's "All Risk" insurance.

11.3.12 The Owner agrees to be responsible for losses not covered by property insurance due to statutory deductible provisions.

11.3.13 The fact that the Owner is furnishing Property Insurance shall not be interpreted to relieve the Contractor of his / her obligation to complete the work without additional cost to the Owner beyond the Contract amount, except as provided in Subparagraph 11.3.1.5.

11.3.14 The Contractor may carry whatever additional insurance he/she deems necessary to protect himself/herself against hazards not covered by the Owner's Property Insurance, including coverage for theft, collapse, water damage, materials and equipment stored on the site, and for materials and equipment stored off site, and against loss of owned or rented capital equipment and tools owned by mechanics or any tools, equipment, scaffolding, staging, towers and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work. Owner's "All Risk" Insurance does not cover theft of material unless installed and made an integral part of the building. This loss must be assumed by the Contractor.

1.46 PERFORMANCE BOND AND PAYMENT BOND

- A. 11.4.1 Delete Paragraph 11.4.1 in its entirety and substitute the following:

11.4.1 Contractor shall furnish each of the performance bond and payment bond meeting all statutory requirements of the State of New Jersey in form and substance satisfactory to the Owner and, without limitation, complying with the following specific requirements:

- .1 Except as otherwise required by statute, the form and substance of such bonds

shall be satisfactory to the Owner in the Owner's sole judgment;

- .2 The bonds shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance P.L. 1995, c.384 (amending N.J.S.A. 2A:44-143 and 2A:44-144, effective January 10, 1996) and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A. and shall remain in effect for a period of not less than two years following the date of substantial completion or the time required to resolve any items of incomplete or inadequate work and the payment of any disputed amounts, whichever time period is longer;
- .3 The performance bond and the labor and material payment bond shall each be in an amount equal to the Contract Sum;
- .4 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his / her power of attorney indicating the monetary limit of such power;
- .5 Any bond under Subparagraph 11.4.1 must display the surety's bond number. A rider including the following provisions shall be attached to each bond:
 - .1 Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change or other modification of the Contract Documents which singularly or in the aggregate equals or is less than 20% of the Contract Sum. Except as to increases in the Contract Sum in excess of the percentage set forth in this clause 11.4.1.5(1). Any other alterations, change, extension of time or other modification of the Contract Documents or a forbearance on the part of either the Owner or the Contractor to the other shall not release the surety of its obligations hereunder and notice to surety of such matter is hereby waived.
 - .2 Surety further agrees that in the event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or surety shall cause written notice of such default (specifying said default in writing) to be given to the Owner, and the Owner shall have thirty (30) calendar days after receipt of such notice within which to cure such default or such additional reasonable time as may be required if the nature of such default is such that it cannot be cured within thirty (30) calendar days. Such notice of default shall be sent by certified or registered U.S. mail, return receipt requested, first class postage, prepaid to the Owner.

1.47 UNCOVERING OF WORK

- A. 12.1.1 Add "or Contract Sum" at the end of the Paragraph.

1.48 CORRECTION OF WORK

- A. 12.2.1 Add the following at the end of the Paragraph:

If prior to the date of Substantial Completion, the Contractor, a subcontractor or anyone for

whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause each such item to be restored to "like new condition" at no expense to the Owner.

- B. 12.2.2.1 Add the following to the end of the Paragraph:

"If payments then or thereafter due to the Contractor are not sufficient to cover such amount, the Contractor, or his / her Surety, shall pay the difference to the Owner. The appropriate reduction shall be an amount equal to the entire cost of replacing the work performed with work originally specified and intended."

1.49 PARAGRAPH 12.3 - ACCEPTANCE OF NONCONFORMING WORK

- A. 12.3.1: Add the following sentence to the end of the Paragraph:

"This Subparagraph relates exclusively to the knowing acceptance of nonconforming work by the Owner. It has no applicability to work accepted by the Owner, Architect or Construction Manager without the knowledge that such work fails to conform to the requirements of the Contract Documents."

1.50 PARAGRAPH 13.1 - GOVERNING LAW

- A. In the first line, delete all everything after "located".
- B. Supplement 13.1 "Governing Law", as follows:

13.1.2 Contractor must comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, utility companies, National Board of Fire Underwriters, and others which bear on performance of Work. Deliver to the Owner certificates and other required legal evidence and proof of compliance with the above.

1.51 PARAGRAPH 13.5 - TESTS AND INSPECTIONS

- A. 13.5.1 Delete the last sentence in its entirety.
- B. 13.5.2 After the word "Architect" add "and Owner" in lines 5 and 6.
- C. 13.5.3 Add the following at the end of the Paragraph:

The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in his / her scheduling and performance of the Work and the cost of testing services related to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor.

1.52 PARAGRAPH 13.6 - INTEREST

- A. Delete Paragraph 13.6 "Interest" in its entirety.

1.53 PARAGRAPH 14.1 - TERMINATION BY CONTRACTOR

- A. Delete Paragraph 14.1.2 in its entirety and substitute the following:

14.1.2 If one of the above reasons exist, the Contractor may, upon fourteen (14) calendar days written notice to the Owner, Construction Manager and Architect, terminate the Contract, unless this reason is cured prior to the expiration of the notice, and recover from the Owner payment of work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) and for payment for cost directly related to work thereafter performed by Contractor in terminating such work, including reasonable demobilization and cancellation charges provided said work is authorized in advance by Construction Manager, Architect and Owner.

1.54 PARAGRAPH 14.2 - TERMINATION BY THE OWNER FOR CAUSE

- A. Delete Paragraph 14.2 in its entirety and substitute the following:

14.2 TERMINATION OF CONTRACT

14.2.1 Owner May Suspend Work:

- .1 Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety (90) calendar days by notice in writing to Contractor and Architect which shall fix the date on which Work shall be resumed. Contractor shall resume the Work on the date so fixed. Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he/she makes a claim therefor as provided in Articles 11 and 12.

14.2.2 Owner May Terminate:

- .1 Upon the occurrence of any one or more of the following events:
- .2 If Contractor is adjudged a bankrupt or insolvent, "subject to the provision of the National Bankruptcy Act and specifically 11 U.S.C., Paragraph 365.
- .3 If Contractor makes a general assignment for the benefit of creditors.
- .4 If a trustee or receiver is appointed for Contractor or for any of Contractor's property.
- .5 If Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws.
- .6 If Contractor repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment.
- .7 If Contractor repeatedly fails to make prompt payments to Subcontractors for labor, materials or equipment.

- .8 If Contractor disregards laws, ordinances, rules regulations or orders of any public body having jurisdiction.
- .9 If Contractor disregards the authority of Architect.
- .10 If Contractor otherwise violates in any substantial way any provisions of the Contract Documents, Owner may after giving Contractor and his / her Surety seven days' written notice, terminate the services of Contractor, exclude Contractor from the site and take possession of the Work and of all Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which Owner has paid Contractor but which are stored elsewhere, and finish the Work as Owner may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to Contractor. If such costs exceed such unpaid balance, Contractor shall pay the difference to Owner. Such costs incurred by Owner shall be verified by Architect and incorporated in a Change Order, but in finishing the Work, Owner shall not be required to obtain the lowest figure for the Work performed.
- .11 Where Contractor's services have been so terminated by Owner, the termination shall not affect any rights of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- .12 Upon seven days' written notice to Contractor and Architect, Owner may without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, Contractor shall be paid for all Work executed and any expense sustained plus reasonable termination expenses.

1.55 PARAGRAPH 15.1 - CLAIMS

- A. 15.1.4 After the first sentence, add "Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by Owner, Architect and Construction Manager. No such claim shall be valid unless so made." At the end of the Subparagraph, add, "Any change in the Contract Sum resulting from such claim shall be authorized only by Change Order or Construction Change Directive, as the case may be."

1.56 RESOLUTION OF CLAIMS AND DISPUTES

- A. Delete the last sentence in Paragraph 15.2.5.
- B. Delete Paragraph 15.2.6 in its entirety.
- C. Delete Paragraph 15.2.6.1 in its entirety.

1.57 PARAGRAPH 15.3 - MEDIATION

- A. Delete Paragraph 15.3 "Mediation", in its entirety.

1.58 PARAGRAPH 15.4 - ARBITRATION

- A. Delete Paragraph 15.4 "Arbitration" in its entirety and substitute the following:

15.4 LITIGATION

15.4.1 The Owner and Prime Contractor agree that all claims, disputes and other matters in question between the parties arising out of or relating to the Project or this contract or breaches thereof, shall be heard in a Court of competent jurisdiction venued in the project's County, New Jersey.

END OF SECTION 00800

SECTION 00850 - CONTRACT DRAWINGS

- 1.1 All Drawings listed on drawing No. G001, "Title Sheet and Drawing Index," dated July 31, 2019, unless otherwise revised or amended (via Addenda, Bulletin, etc.), shall form a part of the Contract Documents.

END OF SECTION 00850

SECTION 00860 - LAWS GOVERNING PUBLIC WORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The paragraphs below supplement the General Conditions. Attention is called, but not limited, to the following Laws Governing Public Work.

1.2 STATE SALES AND USE TAX EXEMPTION

- A. Supplement paragraph 3.6 "Taxes" as follows:

3.6.2 In accordance with Section 9 (a) (1) of the New Jersey Sales and Use Tax Act, The Owner is an exempt organization. Bidders and their subcontractors and material suppliers shall not include in their bids New Jersey State Sales and Use Taxes relative to the performance of the work.

1.3 MUNICIPAL REQUIREMENTS

- A. Supplement paragraph 3.7 "Permits, Fees and Notices" as follows:

3.7.1.1 N.J.S.A. 52:27d-123.1 (P.L. 1983, c.496) (formerly S-1934) effective April 17, 1984, provides that local Municipal Construction Enforcing Agency issue required construction permit, perform required inspections during construction, and issue required certificate of occupancy upon completion of Project.

3.7.1.2 P.L. 1985, Chapter 409,s.1: effective January 13, 1986, amended 1989,c.43,s.2; 1990,c.23,s.4. "No county, municipality, or any agency or instrumentality thereof shall be required to pay any municipal fee or charge in order to secure a construction permit for the erection or alteration of any public building or part thereof from the municipality wherein the building may be located. No erection or alteration of any public building or part thereof by a county, municipality, school board, or any agency or instrumentality thereof shall be subject to any fee, including any surcharge or training fee, imposed by any department or agency of State government pursuant to any law, or rule or regulation, except that nothing contained in this section shall be interpreted as preventing the imposition of a fee upon a board of education by either the Department of Education for plan review or by a municipality for the review of plans submitted to it pursuant to the provisions of section 12 of P.L.1975, c.217 (C.52:27D-130).

3.7.1.3 N.J.S.A. 40:55D-3 (P.L. 1975, c.291, Section 4), amended, effective July 2, 1988. A municipality shall exempt a board of education from the payment of any fee.

3.7.1.4 N.J.S.A. § 52:27d-126e (effective 2013)- Waiving of Construction Permit, Enforcing Agency Fees for Certain Construction Projects To Benefit Disabled Persons.

1. a. Notwithstanding the provisions of the "State Uniform Construction Code Act," P.L. 1975, c.217 (C.52:27D-1 19 et seq.), or any rules, regulations or standards adopted pursuant thereto, to the contrary, the governing body of any municipality which has appointed an enforcing agency pursuant to the provisions of section 8 of P.L.1975, c.217 (C.52:27D-126) may, by ordinance, provide that no person shall be charged a construction permit surcharge fee or enforcing agency fee for any construction, reconstruction, alteration or improvement designed and undertaken solely to promote accessibility by disabled persons to an existing public or private structure or any of the facilities contained therein.

The ordinance may further provide that a disabled person, or a parent or sibling of a disabled person, shall not be required to pay any municipal fee or charge in order to secure a construction permit for any construction, reconstruction, alteration or improvement which promotes accessibility to his own living unit.

For the purposes of this subsection, "disabled person" means a person who has the total and permanent inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment, including blindness, and shall include, but not be limited to, any resident of this State who is disabled pursuant to the federal Social Security Act (42 U.S.C.416), or the federal Railroad Retirement Act of 1974 (45 U.S.C.231 et seq.), or is rated as having a 60% disability or higher pursuant to any federal law administered by the United States Veterans' Act. For purposes of this paragraph "blindness" means central visual acuity of 20/200 or less in the better eye with the use of a correcting lens. An eye which is accompanied by a limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees shall be considered as having a central visual acuity of 20/200 or less.

b. (1) Notwithstanding the provisions of the "State Uniform Construction Code Act," P.L. 1975, c.217 (C.52:27D-119 et seq.) or any rules, regulations or standards adopted pursuant thereto to the contrary, the governing body of any municipality which has appointed an enforcing agency pursuant to the provisions of section 8 of P.L. 1975, c.217 (C.52:27D-126) shall not charge a person who has a service-connected disability declared by the United States Department of Veterans Affairs, or its successor, to be a total or 100% permanent disability that would entitle them to a property tax exemption under section 1 of P.L.1948, c.259 (C.54:4-3.30) or a spouse, parent sibling, or guardian of the disabled veteran, a construction permit surcharge fee or enforcing agency fee for any construction, reconstruction, alteration, or improvement designed and undertaken solely to promote accessibility by the disabled veteran to his own living unit.

(2) A municipality that has granted an exemption from a construction permit surcharge fee or enforcing agency fee pursuant to paragraph (1) of this

subsection may apply to the Department of Community Affairs, in accordance with rules and regulations promulgated by the Commissioner of Community Affairs for this purpose, for reimbursement of those exempt fees.

- B. Utility Connection Fees: Contractor shall pay utility connection fees and shall be reimbursed by Owner upon presentation of receipt for same.
- C. Certificates of Occupancy: Contractors shall be responsible for obtaining all Certificates of Occupancy.

1.4 TIME INCLUDING COMPLETION

- A. Supplement Article 8 "Time" as follows:

8.1.7 The term "completed" in N.J.S.A. 18A:18A-19 shall mean substantial completion as defined in this Article 8.

8.1.8 The term "Working Days" as used to compute the time of completion shall mean Mondays through Fridays, exclusive of the twelve major yearly holidays, as listed on the official State of New Jersey website, <http://www.state.nj.us/infobank/holidays.html/>

- B. Supplement Article 8.3 "Delays and Extension of Time" as follows:

8.3.4 The Contractor agrees that the Owner can deduct from the Contract Price, any wages paid by the Owner to any Inspector or Inspectors necessarily employed by the Owner for any number of days in excess of the number of days allowed in the specifications for completion of the work.

1.5 NONDISCRIMINATION AND MISCELLANEOUS LABOR PROVISIONS

- A. Attention is called to the following which supplement paragraph 13.1 "Governing Law" as follows:

13.1.3 N.J.S.A. 10:2-1 through 10:2-4 Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency of or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

- .1 In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;

- .2 No contractor, Subcontractor, nor any person on his/her behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;
- .3 There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and
- .4 This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women's business enterprise pursuant to N.J.S.A. 18A:18A-51 et. seq. (P.L.1985, c. 490).

Pursuant to N.J.A.C. 17:27 (P.L. 1975, c.127), as amended and supplemented, the following Affirmative Action Against Discrimination on the Project will be a condition of the Contract. An Initial Project Work Report will be required form (AA-201).

During the performance of this contract, the contractor agrees to Mandatory Equal Employment Opportunity Language as shown Exhibit B.

13.1.3 N.J.S.A. 34:11-56.25 et seq., in accordance with which the Contractor and Subcontractor(s) are required to do the following:

- .1 Pay to all workers engaged in the performance of services directly upon the work not less than the prevailing rate of wages. In the event that it is found that any worker employed by the Contractor or any Subcontractor(s) has been paid a rate of wage less than the prevailing wage required to be paid by such contract, the Owner may terminate the contractor's right to proceed with the work or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise.
- .2 Before final payment, furnish Owner with an Affidavit stating that all workers have been paid in accordance with the New Jersey Prevailing Wage Act.
- .3 Keep an accurate record showing the name, craft or trade and actual hourly rate of wages paid to each workman employed by him/her in connection with his/her work. Preserve records for 2 years from date of payment.
- .4 Upon request, the Contractor and each Subcontractor shall file written statements certifying to the amounts then due and owing to any and all workers for wages due on account of the work. The statement shall set forth the names of the persons whose wages are unpaid and the amount due to each. These statements shall be verified by the oaths of the Contractor or Subcontractor(s), as the case may be.

- .5 Post the prevailing wage rates for each craft and classification involved in the work, including the effective date of any changes thereof in prominent and easily accessible places at the site of the work and at such place or places as are used to pay workers their wages. The prevailing wage rates as determined by the State Department of Labor and Industry shall apply, and shall be deemed incorporated by reference as part of the contract. A copy of the current prevailing wage rates as applicable for this Project are on file at the Architect's office.

1.6 DOMESTIC MATERIALS

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.4 N.J.S.A. 18A:18A-20 et seq., providing each Board of Education shall provide, in the specifications for all contracts for work for which it will pay any part of the cost or work which by contract it will ultimately own and maintain, that only manufactured and farm products of the United States, wherever available, be used in such work.

1.7 REQUIREMENTS FOR PUBLIC SCHOOLS

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.5 N.J.S.A. 18A:18A et seq., providing for certain requirements concerning contracts, plans, specifications, etc., for public schoolhouse construction.

1.8 PAYMENTS TO LISTED SUBCONTRACTORS UNDER SINGLE OVERALL CONTRACT

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.6 N.J.S.A. 18A:18A-18, providing that under a single overall contract, all payment required to be made for work and materials supplied by the various subcontractors shall, upon certification by the Prime Contractor of the amount due to the subcontractor(s), be paid directly to the subcontractor(s).

1.9 POLITICAL CONTRIBUTION DISCLOSURE FORM

- A. In accordance with N.J.S.A. 19:44A-20.26 "pay to play," Contracts exceeding \$17,500.00 are not to be entered into with business entities unless certain disclosures are made about political contributions.

1. In accordance with N.J.S.A. 19:44A-20.26 Contractor shall be required to disclose political contributions made, if any, ten (10) days before entering into Contract in accordance with C.271 form. All bidders must complete this form and submitted with Bid Proposal Forms.

1.10 PROMPT PAYMENT ACT

- A. The Owner will issue timely payments to the Contractor in accordance with the requirements of the Prompt Payment Act, N.J.S.A. 2A:30A-1, et seq. The bidders are hereby notified that the Owner as a public entity requires all payments to be approved

at scheduled public board meetings. The vote on authorization for payments will be made at the first public meeting of the Board following the Board's receipt of the architect's authorization for payment and paid during the subsequent payment cycle.

1.11 COMPREHENSIVE IRAN SANCTIONS, ACCOUNTABILITY, AND DIVESTMENT ACT OF 2010

- A. In accordance with N.J.S.A. 52:32-57 (P.L. 2012, c.25), as amended and supplemented, the following Comprehensive Iran Sanctions, Accountability, and Divestment Act of 2010 will be a condition of the Contract as follows:
 - 1. 3.a. A person or entity that, at the time of bid or proposal for a new contract or renewal of an existing contract, is identified on a list created pursuant to subsection b. of this section as a person or entity engaging in investment activities in Iran as described in subsection f. of section 2 of this act, shall be ineligible to, and shall not, bid on, submit a proposal for, or enter into or renew, a contract with a State agency for goods or services.

- B. In accordance with P.L.2012, Chapter 25, C.52:32-58, as amended and supplemented, the following Comprehensive Iran Sanctions, Accountability, and Divestment Act of 2010 will be a condition of the Contract as follows:
 - 1. 4.a. A State agency shall require a person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract to certify, at the time the bid is submitted or the contract renewed, that the person or entity is not identified on a list created pursuant to subsection b. of section 3 of this act as a person or entity engaging in investment activities in Iran described in subsection f. of this act.

- C. N.J.S.A. 18A:18A-49.4 Civil action brought on behalf of board of education.
 - 1. 8.a. A board of education as defined in and subject to the provisions of the "Public Schools Contracts Law," N.J.S.A. 18A:18A-1 et seq. (P.L. 1977, c.114), shall implement and comply with the provisions of N.J.S.A. 52:32-55 et seq. (P.L. 2012, c.25), except that the board shall rely on the list developed by the State Department of the Treasury pursuant to section 3 of N.J.S.A. 52:32-57 (P.L. 2012, c.25).
 - 2. 8.b. If the board determines that a person or entity has submitted a false certification concerning its engagement in investment activities in Iran under section 4 of N.J.S.A. 52:32- (P.L. 2012, c.25), the board shall report to the New Jersey Attorney General the name of that person or entity, and the Attorney General shall determine whether to bring a civil action against the person to collect the penalty prescribed in paragraph (1) of subsection a. of section 5 of N.J.S.A. 52:32-59 (P.L. 2012, c.25). The board may also report to the board's attorney the name of that person, together with its information as to false certification, and the board's attorney may determine to bring such civil action against the person to collect such penalty.

1.12 EQUAL EMPLOYMENT OPPORTUNITIES AND AFFIRMATIVE ACTION

- A. Bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 et seq.
- B. Initial Project Workforce Report - Construction (AA201)
 - 1. In accordance with the requirements of the New Jersey Department of Labor & Workforce Development Construction EEO Compliance Monitoring Unit, the Initial Project Workforce Report-Construction(AA201)document, must be submitted to the Public Agency that awards the contract and the Department of Labor & Workforce Development Construction EEO Compliance Monitoring Program after notification of award, but prior to signing the contract.
www.state.nj.us/treasury/contract_compliance/pdf/aa201.pdf

1.13 OFFICE OF THE STATE COMPTROLLER

- A. N.J.A.C 17:44-2.2: Authority to Audit or Review Contract Records
 - 1. Relevant records of private vendors or other persons entering into contract(s) with covered entities are subject to audit or review by the Office of the State Comptroller (OSC) pursuant to N.J.S.A. 52:15C-14(d).
 - a. (The contract partner) shall maintain all documentation related to products, transactions or services under this contract for a period of **five (5) years** from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

1.14 ANTI-BULLYING BILL OF RIGHTS ACT (P.L. 2010.C.122)

- A. Section 4 of P.L.2002, c.83 (C.18A:37-16) is amended to read as follows:
 - 1. C.18A:37-16 Reprisal, retaliation, false accusation prohibited.
 - 4.a. A member of a board of education, school employee, student or volunteer shall not engage in reprisal, retaliation or false accusation against a victim, witness or one with reliable information about an act of harassment, intimidation or bullying.
 - b. A member of a board of education, school employee, contracted service provider, student or volunteer who has witnessed, or has reliable information that a student has been subject to, harassment, intimidation or bullying shall report the incident to the appropriate school official designated by the school district's policy, or to any school administrator or safe schools resource officer, who shall immediately initiate the school district's procedures concerning school bullying.
 - c. A member of a board of education or a school employee who promptly reports an incident of harassment, intimidation or bullying, to the appropriate school official designated by the school district's policy, or to any school administrator or safe schools resource officer, and who makes this report in compliance with the procedures in the district's policy, is immune from a cause of

action for damages arising from any failure to remedy the reported incident.

d. A school administrator who receives a report of harassment, intimidation, or bullying from a district employee, and fails to initiate or conduct an investigation, or who should have known of an incident of harassment, intimidation, or bullying and fails to take sufficient action to minimize or eliminate the harassment, intimidation, or bullying, may be subject to disciplinary action.

1.15 CONTROLLING SILICA EXPOSURES IN CONSTRUCTION

A. Occupational Safety and Health Administration (OSHA) - U.S. Department of Labor: OSHA 29 CFR 1926.1153, 2017.

1. The above referenced guidance document is not a standard or regulation, and it creates no new legal obligations. The document is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with safety and health standards promulgated by OSHA or by a state with an OSHA approved state plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any specific recommendations contained within this document is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.
 - a. This guidance document addresses the control of employee exposures to respirable dust containing crystalline silica, which is known to cause silicosis, a serious lung disease, as well as increase the risk of lung cancer and other systemic diseases.
 - b. This document provides information on the effectiveness of various engineering control approaches for several kinds of construction operations and equipment, and contains recommendations for work practices and respiratory protection, as appropriate.
 - c. OSHA encourages employers to conduct periodic exposure monitoring to confirm that engineering and work practice controls are effective and that appropriate respiratory protection is being used where necessary.
2. The above referenced document can be found at:
<https://www.osha.gov/dsg/topics/silicacrystalline/>

END OF SECTION 00860

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SECTION 00870 - MISCELLANEOUS REQUIREMENTS

PART 1 - GENERAL

1.1 JOB SITE MEETINGS

- A. Regularly scheduled job meetings shall be held at a location and time convenient to the Owner's representatives, the Architect and the Contractor. The Prime Contractor shall attend such meetings, or be represented by a person in authority who can speak for and/or make decisions for the Contractor.
- B. Attendance by the Prime Contractor is mandatory, whether the meetings are weekly, bi-weekly or at whatever interval is determined by the Architect.
 - 1. Unless given prior approval by the Architect, the Prime Contractor will be fined \$250.00 for each regularly scheduled meeting for which he/she is not presented by a person in authority who can speak for and/or make decisions for the Contractor. Fine amounts shall be withheld and deducted from the Contract Sum.

1.2 STRUCTURAL SAFETY STANDARDS AND CODES

- A. The standards, codes and design data referred to in the New Jersey "State Uniform Construction Code", apply to the work of the Contract, where applicable.
- B. Contractor(s) shall comply with all applicable requirements of the Uniform Fire Safety Act, N.J.S.A. 2:27D-192 et seq. (P.L. 1983, c. 383).

1.3 OWNER'S RIGHT TO OCCUPY

- A. The Owner reserves the right to occupy any portion of the Project which is ready for occupancy prior to completion and acceptance of the Project, after Local Municipal Construction Enforcing Agency approval.
- B. The occupancy of any portion of the Project does not constitute an acceptance of any work nor does it waive the Owner's right to liquidated damages or constitute an acceptance of any work as the Project will be accepted as a whole and not in units. Prior to such occupancy, however, the Architect, a representative of the Owner, and the Contractor shall fully inspect the portions of the Project to be occupied, preparing a complete list of omissions of materials, faulty workmanship, or any items to be repaired, torn out or replaced. The Owner will assume responsibility for damage to premises so occupied of any items not on this list when such damage is due to greater than normal wear and tear, but does not assume responsibility for improper or defective workmanship or materials.

1.4 OWNER'S GENERAL REQUIREMENTS

- A. The Owner requires that the Prime Contractor demonstrate a safety and health program/plan, which includes, but is not limited to first aid, fire protection, housekeeping, illumination, sanitation, personal protective equipment, medical, exit, emergency action plans and all other issues required by government agencies having jurisdiction over the work of this project.
- B. The following Owner's General Requirements shall be enforced during construction and until final completion of the work and shall apply to prime contractors, sub-contractors, delivery persons and all other personnel on the project site:
 - 1. No deliveries of construction materials or equipment is to take place during the arrival and departure of students from their respective schools. Verify and coordinate arrival and departure time with the Principals. All deliveries must be made to the project site, no deliveries will be accepted by the owner. All construction materials and equipment shall be stored behind the construction fence or in other areas as designated by the construction manager.
 - 2. The existing building is to be kept secure at all times. Propping of doors is not permitted for any length of time without supervision by designated owner personnel. No persons may admit another person through a door. All persons entering the building must do so at the designated security entrance only.
 - 3. No smoking is allowed anywhere on school property. Smoking on public school property is unlawful and may subject violators to citations.
 - 4. All workers must wear shirts at all time.
 - 5. Use of profanity will not be tolerated.
 - 6. The Prime Contractor shall provide identification cards for his/her Subcontractors, employees, etc. The construction manager shall be provided with a list of personnel on the project site. The owner may require that construction personnel present legal photo identification before entering the school. All personnel will be subjected to owner's screening and identification procedures. All persons entering the school building must enter through the security check point and obtain an identification tag. Persons violating this rule may be cited by law enforcement.
 - 7. The Contractor shall comply with the requirements of all local ordinances including for noise.

8. The Contractor and his/her Subcontractors shall not interact with students, teachers or staff, other than those identified by the Owner as a representative of the Owner.
9. The owner, architect or construction manager may require the removal of any contractor personnel who violates any work rule. This removal may be temporary or permanent subject solely to the discretion of the owner, architect or construction manager.

1.5 ENVIRONMENTAL PROTECTION

- A. Conform to New Jersey Department of Environmental Protection Regulations N.J.A.C. 7:27, sub-chapters 5 and 7 and all other applicable standards.
- B. Conform to New Jersey Statute N.J.S.A. 26:2C-9.2 which requires that no person shall construct, install, alter or operate any equipment capable of causing the emission of air contaminants into the open air or control apparatus which prevents or controls the emission of air contaminants until an application has been filed with and approved by the Department of Environmental Protection.

1.6 SOIL EROSION AND SEDIMENT CONTROL

- A. Compliance with soil erosion and sediment control will be strictly enforced. Failure to conform to specified sequence of soil erosion and sediment control will result in imposition of penalties as levied by local soil conservation district, and withholding of payments for work not performed in accordance with soil erosion sequence.

1.7 CERTIFIED PAYROLLS

- A. The Prime Contractor shall furnish to the Owner certified payroll records each payroll period within ten (10) working days of the payment of wages, indicating name, craft, social security number and actual hourly rate of wages paid to each worker employed on the project. A certified payroll record is defined as "a payroll record which is attested to by the employer, or a corporate officer of such company, or an authorized agent of the employer."

1.8 OPERATION AND MAINTENANCE

- A. The Prime Contractor shall furnish to the Owner all required operation and maintenance manuals for all included materials and equipment as well as assistance and training to the Owner's personnel for contract's special systems and equipment in accordance with Contract Documents.
 - 1. Contractor shall submit electronic version of the MEP/FP O&M Manuals for review by the MEP/FP Consultant. Paper copies should not be submitted as part of the MEP/FP review process.

1.9 BUSINESS REGISTRATIONS FOR CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS

- A. The Prime Contractor and all Subcontractors that knowingly provide goods or perform services for a Contractor fulfilling this contract must comply with all requirements under N.J.S.A. 52:32-44.

A contractor shall provide the contracting agency with the business registration of the contractor and that of any named subcontractor prior to the time a contract, purchase order, or other contracting document is awarded or authorized. At the sole option of the contracting agency, the requirement that a contractor provide proof of business registration may be fulfilled by the contractor providing the contracting agency sufficient information for the contracting agency to verify proof of registration of the contractor, or named subcontractors, through a computerized system maintained by the State.

c. A subcontractor named in a bid or other proposal made by a contractor to a contracting agency shall provide a copy of its business registration to any contractor who shall provide it to the contracting agency pursuant to the provisions of subsection b. of this section. No contract with a subcontractor shall be entered into by any contractor under any contract with a contracting agency unless the subcontractor first provides the contractor with proof of a valid business registration. For bids and requests for proposals, the contracting agency must retain the proof of business registration in the file where documents relating to the contract are maintained. For all other contracts, proofs of business registration shall be maintained in an alphabetical file.

d. The contractor shall maintain and submit to the contracting agency a list of subcontractors and their addresses that may be updated from time to time during the course of the contract performance. A complete and accurate list shall be submitted before final payment is made for goods provided or services rendered or for construction of a construction project under the contract. A contracting agency shall not be responsible for a contractor's failure to comply with this subsection.

e. The Department of the Treasury shall provide each contracting agency with appropriate language reflecting the obligations of contractors and subcontractors under this section that the contracting agency shall include in any contract document, bid specification, requests for proposals, or other documents notifying

potential contractors of contract opportunities with a contracting agency.

f. Nothing in this section shall in any way alter the provisions or change the responsibilities or obligations of casino industry licensees as set forth in section 92 of N.J.S.A. 5:12-92 (P.L. 1977, c.110).

g. (1) A contractor or a contractor with a subcontractor that has entered into a contract with a contracting agency, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," N.J.S.A. 54:32B-1 et seq. (P.L. 1966, c.30), on all their taxable sales of tangible personal property delivered into this State.

(2) A contracting agency entering into a contract with a contractor, or a contractor with a subcontractor, shall include in its contract with that contractor, or a contractor with a subcontractor, for the term of the contract, a requirement that the contractor or subcontractor and each of their affiliates shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," N.J.S.A. 54:32B-1 et seq. (P.L. 1966, c.30), on all their sales of tangible personal property delivered into this State.

(3) For the purposes of this subsection, "affiliate" means any entity that (1) directly, indirectly, or constructively controls another entity, (2) is directly, indirectly, or constructively controlled by another entity, or (3) is subject to the control of a common entity. For purposes of this subsection an entity controls another entity if it owns, directly or individually, more than 50% of the ownership interest in that entity.

h. The State Treasurer may adopt regulations pursuant to the "Administrative Procedure Act", N.J.S.A. 52:14B-1 et seq. (P.L. 1968, c.410), as are necessary to administer the provisions of this act.

i. If a contractor fails to provide proof of business registration upon request by the contracting agency for a contract that does not require bidding or a request for proposals, and the contracting agency determines that the purpose of that contract is of a proprietary nature with a contractor that does not have a business presence in New Jersey, the contracting agency shall provide the Division of Revenue, within 10 days of executing the contract, a copy of the contract, evidence of the contractor's taxpayer identification number, and a signed certification attesting to the proprietary nature of the contract and representing that the contracting agency made a diligent effort to obtain proof of a business registration from the contractor.

j. When a contracting agency enters into a contract with a contractor under a contract issued by the State of New Jersey Cooperative Purchasing Program, or any other authorized cooperative purchasing system, the contracting agency awarding the initial contract shall receive and file the proof of business registration. Contract documents issued under a cooperative purchasing agreement shall identify the contract and the contracting agency awarding the contract.

k. In situations of an emergent nature, a contracting agency may enter into a contract with a business organization, provided that the contractor agrees to provide a business registration within two weeks of the execution of the contract. The contracting agency shall not pay the business organization for goods or services provided until such time as the organization provides proof of business registration

as set forth in this section. Failure to pay the business organization until proof of business registration is received shall not be grounds for the agency being liable for payment. N.J.S.A. 52:32-44

- B. The Prime Contractor, Subcontractor(s) or a supplier who fails to provide proof of business registration or provides false business registration information shall be liable to a penalty of \$25 for each day of violation, not to exceed \$50,000 for each business registration copy not properly provided or maintained under a contract with a contracting agency. Information on the law and its requirements are available by calling (609) 292-9292.

END OF SECTION 00870

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 SUMMARY

- A. Section Includes:
 - 1. Project description.
 - 2. Contract scope description.
 - 3. Contractor's use of the premises.
 - 4. Preconstruction meeting.
 - 5. Security procedures.

1.3 PROJECT DESCRIPTION

- A. The project consists of the Addition and Renovations to Thomas R. Grover Middle School for the West Windsor-Plainsboro Regional School District, Board of Education, Mercer County, New Jersey.
- B. Contract Documents prepared by Fraytak Veisz Hopkins Duthie, P.C. Architects / Planners, (Project Number: FVHD-5063M) and their Consulting Engineers:
 - 1. Consulting Civil Engineer: Van Cleef Engineering Associates, Hamilton, NJ.
 - 2. Consulting Structural Engineer: Harrison-Hamnett, P.C., Pennington, NJ.
 - 3. Consulting Mechanical/Electrical Engineer: Johnson & Urban, LLC, Colts Neck, NJ.

1.4 CONTRACT SCOPE DESCRIPTION

- A. The work consists of but is not limited to the following:
 - 1. All Site Work including indicated concrete walkways exterior stairs, stormwater system inlets / piping / underground basin, retaining wall(s), pump station, manholes and utility services.
 - 2. New Two-Story Addition:
 - a. First Floor:
 - 1) Two Classrooms with a folding partition;
 - 2) Two Resource Rooms with a folding partition;

- 3) Two Science Classrooms with a shared Prep Room;
- 4) One Science Classroom, One Special Education Science Classroom with a shared Prep Room;
- 5) Boy's and Girls' Gang Toilet Rooms;
- 6) Women's Faculty Toilet Room;
- 7) I.D.F. Room;
- 8) Electrical and Mechanical Rooms;
- 9) Janitor's Closet;
- 10) Storage Room;
- 11) Two Stair Towers.

b. Second Floor:

- 1) Two pair of Classrooms each with folding partitions;
- 2) Two Science Classrooms with a shared Prep Room;
- 4) One Science Classroom, One Special Education Science Classroom with a shared Prep Room;
- 5) Boy's and Girls' Gang Toilet Rooms;
- 6) Men's Faculty Toilet Room;
- 7) Janitor's Closet.

3. Alterations to existing building at the connection of the new addition.
4. All plumbing, sprinkler, mechanical and electrical systems.
5. All indicated casework and equipment.
6. All other indicated work.

B. Single Overall Contract: This contract includes:

1. All work in accordance with drawings, Parts 2, 3, 4, 5 and 6 Specification Sections and in accordance with Contract Documents.
2. General Construction Work includes:
 - a. Work that is primarily architectural and civil in nature plus work traditionally recognized as general construction in accordance with drawings and as listed as a part of Part 2 specification sections, unless otherwise indicated below:
 - 1) Also includes both administrative and coordination responsibilities.
 - a) General Construction Contractor is responsible for all coordination between his/her work and work of all other Prime Subcontractors.
 - 2) All initial excavation inside the building, and the preparation of the subbase under the concrete slab.
 - 3) All earthwork, site utility work outside the building (storm drainage, water service, and sanitary sewer), as specified in Part 2 specification sections.

- a) **Site utility work shall be from 5' outside the building line, unless indicated otherwise in the Contract Documents, and include final utility connections and obtaining permits from all authorities having jurisdiction.**
 - 4) All Concrete work in accordance with Part 2 specification sections excluding concrete pads shown on mechanical and electrical drawings for mechanical and electrical work.
 - 5) Provide and install the metal fabrications, aluminum handrails and railings and in accordance with Division 2 Sections.
 - 6) Perform all existing roof cutting, alterations, repair, replacement and flashing work associated with General Construction Work where indicated or required.
 - a) Roofing work shall be performed in accordance with requirements of existing roofing system warranty and in accordance with the Contract Documents.
 - b) Coordination of all required structural framing and supports for mechanical and electrical work whether shown or not.
 - 7) Furnishing stainless steel sinks, fixtures, accessories, and all items supplied by the casework and equipment subcontractor in accordance with drawings and specification sections in Division 11, for installation by the Plumbing Work Subcontractor.
 - 8) Furnishing all electrical devices and items supplied by the casework and equipment subcontractor in accordance with drawings and specification sections in Division 11 for installation by the Electrical Work Subcontractor.
3. Structural and Miscellaneous Steel Work includes:
- a. Fabrication and erection of structural steel, framing, metal deck, steel stairs, steel handrails and railings and miscellaneous metal fabrications in accordance with Part-3 specification sections.
4. Plumbing, Drainage and Sprinkler System Work includes:
- a. Piping servicing domestic water piping, gas piping, drainage and sprinkler systems and connection of equipment tied into the above types of systems and including all work in accordance with drawings and Part-4 specification sections.
 - 1) Work shall include demolition and removals as indicated or required to allow for new construction.
 - 2) Work shall include reinstallation, cutting, patching, finishing and repair work associated with Plumbing, Drainage and Sprinkler system work and as indicated or required including work at existing roofs; cutting, alterations, replacement and flashing work, where indicated or required.

- a) Roofing work shall be performed in accordance with requirements of existing roofing system's warranty and the Contract Documents.
 - b. Subsequent excavation, backfill and compaction of trenches after the work of the General Construction Work and as required by the installation of plumbing utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
 - c. Concrete pads shown on mechanical drawings for mechanical work. Work shall be performed in accordance with requirements of Section 03300.
 - d. **Work shall be up to 5' outside the building line, unless indicated otherwise in the Contract Documents, and include final utility connections and obtaining permits from all authorities having jurisdiction.**
5. Heating, Ventilating, Air Conditioning and Refrigeration Work includes:
- a. Heating, ventilating, and air conditioning systems as well as the temperature control systems and including all work in accordance with drawings and Part-5 specification sections.
 - 1) Work shall include demolition and removals as indicated or required to allow for new construction.
 - 2) Work shall include reinstallation, cutting, patching, finishing and repair work associated with HVACR work, as indicated or required including performing work at existing roofs; cutting existing roof decking, provide and install structural steel support, and all other roof flashing work where indicated or required.
 - a) Furnishing and installing all required structural framing and supports for roof top mechanical equipment at existing buildings whether shown or not.
 - b) Structural framing shall be as per typical roof framing conditions as shown on structural drawings and/or as per approved shop drawings by the Architect / Structural Engineer.
 - c) Roofing work shall be performed in accordance with requirements of existing roofing system's warranty and the Contract Documents.
 - b. Subsequent excavation, backfill and compaction of trenches after the work of the General Construction above, as required by the installation of mechanical utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
 - c. Concrete pads shown on mechanical drawings for mechanical work. Work shall be performed in accordance with requirements of Section 03300.

6. Electrical Work includes:

- a. The work necessary for electrical power distribution, lighting, and the connections to equipment tied into such systems and including all work in accordance with drawings and Part-6 specification sections.
 - 1) **Work shall include power distribution and wiring for all indicated electrically operated equipment and fixtures, (in Parts 2, 4, 5 and 6), whether shown or not on drawings.**
 - 2) Work shall include demolition and removals as indicated or required to allow for new construction.
 - 3) Work shall include reinstallation, cutting, patching, finishing and repair work associate with Electrical work and as indicated or required including performing work at existing roof(s); cutting existing roof decking, and all other roof flashing work:
 - a) Roofing work shall be performed in accordance with requirements of existing roofing system's warranty and the Contract Documents.
- b. Subsequent excavation, backfill and compaction of trenches after the work of the General Construction, above, as required by the installation of electrical utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
- c. Concrete pads shown on electrical drawings for electrical work. Work shall be performed in accordance with requirements of Section 03300.
- d. **Work shall be up to 5' outside the building line, unless indicated otherwise in the Contract Documents, and include final utility connections and obtaining permits from all authorities having jurisdiction.**

1.5 WORK BY OTHERS

A. OWNER-FURNISHED PRODUCTS

1. Where indicated or shown that Owner will furnish products the work of the Contract shall include providing support systems to receive Owner's equipment, items and assemblies.
2. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
3. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
4. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.

5. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
6. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
7. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
8. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
9. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
10. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
11. If Owner-furnished items are damaged as a result of Contractor's operations, contractor shall repair or replace them.

1.6 CONTRACTOR'S USE OF THE PREMISES

- A. The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is shown on the drawings.
 1. Other areas are off limits to all construction personnel.
- B. The following building facilities may not be used by construction personnel:
 1. Toilet facilities.
 2. Food service facilities, including dining areas.
 3. Elevator.
- C. The Owner will occupy the building during the construction period.
 1. The Owner will endeavor to cooperate with the Contractor's operations when the Contractor has notified the Owner in advance of need for changes in operations in order to accommodate construction operations.
 2. Conduct the work so as to cause the least interference with the Owner's operations.

- D. Coordinate with Local Authorities as to which routes are capable of handling heavy truck traffic.
- E. Signs: Provide signs adequate to direct visitors.
 - 1. Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.
- F. All deliveries by the Prime Contractor and Subcontractors shall be coordinated with the Owner's Representative, prior to the delivery date.

1.7 PRECONSTRUCTION MEETING

- A. A preconstruction meeting will be held at a time and place designated by the Architect for the purpose of identifying responsibilities of the Owner's / Architect's personnel and explanation of administrative procedures.
- B. The Contractor shall also use this meeting for the following minimum agenda:
 - 1. Construction schedule.
 - 2. Use of areas of the site.
 - 3. Delivery and storage.
 - 4. Safety.
 - 5. Security.
 - 6. Cleaning up.
 - 7. Subcontractor procedures relating to:
 - a. Submittals.
 - b. Change orders.
 - c. Applications for payment.
 - d. Record documents.
- C. Attendees shall include:
 - 1. The Owner / Owner's Representative.
 - 2. The Architect, and any Consultants.
 - 3. The Prime Contractor and his / her superintendent.
 - 4. Major subcontractors, suppliers, and fabricators.
 - 5. Others interested in the work.

1.8 SECURITY PROCEDURES

- A. Limit access to the site and building to persons involved in the work.
- B. Provide secure storage for materials for which the Owner has made payment and which are stored on site.

- C. Secure completed work as required to prevent loss.
- D. All Contractor(s), and their employees, will be required to be registered with the Owner's Representative / School's Main Office.
 - 1. The Contractor's personnel and Subcontractors will be required to wear identification badges at all times on the site.

END OF SECTION 01010

SECTION 01020 - ALLOWANCES

PART 1 - GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Definitions and Explanations: Certain requirements of the work related to each allowance are shown and specified in the contract documents. The allowance has been established in lieu of additional requirements for that work, and further requirements thereof (if any) will be issued by change order.
- B. The types of allowances scheduled herein for the work include the following:
 - 1. Unit cost allowances.
 - 2. Lump sum allowances.
- C. Selection and Purchase: At the earliest feasible date after the award of the Contract, advise the Architect of the scheduled date when the final selection and purchase of each product or system described by each Allowance must be accomplished in order to avoid delays in the performance of the work. Obtain and submit proposals for the work of each Allowance, as required by the Architect for use in making the final selections; include whatever recommendations for selection may be relevant to the proper performance of the work. Purchase products and systems as specifically selected (in writing) by the Architect.
 - 1. Submit proposals and recommendations, for the purchase of the products or systems of Allowances, in the form specified for change orders.
- D. Change Order Data: Where applicable, include in each change order proposal both the quantity of the products being purchased and the unit cost, along with the total amount of the purchase to be made. Where requested, furnish survey-of-requirements data to substantiate the quantity. Indicate applicable taxes, delivery charges, and amounts of applicable trade discounts.
 - 1. For unit cost type allowances, submit (and revise where necessary) a substantiated survey of quantities of materials.
- E. Unit Cost Allowances: Each change order amount for unit cost type allowance shall be based solely upon the difference between the unit purchase amount and the unit allowance; multiplied by the final measure or count of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins. Include installation costs in purchase amount only where indicated as included in the allowance. When requested, prepare explanations and documentation to substantiate margins as claimed. Prepare and submit separate substantiation of change in scope of work (if any) claimed in the change orders related to unit cost type allowance.

1. The Owner reserves the right to establish the actual quantity of work-in-place, by independent quantity survey, measure or count.
- F. Lump-Sum Allowances: The amounts herein specified are the net amounts available for purchase of the materials specified, including taxes (if any), and each change order amount shall be based thereon. **All other costs associated with the performance of the work under the Allowance, including but not limited to insurance, storage, handling, overhead, profit, etc., are not a part of the allowance, and shall be included in the lump sum bid / or base bid Contract amount.**
1. In the event the actual purchase amount of materials, plus taxes (if any) exceeds the specified allowance, the Owner will pay the excess; should the actual purchase amount, plus taxes (if any) be less than the specified Allowance, the Contractor shall credit the Owner with the difference.
 2. The actual purchase amount, plus taxes (if any) shall be substantiated by certified bills of sale to be submitted with the change order.
- G. Change Order Mark-Up: Except as otherwise indicated, comply with the provisions of the General Conditions and the Supplementary General Conditions.
- H. Excess Materials: Submit invoices or delivery slips to indicate the actual quantities of materials delivered to the site for use in fulfillment of each allowance. Where economically feasible, and so requested by the Architect, return unused materials to the manufacturer/supplier for credit to the Owner, after the installation has been completed and accepted. Where not economically feasible to return for credit, and so requested by the Architect, prepare unused materials for the Owner's storage, and delivery to the Owner's storage space as directed. Otherwise, disposal of excess materials is the Contractor's responsibility.

1.2 SCHEDULE OF ALLOWANCES

- A. General: The following allowance amounts are included in the Contract Sum, for the corresponding units of work as described.
1. General Construction Work
 - a. A Unit cost allowance for brick delivered and stored at project site, as follows:
 - 1) Utility Face Brick (incl. special shapes) **\$2,000.00 per 1,000.**
 - b. A sum of **\$50,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.

2. Structural and Miscellaneous Steel Work
 - a. A sum of **\$15,000.00** (3 tons of steel @ \$5,000.00 per ton) for additional fabricated and erected steel as defined by and specified in Section 05120, Structural Steel.
3. Plumbing and Drainage Work
 - a. A sum of **\$25,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
4. Heating Ventilating and Air Conditioning Work
 - a. A sum of **\$25,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
5. Electrical Work
 - a. A sum of **\$30,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
 - b. Additional outlets:
 - 1) Allow a sum of money in the Base Bid for 5 additional outlets, location to be selected by the Architect. Work will include the following:
 - a) Conduit from closest panelboard, outlet box of size and type required, wire and connection to branch circuit protective device in panelboards.
 - b) An outlet shall be as defined in the National Electric Code or American Standard with the addition of a local light control switch for lighting fixtures, which shall also be defined as an outlet.
 - c) Include a unit price for one outlet, reflecting all of the above, in the proposal to be used in computing additions to or deductions from the contract price.
 - c. Moving outlets:
 - 1) The Owner, through the Architect, reserves the right to move any outlet a distance of 10 feet before roughing in without additional expense to the Owner.

END OF SECTION 01020

SECTION 01030 - ALTERNATE BIDS

PART 1 - GENERAL

1.1 PROCEDURE FOR ALTERNATE BIDS

- A. Each Bidder shall submit on the Proposal Form, all Alternate Bids applicable to the work under his/her bid. Alternate Bids shall state the difference in price as "additions to" or "deductions from" the Base Bid, unless otherwise noted, for the substitution, omission, or addition of the following materials, items or construction from that shown and specified.
- B. The Alternate Bids, when accepted, become part of the Contract.
- C. Each Bidder shall carefully check the Drawings and Specifications to determine the extent of each Alternate Bid required.
- D. Alternate Bids shall include all overhead and profit applicable thereto.
- E. Alternate Bids shall reflect the increase or decrease in cost of all work of every name and nature which may be affected thereby and no subsequent claims for extras by reason of the Contractor's failure to observe this requirement will be considered.
- F. The description herein for each Alternate Bid is recognized to be incomplete and abbreviated, but implies that each change must be complete for the scope of work affected. Refer to applicable specification sections and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in description of each Alternate Bid. Coordinate related work and modify surrounding work as required to properly integrate with the work of each Alternate Bid. It is recognized that descriptions of Alternate Bids are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.
- G. Except as otherwise described or approved, materials and workmanship of the Alternate Bids shall conform to the requirements specified under the various sections of the Specifications for similar items of work.
- H. Where methods of construction, materials, finishes or details of installation required by the various Alternate Bids differ from the requirements shown on the drawings or specified for corresponding items, the alternate construction, materials, etc. will be subject to approval by the Architect.
- I. The Contractor shall submit shop drawings and samples for the work under each accepted Alternate Bid for approval in conformance with requirements specified for submittals in both Part 1, AIA Document A232 and Section 00800 - Supplementary General Conditions.

- J. The following Alternate Bids shall apply to separate and single overall bids, and must be included in the Bidder's Proposal(s).

1.2 ALTERNATE BIDS

A. **Alternate Bid No. 1: Luxury Vinyl Tile (LVT)**

State the amount to be added to the base bid to provide and install luxury vinyl tile in lieu of vinyl enhanced tile, as shown on various drawings and as indicated in various specification sections.

B. **Alternate Bid No. 2: Security Glazing**

State the amount to be added to the base bid to provide and install security glazing in lieu of security window film (SWF) on laminated glass (LG) and exterior insulated glass (INSUL), at designated locations, as shown on various drawings and as indicated in various specification sections.

END OF SECTION 01030

SECTION 01040 - COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 REQUIREMENTS INCLUDED

- A. Coordination of submittals.
- B. Coordination meetings.
- C. Coordination drawings.
- D. Coordination of project closeout.
- E. Administrative/supervisory personnel.
- F. Coordination of trades.
- G. Coordination of space.
- H. Coordination of field measurements and field conditions.

1.3 GENERAL REQUIREMENTS

- A. The Prime Contractor shall coordinate his/her activities with the activities of all Subcontractors and work performed by others.
 - 1. All requirements not specifically assigned to the General Construction Work Contractor shall apply to all Prime Subcontractors.
- B. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
 - 1. Inform the Architect when coordination of his/her work is required.

1.4 COORDINATION OF SUBMITTALS

- A. Coordinate and correlate the submittals on each work item and on interrelated work items to ensure their timeliness, completeness, consistency, compatibility and compliance with the Contract Documents.
- B. Prepare and submit special coordination drawings where close and careful coordination of information is required for proper fabrication or installation of

materials, products or equipment by separate entities. Coordination drawings may also be required where limited space availability necessitates close and careful coordination for efficient and proper installation of different components.

1. Show interrelationships of components shown on separate shop drawings.
 2. Indicate required installation sequences.
 3. (See also the requirements for the general coordination drawings under paragraph 1.7 below).
- C. Coordinate any request for substitution to ensure compatibility of its space requirements, its operating characteristics and elements and its effects on other work. Prior to proposing a substitution for any item, verify that its size, configuration, supports and connections will coordinate with all other work and that it will fit within the allotted space while allowing for proper operating, maintenance and circulation space.
- D. Comply with requirements for requests for submittal of substitution indicated in AIA A232 and Section 00800.

1.5 COORDINATION MEETINGS

- A. The Prime General Construction Work Contractor shall hold additional coordination meetings and conferences with other Prime Work Subcontractors and others involved in the Work as needed to ensure coordination of work.
1. Notify the Architect of such coordination meetings.
- B. Regular project site meetings shall be in accordance with Sections 00870 and 01200.

1.6 COORDINATION OF TRADES

- A. Coordinate construction activities included under various sections of these Specifications to ensure efficient and orderly installation of each part of the Work and to prevent interferences among parts of the Work. Coordinate work items and construction operations included under different sections of the Specifications that are dependent upon one another for proper installation, connection and operation.
1. Where installation of one part of the Work is interrelated with installation of other components, schedule construction activities in the sequence required to obtain the best results.
 2. Where availability of space is limited, coordinate installation of different components to prevent interferences and to ensure proper accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda outlining special procedures required for coordination. Include such items as required notices, reports and attendance at meetings. Distribute these coordination memoranda to all parties involved in the work being coordinated.
1. Prepare similar memoranda for the Owner and other Contractor(s) where coordination with construction or operations by them is required.
 2. Provide copies of such coordination memoranda to the Architect.
- C. Coordinate the scheduling and timing of required administrative activities with other construction activities to avoid conflicts and ensure orderly progress of the Work. Administrative activities include:
1. Preparation and updating of schedules.
 2. Preparation and processing of submittals.
 3. Preparation and processing of requests for information.
 4. Project meetings.
 5. Testing and inspection activities.
 6. Project close-out activities.

1.7 COORDINATION DRAWINGS

- A. General Requirements: Prepare coordination drawings where limited space available may cause conflicts in the locations of installed products, and where required to coordinate installation of products.
1. In preparing the coordination drawings, large scale details as well as cross and longitudinal sections shall be developed as required to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts and similar features.
 2. In preparing the coordination drawings, minor changes in duct, pipe or conduit routing that do not affect the intended functions may be made as required to avoid space conflicts, when mutually agreed, but items may not be resized or exposed items relocated or other features affecting the function or aesthetic effect of the building changed without the Architect's prior review and acceptance. It should be assumed that no changes shall be made in any wall or chase locations, ceiling heights, door swings or locations, or window or other openings. If conflicts or interferences cannot be satisfactorily resolved, then the Architect shall be notified and their determinations obtained. Any conflicts or design deviations shall be specifically identified on drawings submitted to them.

3. The coordination drawings shall be submitted, in all cases, in ample time to avoid construction delay. The coordination drawings submitted may lack complete data in certain instances pending receipt of shop drawings, but sufficient space shall be allotted for the items missing, as evidenced by the sign-off of the party responsible for the missing items. When the missing information is available, it shall be promptly incorporated in the composite drawings.
 4. Cost and time impacts of relocating any duct, pipe, conduit, or other material that has been installed without proper coordination between all trades involved will be charged to the responsible party. If any improperly coordinated work or work installed that is not in conformance with the approved coordination composites necessitates additional work, the cost and time impacts of all such additional work shall likewise be the responsibility of the affective party. The Architect shall be the sole judge in determining all responsibilities.
 5. All changes in the scope of work due to revisions formally issued and approved shall be shown on the composite drawings.
 6. All work on the coordination drawings shall be performed by a competent draftsmen and shall be clear and fully legible. The Architect shall be the judge of the legibility of the composite drawings.
 7. In particular, prepare the following coordination drawings:
 - a. Drawings showing all piping, duct, cabletrays, electrical ductbanks, and similar items, but not electrical conduit less than 4 inches in diameter.
 - b. Complete architectural, mechanical and electrical reflected ceiling layouts, (including ductwork, conduits, piping, lighting, etc.).
 - c. Special coordination drawings are to be provided for the following:
 - 1) Where space is limited, show plan and cross-section dimensions of space available, including structural obstructions and ceilings as applicable.
- B. The Prime General Contractor shall prepare the coordination drawings required for his/her work.
- C. Layout Drawings: As soon as practical, but in no case starting later than thirty (30) days after the HVACR Work Subcontractor has received the notice to proceed, the HVACR Work Subcontractor shall prepare layout drawings of all duct work and piping at not less than 3/8" scale.
1. These drawings shall show registers, grilles, diffusers and similar features, as well as locations of all units, valves, dampers and other items requiring access for service and maintenance.

2. The drawings shall also show roof, floor and wall openings, reflected ceiling layouts, structural beams, framing and miscellaneous structural steel supports, ceiling heights, walls, floor to floor dimensions, structural columns, doors and other major architectural and structural features as shown on the architectural and structural drawings and as per approved shop drawings.

D. Composite Drawings:

1. The HVACR Work Subcontractor shall, as scheduled by the Prime General Contractor, produce a mylar, two (2) prints and one (1) sepia of each layout drawing as described.
2. The sepia will be retained for his/her records while the mylar and two (2) prints will be formally transmitted to the Plumbing Subcontractor, with copies of the transmittal to the Architect.
3. These drawings must be hand delivered or sent via a reliable mailing service that provides receipts and guarantees 24-48 hour delivery.
 - a. Common carrier mailing will not be acceptable.
4. The Plumbing Work Subcontractor, upon receipt of these mylars, will transfer the work from his/her shop drawings to the mylars, at the same time indicating where conflicts exist between his/her work and the work already shown on the mylars.
 - a. The Plumbing Work Subcontractor will utilize a green colored pencil for the layout of his/her work.
 - b. After completion, the Plumbing Subcontractor will forward the mylars and two (2) prints to the Electrical Subcontractor while retaining a sepia for his/her records.
 - c. The same mailing procedures will pertain.
5. The Electrical Work Subcontractor will duplicate the procedure outlined above, utilizing orange colored pencil for his/her layout.
 - a. After completion the Electrical Subcontractor will forward the drawings as specified above to the Fire Protection Work Subcontractor, (Plumbing Work Subcontractor), if applicable, who will layout his/her work with a red pencil and, after completion, forward the drawings to the General Contractor, retaining a sepia for his/her records.
6. The General Construction Work Contractor shall then have the HVACR's instrumentation (ATC) Work Subcontractor review the completed composite

drawings and attest to his/her concurrence that his/her work can be installed without conflict.

7. The General Construction Work Contractor will schedule coordination meetings on the job site to review the coordination drawings.
 - a. These meetings will be attended by a representative from each of the Subcontractors or Prime Contractor involved in the coordination process.
 - b. At these meetings, these Subcontractors or Prime Contractor will indicate where conflicts exist and resolve the conflicts through mutual agreement.
 - c. Should an impasse occur, the Architect will determine the resolution.
8. When all conflicts are resolved, the Subcontractors or Prime Contractor will indicate their agreement by signing these final composite drawings.
9. The drawings shall be signed-off by each of the involved Subcontractors, or Prime Contractor indicating their awareness of and agreement with the indicated routings and layouts and their interrelationship with the adjoining or contiguous work. The General Contractor shall then sign these final composite drawings.
10. The final composite drawings shall be completed and signed-off by all parties no later than ninety (90) calendar days after the General Construction Work Contractor has received the Notice to Proceed.
 - a. After the final composite drawings have been agreed upon and signed by the Subcontractors or Prime Contractor and by the General Construction Work Contractor, the General Construction Work Contractor shall provide and distribute prints to each of the Subcontractors, and four (4) sets of prints to the Architect for reference and record purposes.
 - b. The record copies of the signed-off final composite drawings shall be retained by the General Construction Work Contractor and each Subcontractor as working reference documents.
 - c. All shop drawings, prior to their submittal to the Architect, shall be compared with these composite drawings and developed accordingly.
 - 1) Any revisions to the composite drawings which may become necessary during the progress of the work shall be noted by the General Construction Work Contractor and by each affected Subcontractor and shall be neatly and accurately recorded on their record copies.

11. The General Construction Work Contractor and each Subcontractor shall be responsible for the up-to-date maintenance of his/her record copies of the composite drawings and for having one up-to-date copy available at the site.
12. The composite drawings, incorporating any subsequent changes thereto, shall be utilized by the General Construction Work Contractor or each Subcontractor in the development of his/her record drawings.
13. Following sign-off of the final composite drawings, no deviations will be permitted without prior review and acceptance by the Architect.
 - a. Unauthorized deviations will be subject to removal and correction at no additional cost to the Owner.
14. In areas where no HVAC work occurs, but where other mechanical and electrical installations are required, each involved Subcontractor shall be responsible for his/her own work and shall cooperate, as directed by the Prime General Construction Work Contractor, in preparing similar layout and composite drawings.

1.8 COORDINATION OF PROJECT CLOSEOUT

- A. Coordinate completion and clean-up work and administrative activities in preparation for Substantial Completion and occupancy of the Work or of designated portions of the Work.
- B. After Owner occupancy, coordinate access for completion or correction of the work not in conformance with the Contract Documents to minimize disruption of Owner's activities.
- C. Assemble and coordinate closeout submittals specified in Section 01700.

1.9 REQUIRED ADMINISTRATIVE / SUPERVISORY PERSONNEL

- A. General: In addition to the other administrative and supervisory personnel required for the performance of the Work, the Prime Contractor shall provide specific coordinating personnel as specified herein.
- B. Project Manager / Superintendent: A full time on site Project Manager, with a recommended minimum of eight (8) years experience, including project management experience on a similar type of projects.
 1. The Prime Contractor for General Construction Work shall provide a full-time staff member or members, (Project Manager/Superintendent), experienced in coordination of mechanical and electrical work on projects of this type and scale, including administration and supervision.

- a. Responsibilities:
 - 1) Coordinate all mechanical, plumbing, and electrical work, and coordinate that work with the other work of the project.
 - 2) Where space is limited, coordinate arrangement of mechanical, electrical, and other work to fit.
 - 3) Coordinate cutting and patching activities and sequencing.
 - 4) Coordinate use of temporary facilities.
- b. Prepare coordination drawings where required and where indicated.
- c. Provide information to the entity preparing the progress schedule.
- d. Participate in progress meetings; report progress, changes required in schedules, and unresolved problems.
- e. Review submittals for compliance with the contract documents and for coordination with other work.
- f. Check field dimensions, clearances, relationships to available space, and anchors.
- g. Check compatibility with equipment, other work, electrical characteristics, and operational control requirements.
- h. Check motor voltages and control characteristics.
- i. Coordinate controls, interlocks, wiring of switches, and relays.
- j. Coordinate wiring and control diagrams.
- k. Review the effect of changes on other work.
- l. Obtain and distribute installation data on each item of equipment requiring mechanical or electrical connections; include:
 - 1) Electrical power characteristics.
 - 2) Control wiring requirements.
- m. Observe and maintain record of tests and inspections.
- n. Observe work for compliance with contract documents and notify the applicable contractor in writing of observed defects in the work.
- o. Coordinate and observe startup and demonstration of equipment and systems.

- p. Coordinate maintenance of record documents.
 - q. Assist the Architect with final inspections.
2. Prime Subcontractor(s) shall provide staff for coordination between trades. Staff requirements noted above represent the minimum full-time on site staff required.
 3. Staffing is subject to Owner / Architect's approvals.
 4. Staff members may not be removed or replaced without Owner/Architect's approvals.
 5. Staff name(s), duties and resumes are to be submitted to the Architect for approval within fifteen (15) days of the Notice to Proceed.

1.10 COORDINATION OF TRADES

- A. Coordinate work with other trades to eliminate any possible interference before any piping, conduit, equipment, devices, controls, supports, ductwork and fixtures are installed.
- B. Where multiple items of mechanical and electrical equipment, devices, piping, conduits, supporting metal work, hangers, pull boxes, outlets, ductwork or controls are shown on any of the Contract Documents of the various trades in the same location, coordinate and adjust items to fit within designated location(s).
- C. Provide and install necessary offsets, bends, turns and modifications in piping, ductwork, conduit and devices required to install the work without interference with that of other trades or structure, without additional cost to the Owner.
- D. For products specified to be furnished by one Contractor and installed by another Contractor:
 1. Contractor specified to furnish (or remove) product shall be responsible for delivery to (or return from) the project site, and shall pay transportation costs.
 2. Contractor specified to install product shall be responsible for coordinating product delivery, loading or unloading, storing, protecting and installing product as required.

1.11 COORDINATION OF SPACE

- A. Coordinate use of available space and sequence of installation for work (e.g., mechanical and electrical work) which is indicated diagrammatically or schematically on the drawings. Prevent physical interference of components. Follow routing

shown for pipes, ducts and conduits, taking into account the limitations of available space; make runs parallel with lines of building. Utilize space efficiently to ensure proper installations (including installation of other work) and accessibility for maintenance, service and repairs.

- B. Detailed drawings of proposed departures from spatial arrangements or locations indicated in the Contract Documents, due to field conditions or other causes, shall be submitted to the Architect for review. No such departures shall be made without prior review by the Architect.
- C. Where required for coordination, the Architect will have the authority to order, as changes in the Work, changes in locations and sizes of piping, ductwork conduit, raceways and ducts. Such changes shall be made without adjustment to the Contract Sum or Contract Time.
- D. Field verify measurements of existing items and work which precedes each sequence. Ensure proper fit and location.
- E. In finished areas, conceal pipes, ducts and wiring in the construction.
- F. Coordinate locations of fixtures and outlets with finish elements.

1.12 COORDINATION OF FIELD MEASUREMENTS AND FIELD CONDITIONS

- A. Prior to ordering materials or equipment or performing work, the Contractor and/or Subcontractors shall verify Contract Document and submittal of dimensions and weights affecting their work and other Contractor's work associated with field measurements and field conditions at the project site, (for site and building work), and shall be responsible for their accuracy and correctness.
- B. Differences discovered from dimensions or weights indicated in the Contract Documents or submittals shall be submitted in writing to the Architect for review, before proceeding with the work.
- C. Commencing work implies acceptance of surfaces, areas, preceding work and other field conditions, and verification of dimensions, by the Contractor.
- D. No Change Order will be issued in cases where discrepancies in dimensions are discovered after work has been commenced or where the Contractor has failed to properly investigate and take into account field measurements and existing field conditions.
- E. Inspection of Conditions: Require the Installer of each major component to inspect both substrate and conditions under which his/her work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

- F. Recheck measurements and dimensions, before starting each installation.
 - 1. Submit to the Architect for review any change in dimensions shown on the Contract Documents or submittals affecting physical size, shape or location of any part of the work, whether due to field conditions or other causes.
- G. Passage of equipment:
 - 1. Establish passage clearances required to deliver, install and erect mechanical and electrical equipment. Wherever necessary, provide equipment in sections or knocked down in order to allow passage of equipment through available openings.
 - 2. Where there is not sufficient clearance for passage of mechanical or electric equipment, deliver, install and protect such equipment before confining walls, floors, slabs and steel work are erected. Schedule and coordinate this work with the work of other trades.
 - 3. If any structure, equipment or system must be altered to allow passage of equipment, the person or entity responsible for providing that structure, equipment, or system shall restore it to its original condition, without additional cost to the Owner.
 - 4. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- H. Verify the size of shafts and chases, the adequacy of partition thickness and the clearance in double partitions and hung ceilings for proper installation of work.
 - 1. Contractors shall cooperate in arranging their work with other Contractors whose work is in the same spaces.
 - 2. The amount of space occupied by each trade's work shall be kept to the minimum required.
 - 3. Arrange for chases, slots and openings in other building components during progress of construction, to allow for timely installation of work.
- I. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- J. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

- K. Provide all appropriate structural supports, hangers, wires for roof, floor and wall and associated assemblies which include but are not limited to materials, finishes, equipment, fixtures, piping, raceways, mechanical and electrical components. This work shall be in conformance with requirements of the Contract Documents whether or not indicated by a reference in specification or as may be in detail shown on drawings and schedules.
- L. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- M. Install each component during weather conditions and construction status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
- N. Coordinate temporary enclosures with required inspections and tests, to minimize necessity of uncovering completed construction for that purpose.
- O. Where mounting heights are not indicated:
 - 1. Install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.
 - 2. Install mechanical and electrical systems, materials and equipment to provide maximum possible headroom. Maintain maximum headroom and space conditions. Where headroom or space conditions (less than 8'-0") appear inadequate, the Architect shall be notified before proceeding with the work.

END OF SECTION 01040

SECTION 01050 - ALTERATIONS, CUTTING, PATCHING AND REFINISHING WORK

PART 1 - PRODUCTS

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 DESCRIPTION

- A. Work included: Alterations, removals and demolition required for this work include, but are not necessarily limited to:
 - 1. Alterations, cutting, patching, removal and preparation work to be done as noted on drawings and as required to complete construction.
 - 2. Patching and refinishing of existing surfaces damaged or left unfinished as a result of this work, including site work and existing ground surfaces; concrete surfaces, bituminous paving surfaces, etc.
 - 3. Protection.
 - 4. Asbestos.
 - a. The Prime Contractor shall review and familiarize themselves with the Owners Asbestos Hazard Emergency Response Act (AHERA) report prior to the commencement of any demolition activity. Also, the/all Contractor(s) will be provided with an inventory of all ACM (Asbestos Containing Materials) in the buildings where they are working, and will be required to sign a form (provided by the Owner) that they are in receipt of the inventory.
 - b. Contractor(s) is/are herein cautioned that asbestos may be within concealed spaces where work will be taking place. The Contractor shall immediately notify the Owner if any concerns or conditions arise in regards to potential asbestos containing building materials (ACBM's) in order that the Owner may verify same and take appropriate action. The Contractor shall not proceed with the work until the material has been abated and air sampling clearance levels have been achieved as set forth by the Owner's Environmental Consultant.
 - c. The Contractor shall employ personnel who are trained in accordance with OSHA workplace standards as they pertain to asbestos.

- d. The Architect / Engineer has no authority or professional involvement relative to the hazardous material/asbestos removal or disposal phase for this project and are not available for questions and/or direction in this regard. The hazardous material/ asbestos reference is included as a convenience for the Owner, and the Architect accepts no responsibility nor liability for the accuracy of information, bidders conclusions, methods to be used, nor for any aspect of approvals required by the Contractor in undertaking and completing this project insofar as hazardous material/asbestos is concerned. The Contractor shall direct any/all questions and concerns to the Owners Hazardous Material Abatement Consultant.
 - e. Worker and Community Right to Know Act Requirements
 - 1) It is required that the Contractor and/or Subcontractors comply with all of the requirements of HAZCOM 2012 and New Jersey Right To Know (RTK) program. General Contractor is responsible for ensuring that containers of substances belonging to the Contractor and/or Subcontractors that are stored at the Owner's facility are properly RTK labeled. Refer to N.J.A.C. 8:59-5.10.
 - 2) Surveys of hazardous substances stored at the Owner's facility by the Contractor and/or Subcontractor are to be provided to the Owner of the facility. Refer to N.J.A.C. 8:59-2.2(h).
 - 3) Material Safety Data Sheets (MSDS) and/or Safety Data Sheets (SDS) from manufacturers must be provided to the Owner for all products present at, purchased for, and brought on site by Contractors and/or Subcontractors to the Owner's facility. Refer to N.J.A.C. 8:59-2.2(1).
 - 4) Contractor and/or all Subcontractors must submit, prior to starting any work, a copy of their approved Hazard Communication Plan - 29 CFR 1910.1200.
5. This project shall be subject to the requirements of the EPA "Renovation, Repair and Painting" rule including the following:
- a. The Contractor must be lead safe trained and certified. The Contractor will be required to submit a copy of their EPA certificate prior to the start of the work.
 - b. The Contractor shall provide the Owner with a copy of the EPA's Lead Hazard Management information pamphlet "Renovate Right-Important Lead hazard Information for Families, Child Care Providers and Schools" prior to the start of any renovation work. The Contractor shall have the Owner sign a pre-renovation disclosure form confirming receipt of the pamphlet.

- c. The Contractor shall at all times employ lead safe practices as identified in the rules.
6. This project shall be subject to the requirements of the EPA rules on diesel exhaust and off-site particulate dust, including the following:
 - a. Diesel exhaust contributes the highest cancer risk of all air toxics in New Jersey and is a major source of NOx within the state. Therefore, per NJ DEP recommendations, construction projects involving non-road diesel construction equipment operating in a small geographic area over an extended period of time shall implement the following measures to minimize the impact of diesel exhaust:
 - 1) All on-road vehicles and non-road construction equipment operating at, or visiting, the construction site shall comply with the three minute idling limit, pursuant to N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15. Contractor shall purchase "No Idling" signs to post at the site to remind subcontractors to comply with the idling limits. Signs are available for purchase from the Bureau of Mobile Sources at 609/292-7953 or <http://www.stopthesoot.org/sts-no-idle-sign.htm>.
 - 2) All non-road diesel construction equipment greater than 100 horsepower used on the project for more than ten days shall have engines that meet the USEPA Tier 4 non-road emission standards, or the best available emission control technology that is technologically feasible for that application and is verified by the USEPA or the CARB as a diesel emission control strategy for reducing particulate matter and/or NOx emissions.
 - 3) All on-road diesel vehicles used to haul materials or traveling to and from the construction site shall use designated truck routes that are designed to minimize impacts on residential areas and sensitive receptors such as hospitals, schools, daycare facilities, senior citizen housing, and convalescent facilities.
 - b. Contractor will be liable for the effects of off-site particulate dust and/or odors during construction and shall take steps to minimize the impact of air pollution from these activities.

B. Related Sections:

1. Section 00870 - Miscellaneous Requirements.
2. Section 01010 - Summary of the Work.
3. Section 01040 - Coordination.
4. Section 02070 - Selective Demolition.

5. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 1. Location and Extent of Work: Submit key plan indicating room location where work to take place. Describe cutting and patching, indicate methods and show how they will be performed.
 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 3. Products: List products to be used and firms or entities that will perform the Work. Provide samples and field mock-up as indicated or requested by the Architect.
 - a. Samples and field mock-up shall match existing surfaces and colors.
 - b. Obtain Architect's approval prior to proceeding with work.
 4. Schedule and Dates: Provide work schedule, indicate when cutting and patching will be performed.
 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Coordinate cutting of operating elements with other plumbing, HVAC, electrical or other trades.
- C. Miscellaneous Building Elements: Do not cut and patch any building elements or related components in a manner that could change their operation, load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - 1. Engage experienced installers or fabricators for all work.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- F. Mock-Ups: Provide mock-ups for Architect approval for each proposed patching method. Do not proceed with patching work until obtaining of approvals from the Architect.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties. Confirm existing warranties with Owner prior to starting of work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

- B. Inspection:
 - 1. Prior to start of any work the Prime General Construction Work Contractor shall verify all existing work area conditions; building lines, lengths, corners and all other dimensions.
 - a. General Construction Work Contractor shall engage a Licensed Professional Land Surveyor (PLS) to perform layout of the building and site elements. In addition, for building additions, the PLS shall verify all existing wall dimensions, angles, center lines, alignment points and other information which affect building closure. He shall also confirm floor to floor heights where applicable as well as any other vertical dimensions required for the execution of the work. Copies of all surveys performed by the General Contractor shall be submitted to the Architect in two copies and shall include layout drawings and data sheets.
 - b. All survey work must be done immediately in order to facilitate preparation of steel shop drawings by Steel Work Subcontractor.
 - 2. The General Construction Work Contractor shall submit information and survey to other Prime Work Subcontractor(s), the Architect for all required coordination of new construction and all other related site work.
 - 3. The Structural Steel Work Subcontractor shall verify and confirm floor to floor elevations and building dimensions with the General Construction Work Contractor prior to start of preparation of shop drawings for steel work.
 - 4. Prior to work of this section, verify information and survey submitted by the General Construction Work Contractor, carefully inspect the existing conditions and verify that materials and surfaces to be altered or removed are the same as noted on the drawings.

C. Discrepancies:

1. In the event of discrepancy of existing conditions, surfaces, etc., immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. The Prime Contractor shall provide cutting, patching, relocations, and or re-installations of existing construction to provide for installation of other components or performance of other construction associated with his/her work, and subsequently patch and finish as required to restore surfaces to their original condition. Work shall be performed whether or not shown on drawings.
 2. The General Construction Work Contractor shall provide all required and necessary pockets in concrete and masonry walls and in new roof assemblies including all required cutting, and preparation work to allow for installation of new structural steel framing, supports, lintels, bearing plates, dunnage, etc. The General Construction Work Contractor shall subsequently patch as required to restore and prepare surfaces to receive new finishes.
 - a. Cutting roof decking, roof flashing, patching and associated roofing work in additions shall be performed by the General Construction Work Contractor.
 - b. Cutting roof decking, roof flashing, patching and associated roofing work in existing building, where no roofing replacement is indicated or required,

shall be performed by each Prime Subcontractor for work included under the work of his/her scope of work.

3. All repairing, patching, piecing out, filling in, restoring and refinishing shall be neatly done by craftsmen skilled in their respective trades and completed in proper manner to leave same in condition satisfactory to the Architect.
4. All new work shall be installed plumb, level, true, and shall be shimmed as required to cover any irregularities in substrates.

B. Cutting:

1. Before cutting is started in any location the Contractor shall carefully investigate conditions as to human and structural safety, existing piping, wiring and items concealed, and wherever same interfere with the work they shall be properly relocated, rerouted or removed as the case may be, at no increase to contract price.
2. Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
3. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
4. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
5. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
6. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
7. Do not disturb any structural work, plumbing, steam, gas, or electric work without approval of Architect.
8. Mechanical and Electrical Services:
 - a. Cut off pipe or conduit in walls or partitions to be removed shall be performed by respective trade.

- b. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting shall be performed by respective trade.
 9. Proceed with patching after construction operations requiring cutting are complete.
 - a. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work.
 10. Existing work disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled or replaced with new work, and refinished and left in as good condition as existing before commencing work.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Field Mock-up: Prepare field mock-up of proposed restoration method as requested or required by the Architect. Obtain Architect's approval prior proceeding with actual work.
 3. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate or minimize evidence of patching and refinishing.
 4. Floors and Walls: Where walls, partitions and/or built-in cabinets that are removed extend one finished area into another, patch and repair floor and wall surfaces in the existing and new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 5. Ceilings: Cut, remove, patch, repair, install new including hanging assemblies and finish ceilings as necessary to provide an even-plane surface of uniform appearance.

6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.4 CLEAN-UP

- A. Areas where demolition is in progress within or adjacent to Owner occupied areas shall be broom cleaned at the end of each working day.
- B. Do not burn materials or debris on premises.
- C. Do not allow demolished materials to accumulate inside or outside of existing building.
- D. Remove from the site all rubbish and debris resulting from work of this section.
- E. If the Prime Contractor fails to clean-up their debris within 24 hours, the Owner has the right to clean-up the debris left by the Contractor(s). All associated clean-up costs, incurred by the Owner, will be back-charged to the Prime Contractor.

3.5 PROTECTION

- A. Contractor shall provide all other necessary temporary enclosures, guardrails, barricades, etc. to adequately protect all workers and public from possible injury. Provide all necessary temporary partitions, enclosures, coverings of approved materials and construction for the exclusion of weather and for confining dust and debris.
- B. Contractor shall be responsible for the protection of the existing building, facilities and improvements within the areas where work is being done. Any disturbance or damage to the work, the existing building, and improvements, equipment or any impairments of facilities resulting from his/her work, shall be promptly restored, repaired, or replaced by the responsible Contractor at no extra cost to the Owner.
- C. Adequate protection of persons and property shall be provided at all times, including Saturdays, Sundays and holidays, and during time work is being performed and after working hours. Protection shall include barricade fencing, traffic control, dust partitions, weather protection and other means as required.
- D. Preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site and along access to the site. Be responsible for all unauthorized cutting or damaging of trees and shrubs, including damage due to careless operation of equipment, stock-piling of materials or tracking of grass areas by equipment.

3.6 SALVAGE

- A. Partial Removal: Items of salvable value to Contractor may be removed from structure as work progresses. Salvage items must be transported from site as they are removed.
 - 1. Storage or sale of removed items on site will not be permitted.
- B. Items designated on drawings or in specifications to remain the property of the Owner, or to be reused, shall be removed, and securely stored with care to prevent damage. Repair or replace such items damaged in removal.
- C. Before transporting non-designated, removed items from the site, contact Architect for decision as to what items if any are to remain the property of the Owner. Items retained by the Owner will be transported by him to his/her storage area.

3.7 STANDARDS

- A. All demolition work shall be performed in accordance with the applicable rules and regulations and the Codes and Ordinances of local, State and Federal authorities, and in accordance with the requirements of public utility corporations.
- B. Work shall satisfy requirements of the Occupational Safety and Health Act of 1970 with amendments.
- C. Work not affected by more stringent requirements of regulatory agencies shall satisfy the provisions of ANSI-A10.6-2006 - American National Standard Safety Requirements for Demolition.
- D. Confine the movement and storage of vehicles, equipment and materials to such routes and locations as may be designated by the Owner and Architect.
- E. The building and grounds will be maintained in a clean and orderly manner so as to conform with all local fire safety regulations and in accordance with the latest editions of the Safety Code of the National and State Board of Fire Underwriters.

3.8 INGRESS, EGRESS AND CIRCULATION

- A. The Prime Contractor shall be responsible for performing his/her construction activities in such manner to maintain ingress and egress for visitors and occupants of Owner-occupied areas and to continuously maintain all required emergency exits from and circulation between existing facilities. Passageways for emergency exits shall be kept continuously free from debris, construction equipment, tools, stockpiles or materials, and other hazards to speedy evacuation. The Contractor shall provide all necessary temporary work as prudence and good practice may dictate and in

accordance with Applicable Law and Authorities having jurisdiction to obtain and maintain all such ingress, egress and circulation requirements. The Prime Contractor shall be responsible for providing coordination of this temporary work between Prime Subcontractor(s), as directed by the Architect. All temporary work shall be removed when no longer required.

3.9 NON-INTERFERENCE WITH OWNER'S OPERATIONS

- A. Work under this Contract will be performed when the existing building is occupied. Coordinate with Owner's schedule and operation, obtain Owner's approval prior to proceeding with work.
- B. Contractor shall acquaint himself with the general character of the Owner's operations prior to commencing work and shall schedule his/her work to avoid interference therewith. The sequence of alteration operations shall be in accordance with a schedule of contract operations approved by the Owner and Architect.
- C. The Contractor shall not start work until the schedule has been approved in writing by the Architect and the Owner. The Contractor shall not perform work in occupied areas without giving the Owner 72 hours written notice of his/her intention to work in occupied areas.
- D. The Contractor shall expedite placing orders and submission of shop drawings for equipment required to complete work under this Contract to ensure delivery of all equipment with adequate time allowed to complete the installations to conform to the project completion date.

3.10 REMOVAL AND DISPOSAL OF DEBRIS, RUBBLE, TRASH, ETC.

- A. The Prime General Contractor and Prime Subcontractor(s) shall be responsible for collection of own debris of all kinds, unsanitary, rubble, trash, combustible materials, etc. created by and in the execution of his/her contract and operations, on a daily basis. Provide clean up in accordance with Article 3.4 above. If hazardous or other harmful waste material are discovered, those materials shall be removed and disposed of by separate contract.
 - 1. Disposal shall be to trash receptacles, hoppers, containers, dumpsters, etc. provided by the Prime General Contractor.
 - 2. Disposal shall include all debris created by or connected with the operations of the Contractor and his/her Subcontractors and material suppliers.
 - 3. The Prime Contractor shall pay all costs, fees and permits attendant to the loading, unloading, cartage, dumping and off-site disposal of all indicated materials, rubbish and/or debris. The complete removal and disposal shall be performed with such frequency as to maintain the grounds around the building free from debris.

- a. Areas designated as "Loading Area" will be the only place that this Contractor will be allowed to load and off load usable materials and/or debris.
- b. He/She shall, at no time, block the fire exits of the building.
- c. He/She will erect a snow fence around the area at the start of the job; remove same at completion of the work.
- d. He/She will further repair any damage done to sidewalks, pavements and lawn areas upon completion of the work at no additional cost to the Owner.

END OF SECTION 01050

SECTION 01151 - UNIT PRICES

PART 1 GENERAL

1.1 PROCEDURE

- A. Bidder shall insert on the Proposal Form, all Unit Prices applicable to the work under his/her bid. Unit Prices will be used as the basis for computing "additions to" or "deductions from" the Contract Price for extra work and for work countermanded, reduced or omitted.
- B. Except as otherwise provided in the General Conditions, the Unit Prices when accepted, adjusted or established by the Contract shall remain binding and irrevocable for the entire period of the Contract, regardless of the quantities of work ordered or required under such Unit Prices.
- C. The acceptance of the Unit Price is on condition that the general character of the material and workmanship required for any work related thereto shall be equivalent to corresponding work as shown and specified, and that all costs, overhead and profit, as well as all incidental work required in connection therewith, has been included in the Unit Price.

1.2 RULES OF MEASUREMENT: EARTHWORK

- A. Except as provision is made hereinafter for arbitrary measurement, the quantity of excavation shall be its in-place volume before removal.
- B. The reference point for computing changes in depth shall be the plan grade at which the change starts.
- C. No allowance will be made for excavating additional material of any nature taken out for the convenience of the Contractor beyond the quantity computed under these Rules of Measurement.
- D. General excavation for buildings shall arbitrarily be assumed to extend to vertical planes 2 feet outside of the outside wall lines and to the elevation of the plan subgrade.
- E. Excavations shall be in accordance with OSHA requirements and that excavations should be shored and braced, as needed, to avoid encroaching into existing site improvements that are noted to remain undisturbed.
- F. Excavation for a footing (the pad) under a wall shall be measured as the neat plan width and depth of the footing
- G. Rock excavation shall arbitrarily be assumed to extend to vertical planes one foot beyond wall lines, pipe, etc., and to 6 inches below the established elevations.
- H. Excavation for footings for columns or piers shall be computed as vertical shafts, each with a horizontal cross section identical in shape and size with the bottom of the footing.
- I. Excavation for sump and other pits shall be computed as vertical shafts, each with a horizontal cross section identical in shape and size with the plan of the bottom of the construction installed (out to out of pit walls).

- J. The volume of backfill shall be the volume of excavation computed under these Rules of Measurement, less the volume of actual displacement by walls, beams, columns, piers, footings or other construction installed.
- K. Concrete quantities shall be computed from plan size, or if there are no drawings, from actual measurement of the work ordered and placed.

1.3 UNIT PRICES - GENERAL CONSTRUCTION, PLUMBING AND DRAINAGE, HEATING, VENTILATING AND AIR CONDITIONING, AND ELECTRICAL: EARTHWORK

- A. Bulk Rock and Trench or Pit Rock Excavation requiring jackhammering - Per Cubic Yard. Price shall include the breaking up of the rock by other means as directed by the Architect and its removal from the site, specified for other excavated material, and shall be the price over and above the price for earth excavation.

The Unit Price for bulk rock shall be \$ 300.00 per cu. yd.
 and trench or pit rock excavation shall be \$ 400.00 per cu. yd.

If the Contractor cannot perform the work at the given unit price, he/she shall accept for consideration subcontractor's price suggested by the Owner and/or the Architect.

1.4 UNIT PRICES - GENERAL CONSTRUCTION: Materials in Place.

Topsoil 5", Seed Fertilize, Lime, Mulch and Tack	\$_____ per sq. yd.
Test Pit	\$_____ per cu. yd.
Earthwork Onsite Cut/Fill	\$_____ per cu. yd.
Concrete Curb- 6"x8"x18" - 4500 psi	\$_____ per lin. ft.
Concrete Sidewalk 4" Thick - 4500 psi	\$_____ per sq. ft.
Pavers (Including Concrete Base and Masonry Sand)	\$_____ per sq. ft.
DGA (includes Excavation and Placement)	\$_____ per cu. yd.
24" Wide White Thermoplastic Crosswalk Striping	\$_____ per lin. ft.
2" HDPE Sanitary Sewer Forcemain	\$_____ per lin. ft.
1-1/2" Clean Stone Pipe Backfill	\$_____ per cu. yd.
Temporary 8' High Chain Link Fence w/ Privacy Screening & Gates	\$_____ per lin. ft.
6" Dia Bollards with Covers	\$_____ per unit

Replacement of existing damaged or deteriorated wood decking and match existing material and thickness. \$ _____ per sq. ft.

Replacement of existing damaged or deteriorated Tectum roof decking and match existing material and thickness. \$ _____ per sq. ft.

Replacement of existing damaged or deteriorated metal decking \$ _____ per sq. ft.

Replacement of existing wet or deteriorated roof insulation board \$ _____ per sq. ft.

Replacement of existing damaged or deteriorated wood nailers/blocking or framing, including removal of existing deteriorated wood, furnishing and installing new galvanized anchor bolts, expansion bolts at 4'-0" o.c. or nails through existing construction to remain: \$ **2.90** per board ft.

a. 2x4 for the above work \$ _____ per lin. ft.

b. 2x6 for the above work \$ _____ per lin. ft.

c. 2x8 for the above work \$ _____ per lin. ft.

d. 2x10 for the above work \$ _____ per lin. ft.

e. 2x12 for the above work \$ _____ per lin. ft.

Cost to remove and replace broken brick and mortar to match adjacent material per brick & surrounding mortar \$ _____

Cost to remove and replace deteriorated mortar to match adjacent material \$ _____ per lin. ft.

Cost of mechanically keyed stainless steel through wall with weepholes \$ _____ per lin. ft.

Cost to replace damaged or missing pre-finished aluminum counterflashing \$ _____ per lin. ft.

Cost to replace damaged or missing stainless steel counterflashing \$ _____ per lin. ft.

1.5 UNIT PRICES - PLUMBING, DRAINAGE & SPRINKLER SYSTEM: Materials in Place.

1-1/2" cast iron pipe above grade \$ _____ per lin. ft.

2" cast iron pipe above grade \$ _____ per lin. ft.

2-1/2" cast iron pipe above grade \$ _____ per lin. ft.

3" cast iron pipe above grade	\$_____ per lin. ft.
4" cast iron pipe above grade	\$_____ per lin. ft.
5" cast iron pipe above grade	\$_____ per lin. ft.
6" cast iron pipe above grade	\$_____ per lin. ft.
2" cast iron pipe below grade	\$_____ per lin. ft.
3" cast iron pipe below grade	\$_____ per lin. ft.
4" cast iron pipe below grade	\$_____ per lin. ft.
5" cast iron pipe below grade	\$_____ per lin. ft.
6" cast iron pipe below grade	\$_____ per lin. ft.
8" cast iron pipe below grade	\$_____ per lin. ft.
10" cast iron pipe below grade	\$_____ per lin. ft.
12" cast iron pipe below grade	\$_____ per lin. ft.
1/2" Type "L" copper tubing	\$_____ per lin. ft.
3/4" Type "L" copper tubing	\$_____ per lin. ft.
1" Type "L" copper tubing	\$_____ per lin. ft.
1-1/2" Type "L" copper tubing	\$_____ per lin. ft.
2" Type "L" copper tubing	\$_____ per lin. ft.
2-1/2" Type "L" copper tubing	\$_____ per lin. ft.
3" Type "L" copper tubing	\$_____ per lin. ft.
2" piping insulation	\$_____ per lin. ft.
4" piping insulation	\$_____ per lin. ft.
5" piping insulation	\$_____ per lin. ft.
6" piping insulation	\$_____ per lin. ft.
1" black steel schedule 40 pipe	\$_____ per lin. ft.
1-1/2" black steel schedule 40 pipe	\$_____ per lin. ft.

2" black steel schedule 40 pipe	\$ _____ per lin. ft.
2-1/2" black steel schedule 40 pipe	\$ _____ per lin. ft.
3" black steel schedule 40 pipe	\$ _____ per lin. ft.
4" black steel schedule 40 pipe	\$ _____ per lin. ft.
5" black steel schedule 40 pipe	\$ _____ per lin. ft.
6" black steel schedule 40 pipe	\$ _____ per lin. ft.
Ball Valve, under 1"	\$ _____ per unit
Ball Valve, 1"	\$ _____ per unit
Ball Valve, 1-1/2"	\$ _____ per unit
Ball Valve, 2"	\$ _____ per unit
Ball Valve, 2-1/2"	\$ _____ per unit
Ball Valve, 3"	\$ _____ per unit
Thermostatic mixing valve MV-1	\$ _____ per unit
Floor drain FD-1	\$ _____ per unit
Sprinkler head w/ associated 1" branch piping (Approx. 5'-0" length)	\$ _____ per unit

1.6 UNIT PRICES - HEATING AND VENTILATING: Materials in Place.

Galvanized steel ductwork	\$ _____ per lb.
Rigid duct insulation	\$ _____ per sq. ft.
2" Type "L" copper and brazed joints	\$ _____ per lin. ft.
1-1/2" Type "L" copper and brazed joints	\$ _____ per lin. ft.
1-1/4" Type "L" copper and brazed joints	\$ _____ per lin. ft.
1" Type "L" copper and brazed joints	\$ _____ per lin. ft.
7/8" Type "L" copper and brazed joints	\$ _____ per lin. ft.
3/4" Type "L" copper and brazed joints	\$ _____ per lin. ft.

1/2" Type "L" copper and brazed joints	\$ _____ per lin. ft.
2" piping insulation	\$ _____ per lin. ft.
1-1/2" piping insulation	\$ _____ per lin. ft.
1 1/4" piping insulation	\$ _____ per lin. ft.
1" piping insulation	\$ _____ per lin. ft.
7/8" piping insulation	\$ _____ per lin. ft.
3/4" piping insulation	\$ _____ per lin. ft.
1/2" piping insulation	\$ _____ per lin. ft.
Ball Valve, under 1"	\$ _____ per unit
Ball Valve, 1"	\$ _____ per unit
Ball Valve, 1-1/4"	\$ _____ per unit
Ball Valve, 1-1/2"	\$ _____ per unit
Ball Valve, 2"	\$ _____ per unit
Balancing Valve, 1-1/2"	\$ _____ per unit
Balancing Valve, 1-1/4"	\$ _____ per unit
Balancing Valve, 1"	\$ _____ per unit
Balancing Valve, 3/4"	\$ _____ per unit
VRF Branch selector box	\$ _____ per unit
Condensate pump	\$ _____ per unit
24" x 24" ceiling diffuser	\$ _____ per unit
24" x 24" ceiling register	\$ _____ per unit
Unitary controller	\$ _____ per unit
Thermostat	\$ _____ per unit

1.7 UNIT PRICES - ELECTRICAL WORK: Materials in Place.

Outlet, including outlet boxes and wiring. Receptacles will generally be connected to adjacent receptacle circuits \$_____ per unit

Dual Jack data outlet and 150 ft. of cable from IDF/data cabinet \$_____ per unit

Fully recessed outlet box, 3-1/2" deep with coverplate and 1-1/2" conduit extending from the box to above ceiling and terminated with a bushing \$_____ per unit

Fully recessed single gang outlet box with coverplate and 3/4" conduit extending from the box to above ceiling and terminated with a bushing \$_____ per unit

20A-1 Pole branch circuit installation 600V, including MC cable and termination. \$_____ per lin. ft.

20A-1 Pole branch circuit installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

30A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

50A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

60A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

70A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

80A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

90A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

100A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

150A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

200A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination. \$_____ per lin. ft.

400A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination.	\$_____ per lin. ft.
600A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination.	\$_____ per lin. ft.
800A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination.	\$_____ per lin. ft.
1000A-3 Pole feeder installation 600V, including EMT conduit, THHN wire, and termination.	\$_____ per lin. ft.
20A General purpose receptacle including back box, plate, conduit and wiring to the nearest device(30')	\$_____ per unit
20A GFCI receptacle including back box, plate, conduit and wiring to the nearest device(30')	\$_____ per unit
20A Single pole light switch including back box, plate, conduit and wiring to the nearest device(30')	\$_____ per unit
20A Single pole three way light switch including back box, plate, conduit and wiring to the nearest device(30')	\$_____ per unit
30A 3 Pole Fused Disconnect Switch, Nema 3R.	\$_____ per unit
60A 3 Pole Fused Disconnect Switch, Nema 3R.	\$_____ per unit
100A 3 Pole Fused Disconnect Switch, Nema 3R.	\$_____ per unit
200A 3 Pole Fused Disconnect Switch, Nema 3R.	\$_____ per unit
400A 3 Pole Fused Disconnect Switch, Nema 3R.	\$_____ per unit
20A 1 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
30A 1 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
50A 1 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
60A 1 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
80A 1 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
20A 2 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
30A 2 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
50A 2 Pole Circuit Breaker Installed in a panel.	\$_____ per unit

60A 2 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
80A 2 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
20A 3 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
30A 3 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
50A 3 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
60A 3 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
80A 3 Pole Circuit Breaker Installed in a panel.	\$_____ per unit
Interior 12-strand fiber optic cable	\$_____ per lin. ft.
Termination of a single fiber strand of a multi-strand fiber optic cable at existing fiber optic interconnect box	\$_____ per unit
Rack mounted fiber optic interconnect box including patch panel and connector materials for 12-strand fiber	\$_____ per unit
Dual Channel Surface Raceway	\$_____ per lin. ft.
Single Channel Surface Raceway	\$_____ per lin. ft.
Wall mounted occupancy sensor, including wall box and wiring.	\$_____ per unit
Ceiling mounted occupancy sensor, including wiring	\$_____ per unit
Corner mounted occupancy sensor, including wiring	\$_____ per unit
Daylight harvesting ceiling mounted sensor, including wiring	\$_____ per unit
Fire Alarm Pull Device, including outlet box and wiring	\$_____ per unit
Fire Alarm smoke/heat detector including wiring, programming, and testing.	\$_____ per unit
Fire Alarm duct smoke detector including remote test switch, wiring, programming, and testing.	\$_____ per unit
Fire Alarm Beam detector including wiring, programming, and testing.	\$_____ per unit
Fire Alarm horn/strobe including wiring, programming, and testing.	\$_____ per unit

Fire Alarm monitor/control module including wiring, programming, and testing.	\$_____ per unit
Fire Alarm door holder including wiring, programming, and testing.	\$_____ per unit
Fire Alarm Beam detector including wiring, programming, and testing.	\$_____ per unit
Smoke Detector Device, including outlet box and wiring	\$_____ per unit
Heat Detector Device, including outlet box and wiring	\$_____ per unit
Duct Mounted Smoke Detector, including outlet box and wiring	\$_____ per unit
Wall mounted fire alarm strobe device.	\$_____ per unit
Wall mounted fire alarm horn / strobe device.	\$_____ per unit
Welded wire mesh device guard for wall mounted fire alarm strobe or horn / strobe device.	\$_____ per unit

END OF SECTION 01151

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Construction Conference
 - 2. Pre-Installation Conferences
 - 3. Coordination Meetings
 - 4. Progress Meetings
- B. Construction Schedule requirements is specified in another Division 1, Section.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. The Architect will schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than fifteen (15) calendar days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Construction Manager, Architect and their consultants, Prime Contractor and his/her superintendent, Prime Subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could effect progress including such topics as:
 - 1. Tentative construction schedule
 - 2. Critical work sequencing
 - 3. Designation of responsible personnel
 - 4. Procedures for processing field decisions and Change Orders
 - 5. Procedures for processing Applications for Payment
 - 6. Distribution of Contract Documents
 - 7. Submittal of Shop Drawings, Product Data, and Samples
 - 8. Preparation of record documents
 - 9. Use of the premises
 - 10. Office, Work, and storage areas
 - 11. Equipment deliveries and priorities

12. Safety Procedures
13. First Aid
14. Security
15. Housekeeping
16. Working hours

1.4 PRE-INSTALLATION CONFERENCES

- A. The Prime Contractor to conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The installer and representative of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect and Construction Manager of scheduled meeting dates.
 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - a. Contract Documents
 - b. Options
 - c. Related change orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, product data and quality control samples
 - g. Possible conflicts
 - h. Compatibility problems
 - i. Time schedules
 - j. Weather limitations
 - k. Manufacturer's recommendations
 - l. Compatibility of materials
 - m. Acceptability of substrates
 - n. Temporary facilities
 - o. Space and access limitations
 - p. Governing regulations
 - q. Safety
 - r. Inspection and testing requirements
 - s. Required performance results
 - t. Recording requirements
 - u. Protection
 2. Record significant discussions and agreements and disagreements of each conference along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner, Construction Manager, Architect and Prime Subcontractors.
 3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

1.5 COORDINATION MEETINGS

- A. The Contractor for General Construction will conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 PROGRESS MEETINGS

- A. Regular Progress Meetings: The Construction Manager will schedule and conduct regular progress meetings as follows:
 - 1. Weekly meetings with the Contractor and Subcontractors.
 - 2. Bi-weekly meeting with the Owner, Architect, Contractor and Subcontractors.
 - a. Weekly meetings between the Contractor and Subcontractors will be the responsibility of the Contractor and the Architect will not attend.
- B. Special Meetings will be conducted as required by the progress of the work
- C. Location of the meetings: Meetings shall be conducted at the field office.
- D. Attendance: Attendance at Construction Meetings shall be as follows:
 - 1. The Owner shall be in attendance at bi-weekly meetings and at any special meetings as appropriate to the agenda.
 - 2. The Construction Manager, Architect and their professional consultants, as needed, at bi-weekly meetings and at any special meetings as appropriate to the agenda.
 - 3. The Prime Contractor at all construction meetings.
 - 4. Prime Subcontractors as appropriate to the agenda.
 - 5. Suppliers as appropriate to the agenda.
 - 6. The Owner's Representative at all construction meetings.
- E. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.

- F. Contractor's Construction Schedule:
1. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements
 - b. Time
 - c. Sequences
 - d. Deliveries
 - e. Off-site fabrication problems
 - f. Access
 - g. Site utilization
 - h. Temporary facilities and services
 - i. Hours of work
 - j. Hazards and risks
 - k. Housekeeping
 - l. Quality and work standards
 - m. Change orders
 - n. Documentation of information for payment requests
- G. Reporting: No later than three (3) business days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- H. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.
- I. Attendance by the Prime Contractor and Prime Subcontractors is mandatory, whether the meetings are weekly, bi-weekly or at whatever interval is determined by the Architect and the Construction Manager.
1. Unless given prior approval by the Construction Manager / Architect in writing not to attend meetings, Contractor will be fined **\$250.00** for each regularly scheduled meeting for which he/she is not represented by a person in authority who can speak for and/or make decisions for the Contractor.
 2. Fine amounts shall be withheld and deducted from the Contract Sum.

END OF SECTION 01200

SECTION 01400 - MATERIAL TESTING / QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for material testing and quality control services.
 - 1. **International Construction Code (ICC) requires Special Inspections - Material Testing shall be engaged and performed through Owner's Testing Inspection Agency which will be paid for by the Owner by means of an Allowance which is indicated in Section 01020.**
 - 2. **Testing and inspecting services other than the Special Inspections - Material Testing are required to verify compliance with requirements specified or indicated and are the responsibility of the Contractor. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.**
- B. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 1. Quality Control Services is the responsibility of the Prime General Contractor.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, and the Owner or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections in AIA Document A232 and Section 01200.
 - 2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.

3. Division 2 through 16 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality Control Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
 1. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 REGULATORY REQUIREMENTS

- A. Copies of Regulations: Obtain copies of referenced regulations which also available in Local Public Libraries.

1.6 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- B. Delegated-Design Submittal: When requirement is indicated in specific technical section and/or when requested by the Architect, in addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
 2. Description of test and inspection.
 3. Identification of applicable standards.
 4. Identification of test and inspection methods.
 5. Number of tests and inspections required.
 6. Time schedule or time span for tests and inspections.
 7. Entity responsible for performing tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- D. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
 - 1. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
 - 2. Contractor responsibilities include the following:
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies

to adequately demonstrate capability of product to comply with performance requirements.

- b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
 - d. When testing is complete, remove assemblies; do not reuse materials on Project.
3. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and the Owner with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect .
 2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.8 QUALITY CONTROL

- A. Contractor's Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - a. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Owner's Responsibilities: Owner will engage a qualified testing agency to perform the Special Inspections - Material Testing services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and **the Contract Sum will be adjusted by Change Order Credit to the Owner.**
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - a. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

1. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - a. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - b. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - c. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - d. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 - e. Do not perform any duties of Contractor.
2. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - a. Access to the Work.
 - b. Incidental labor and facilities necessary to facilitate tests and inspections.
 - c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - d. Facilities for storage and field-curing of test samples.
 - e. Delivery of samples to testing agencies.
 - f. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - g. Security and protection for samples and for testing and inspecting equipment at Project site.
3. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

- a. Schedule times for tests, inspections, obtaining samples, and similar activities.
4. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.
 - a. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

- A. For **Class I Buildings** (only), Testing Agencies / Special Inspector shall be established and recognized agency or design professional acting as the approved agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved. Special inspectors shall be certified in accordance with administrative provisions of the Uniform Construction Code (NJ UCC), N.J.A.C. 5:23-1.1 (2013), N.J.A.C. 5:23-3.14, N.J.A.C. 5:23-2.20(b), NJ DCA Bulletin No. 03-5 (Rev. November 2008) and applicable requirements of International Building Code (ICC), Chapter 17 as indicated below:
 1. Steel Construction (ICC, Section 1705.2 and Table 1705.2.3),
 2. Concrete (ICC, Section 1705.3 and Table 1705.3),
 3. Soils (ICC Section 1705.6 and Table 1705.6),
 4. Fabrication Process of Structural, Load-Bearing or Lateral Load-Bearing Members or Assemblies (ICC, Section 1705.10),
 5. Fire-Resistant Penetrations and Joints in High-Rise Buildings or Building assigned to Risk Categories III or IV (ICC, Section 1705.17).
- B. Class 1 Buildings:
 1. For Class 2 Enforcing Agencies - N.J.A.C. 5:23-4.3A(b)2, is a project in which the building exceeds the following criteria:
 - a. Use Group 'E': More than 14,400 sf, more than two stories / 55' high.
- C. Statement of Special Inspections: Where special inspection(s) or testing is required as indicated in ICC, Section 17, the registered design professional shall prepare a statement of special inspections in accordance with ICC, Section 1704.3 for submittal by the applicant.

- D. Records of each inspection must be submitted to the building official so as to compile legal record of the project. These records must include all inspections made, violations and discrepancies.
 - 1. Before a certificate of occupancy is issued, a final report must be submitted indicating that all special inspections have been made and all discrepancies have been resolved or removed in order to show compliance with the applicable code requirements.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 - 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
 - 3. Protect construction exposed by or for quality-control service activities.
 - 4. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01410 - REFERENCES AND INDUSTRY STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved:" The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities.
- C. "Directed:" Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated:" The term "indicated" refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations:" The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish:" The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install:" The term "install" describes operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide:" The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer:" An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

- J. The term "experienced," when used with an entity, means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction, subject to verification by and approval of the Architect.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. "Project site(s)" is the space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. **Applicability of Standards:** Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. **Publication Dates:** Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. **Conflicting Requirements:** If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. **Copies of Standards:** Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction

activity, obtain copies directly from publication source and make them available on request.

- E. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01410

SECTION 01505 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. The Prime General Contractor and Prime Subcontractors for the school project shall be responsible for the following temporary facilities and services:
1. Installation, operation, maintenance and removal of each temporary facility usually considered as its own normal construction activity.
 2. Plug in electric cords, extensions cords, supplementary plug in task lighting and special lighting necessary exclusively for their own activities.
 3. Their own field office, complete with necessary furniture, utilities and telephone service.
 4. Their own storage and fabrication sheds.
 5. All hoisting requirements for their work.
 6. Collection and disposal of their own debris, hazardous, unsanitary or other harmful waste material from their operations, on a daily basis to trash receptacles, hoppers, containers, etc. provided by the Prime General Contractor. Do not allow waste to accumulate inside building or on site. In addition, refer to Section 01524 Construction Waste Management.
 7. The secure lockup of their own tools, materials and equipment.
 8. Construction aids and miscellaneous services and facilities necessary exclusively for their own construction activities.
 9. Temporary storage provisions for their work, including offsite provisions, if required.
 10. Containerized bottled drinking water units for their personnel.
 11. Fire protection provisions related to their work.
 12. All personnel safety equipment and provisions for their personnel.
- B. The Prime General Contractor shall provide complete temporary safety programs for review and approval by, the Architect and the Owner.

- C. The Prime General Contractor shall be responsible for the following temporary facilities:
1. Administrative Facilities set forth in this Section for the exclusive use of the Owner, the Architect.
 2. Temporary access roads and paths to building, including access ways for cranes and trucks.
 3. Temporary toilets in sufficient quantity to suit project needs and including disposable supplies.
 4. Temporary insulated enclosure of the building, if required.
 5. Project identification signs.
 6. Rodent and pest control services.
 7. Barricades, warning lights, safety signage.
 8. Site enclosure fence, including maintenance and any gates needed. Provide fence relocations as needed during construction.
 9. Temporary grading to facilitate drainage from site.
 10. Environmental protections and erosion control, except for the truck wheel wash station.
 11. Snow and ice removal.
 12. Dewatering facilities.
 13. Dust and fume control
 14. Temporary storm sewer, if required.
 15. Tree and plant protection.
 16. Temporary partitions, whether or not shown on the drawings.
 17. Temporary covering for all openings in roof deck upon completion of erection of metal deck work.
 18. Temporary egress precautions routes for use when building is partially occupied, include but not limited to the following:

- a. Temporary doors and hardware.
 - b. Sidewalks
 - c. Fencing.
 - d. Signage whether shown or not on the drawings.
- D. The Prime Structural Steel Subcontractor is responsible for the following temporary facilities and services:
1. Perimeter protection of elevated areas as set forth in this Section.
 2. Other temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
- E. The Prime Plumbing Work Subcontractor shall be responsible for the following temporary facilities and services:
1. Temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
- F. The Prime Heating Ventilation Air Conditioning and Refrigeration (HVACR) Subcontractor shall be responsible for the following temporary facilities and services:
1. Temporary HVACR system after enclosure of the building, in accordance with the requirements of the activity milestone schedule.
 2. Other temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
- G. The Prime Electrical Subcontractor shall be responsible for the following temporary facilities and services:
1. Electric service for security lighting, if required.
 2. Other temporary facilities and services stated as his/her responsibility elsewhere in the Project Documents.

1.2 OFFICE AND STORAGE FACILITIES

- A. Each Contractor shall provide temporary office and storage facilities for their own use.
- B. In addition to the field office requirements set forth in this section the Prime General Construction Work Contractor will provide administrative facilities for the exclusive use by the Owner, Architect and Construction Manager.
1. Provide a new or reconditioned trailer, minimum size of 14' x 50', by Williams Inc, or approved equal with toilet, two offices and conference room.

2. Provide electric heating and insulated wall/roof/floor construction sufficient to maintain a minimum of 70°F interior temperature during the winter. Provide air conditioning sufficient to maintain a maximum of 70°F interior temperature during the summer.
3. Provide hot and cold water cooler/refrigerator combination with bottled water service for length of the project.
4. Include weekly cleaning service of entire trailer unit, and trash removal.
5. Provide set up/knock down of trailer, steps, and insulating skirts around trailer.
6. Provide Built-in private toilet facilities chemical water closet within the trailer and weekly cleaning.
7. Secure and pay for trailer permit if required.
8. Provide the following furnishings:
 - a. 1 new desk 36"x72", and one new or reconditioned cushioned rolling desk chair.
 - b. 1 drawing table (48"x96") and stool
 - c. 1 plan racks with minimum capacity for 12 sets of drawings (with clamps, 42")
 - d. 2 new - legal size, four drawer file cabinets with cylinder locks, manufactured by Steelcase or equal
 - e. 6 linear feet of bookshelving
 - f. 2 36"x72" folding table
 - g. 20 steel folding chairs
 - h. Grates/Blinds on all windows, and locking bar across door.
9. Provide exterior lighting at doors of trailer.
10. Provide the following equipment:
 - a. Software:
Microsoft MS Office XP Professional w/licensing, Primavera Expedition 8.5 w/licensing, Primavera P3 e/c w/licensing.
 - b. Multi-Function Color Laser Printer/Scanner and Fax Machine capable of making 11x17 copies: HP Laser Jet.
 - c. 5.6 GHz (1) line cordless telephone and (1) line corded speaker phones.
 - d. Include three (3) phone lines – (1) fax line, (1) for computer modem and (1) for voice.
 - 1) Services to include maintenance and regional/long distance for all phone lines (jacks to be located as directed by Construction Manager).
 - 2) Provide AT&T voice mail for the (1) voice line.
 - 3) Provide internet service provider

- h. Office supplies: The Contractor for General Construction shall provide, as part of his contract, an allowance for the supply of office supplies for the Construction Manager. (Refer to Allowances in Section 01020).
11. All facilities, equipment and furnishings are to be provided to the Construction Manager not more than fourteen (14) days after Notice to Proceed and are to remain on site until thirty days after punch list completion or sooner, if directed by the Construction Manager. At that time, all equipment and items as listed will be returned to the Owner.

1.3 TEMPORARY RAILINGS AND PERIMETER PROTECTION

- A. For all areas, the Prime General Contractor shall furnish, install, maintain and remove all initial safety protection work in full compliance with OSHA Standards.
 - 1. This work shall include but not be limited to, the protection of stair openings, shaft openings, safety railings and blocking at metal pan stairs prior to concrete fill, except the portion of the work which is included in the scope of the Structural Steel Subcontractor stated below.
 - a. For all areas, the Structural Steel Subcontractor shall furnish, install, maintain and remove all perimeter protection cable in full compliance with OSHA Standards at all elevated areas, including the roof level.
- B. The Prime Contractor and Prime Subcontractors are responsible for the removal and immediate replacement, at the conclusion of their work, of all temporary protection measures as required in order to facilitate their work.
- C. No fall or opening protection shall be removed until the progress of the permanent work is installed in a manner that results in no hazard to any party.
- D. The installation of all barricades, enclosure, temporary partitions and other protective measures shall be performed in full compliance with the requirements of the New Jersey State Department of Labor, OSHA regulations and all other applicable Federal, State and Local laws.

1.4 TEMPORARY CONSTRUCTION FENCE

- A. Site Fence: Chain link fence.
 - 1. General Construction Work Contractor shall design and install to prevent easy access to site by people and animals.
 - 2. The entire construction site shall be enclosed with a 8' high chain link fence with modesty slats.
 - a. Provide gates, as required for access.

- b. Do not remove until other security facilities, either temporary or permanent, are in place and in operation.
- c. Relocate, as needed.
- d. Furnish padlocks with keys for all personal, including the police and fire department.

1.5 COMPRESSED AIR

- A. Each Contractor shall furnish their own equipment and energy source to provide compressed air required for the completion of their work.

1.6 TEMPORARY HEAT

- A. Prior to the building being enclosed by walls and roof, if the outside temperature shall fall below 40°F at any time during the day or night, and the work in progress requires heat for execution and protection, the General Construction Work Contractor shall furnish acceptable means to provide sufficient heat to maintain a temperature of 40°F for that portion of the work for all areas requiring heat.
 - 1. Heating of field office, storage spaces, concrete and masonry shall be provided by each contractor under respective specification headings affected.
- C. As soon as the building is generally enclosed by walls and roof, the responsibility for supplying working area heat shall rest with the General Construction Work Contractor. The GC shall furnish sufficient heat by the use and maintenance of LP gas heaters to maintain a minimum temperature of 40°F within the enclosed area of the building at all times, and remove same when no longer required. The GC will be held responsible for freeze-ups for the duration of the forty (40) working day period following enclosure of the building. He/She shall remove soot smudges and other deposits from walls, ceilings, and all exposed surfaces, which are the result of the use of heating equipment. He/She shall not do any finish work until the areas are properly cleaned. The GC shall provide or arrange at his/her expense, supervision of the LP gas heaters at all times prior to start of the permanent heating contractor's obligation, which shall be forty (40) working days after the acknowledged enclosure of the building or buildings. The GC shall furnish and pay for all fuel.
 - 1. All heating equipment shall be NBFU approved and connected to approved flues to the atmosphere. Gas cylinders within the building shall not exceed 100 lb. capacity, shall have Interstate Commerce Commission approval and shall be fitted with a permanent cap to protect the valve when not in use. Heaters shall be approved by a recognized testing laboratory and must be equipped with a positive shut-off safety valve. Cylinders and heaters shall stand at least six feet (6'-0") apart and be connected with two braid neoprene hoses that will withstand 400 psi test pressure.

2. When cylinders and heaters are on the same floor, not more than one cylinder shall feed 400 sq. ft. of heated floor space. If cylinders feed heaters installed on a floor above, the area of heated floor may be increased to 600 sq. ft. Storage of cylinders within the building will not be permitted at any time. Fire extinguishers shall be provided on each floor where heaters are used, and the area must be ventilated.
 3. Contractors shall train at least two dependable persons to supervise heating installation at construction site.
- D. If the Prime Heating and Ventilating Subcontractor does not provide operation of the permanent heating system within the 40 working day period, the Prime General Contractor shall be liable for Liquidated Damages in an amount per day in accordance with the Contract Documents for the Subcontractors causing the delay.
1. In like manner, if the Prime Electrical and Plumbing Subcontractors do not provide the necessary electrical and plumbing work for operation of the permanent heating system, in sufficient time so that the 40 working day date can be met, the Prime General Contractor shall be liable for Liquidated Damages in an amount per day in accordance with the Contract Documents for the Subcontractors causing the delay.
- E. The GC shall continue to provide acceptable means of heat until the obligation of the permanent heating subcontractor shall become effective as herein stated. If the permanent heating system is not acceptable to the Architect / Engineer for providing temporary heat, the General Construction Work Contractor shall continue to provide temporary heat as described above, at the expense of the HVACR or Electrical Subcontractor(s) responsible for the delay in operating the permanent heating system.
- F. At the termination of the 40 working day interval after notice has been given that the building is enclosed, the HVAC Subcontractor shall operate and maintain the heating system throughout the period that heat is required. The permanent heating system shall provide such heat to a minimum temperature of 55°F, or to such higher temperature not exceeding 75°F, as may be directed by the Architect, for the proper conduct and protection of the work until such time as work is completed and accepted. Accepting Heating system for use during the construction period shall not constitute acceptance of the complete system but merely acceptance of those components listed hereafter, which components will be covered by a one-year guarantee, unless otherwise indicated in Part-5 specification sections. Warranty shall be starting on the date of take-over.
- G. When the permanent heating system is used for temporary heat, the cost of electric power and fuel will be paid for by the General Construction Work Contractor. At the time of substantial completion for the entire project, the Heating and Ventilating Subcontractor will clean or change all filters.

- H. Valves, traps and other parts of the heating system which are permanently installed by the Heating Subcontractor and used for supplying heat during the construction period need not be replaced, providing the system was in acceptable condition prior to its use, and further, that the system is properly cleaned and adjusted to operate after the permanent system is in use and to the satisfaction of the Architect / Engineer.
- I. If plastering or parging or finishing of any surfaces is necessary to enable the Heating Subcontractor to install the heating system in manner to permit its use for supplying heat during the construction period, the finishing, plastering and parging of such surfaces shall be done by the GC so as not to delay the installation of the permanent system. In the event this plastering or parging work is not completed in ample time to make possible the installation of permanent piping and heating units in a particular area, the permanent Heating Subcontractor shall install temporary piping and the heating units and cost of such temporary installation shall be paid by the GC.
- J. If additional heat is required beyond that specified herein, the Contractor requiring such additional heat shall pay for additional costs at no expense to the Owner.

1.7 TEMPORARY WATER

- A. The Plumbing Subcontractor shall provide, protect and maintain an adequate water supply for the use of all Contractors on the project during the period of construction, either by means of the permanent water supply line, or by the installation of a temporary water supply line. This water supply line shall be made available within fifteen (15) days after written request has been made to the Plumbing Subcontractor by any contractor requiring this service, with copies to the Architect/Engineer.
 - 1. If the Plumbing Subcontractor fails to carry out his responsibility in the supplying of the water, as set forth herein, he/she shall be held responsible for such failure and the Architect / Engineer shall have the right to take such action as he/she deems proper for the protection and conduct of the work.
 - 1. The Prime General Contractor shall be liable for Liquidated Damages in an amount per day in accordance with the Contract Documents for any (Sub)Contractor(s) causing delay.
- B. The Owner shall be responsible and pay all costs for water consumption.

1.8 TEMPORARY LIGHT AND POWER

- A. Electrical Work Subcontractor - "EC" shall extend electrical service to the building or buildings, including temporary field offices, at locations approved by the Architect / Engineer. Initial temporary service shall be three phase or single phase, depending upon which phase is closest to the project. This service shall be installed within fifteen (15) days after written request has been made to the EC by the Prime Contractor or Prime Subcontractor(s) requiring such service with copies to the

Architect / Engineer. When the contract calls for 3-phase permanent service, the EC shall install same within six (6) months to permit use by the Contractors. Electrical characteristics shall be provided to meet all temporary light and power requirements as herein and hereinafter specified or as included under Supplementary General Conditions. The EC shall provide the necessary distributing facilities and meter.

- B. The Electrical Work Subcontractor shall extend the service into the new addition and/or renovated areas and shall provide receptacles and lighting as described herein and one (1) 5 HP 208 V. or 220 or 230 volts power outlet and one separate power outlet for each contractor for the proper conduct of his work. Power outlets shall be fed independently of the temporary lighting system. Where service of a type other than herein mentioned is required, the contractor requiring same shall install and pay all costs of such special services. The size and the incoming service and main distribution switch and panel shall be sized as any service by NEC requirements.
- C. The Electrical Work Subcontractor shall provide double sockets at a maximum of thirty feet (30') on centers in large areas. One socket shall contain a 150 watt lamp and the other socket shall be a grounding type to accept a receptacle plug for small single phase loads to be used for short periods of time. The Electrical Subcontractor shall provide double sockets of the type described above in all individual rooms, one double socket for each 500 sq. ft. or fraction thereof of room area (for example: a room 30' x 30' - 900 sq. ft. would require two double sockets).
- D. Temporary power and lighting services and maintenance shall be provided by the Electrical Work Subcontractor, including power required for temporary construction trailers, security and protection specified under other sections.
 - 1. The General Construction Work Contractor shall be responsible and pay all costs for electrical consumption.
 - 2. On the date when the heating system is taken over by the Owner, the Electrical Work Subcontractor shall have the permanent service and distribution system in operation; this shall include service entrance and distribution equipment and power circuits to heating equipment. This will not, however, constitute acceptance of the electrical system.
- E. When the temporary electrical lines are no longer required they shall be removed by the Electrical Work Subcontractor and he/she shall restore to their original condition any part, or parts, of the ground or building, disturbed or damaged.
- F. Any Contractor who fails to carry out his responsibility in the supplying of uninterrupted light and power, as set forth in this contract, shall be held responsible for such failure and the Architect shall have the right to take such action as he/she deems proper for the protection and conduct of the work.
 - 1. The Prime General Contractor shall be liable for Liquidated Damages in an amount per day in accordance with the Contract Documents for any (Sub)Contractor(s) causing delay.

- G. There shall be no additional cost to the Owner or Prime Contractor because of standby requirements due to conflict in the normal working hours of the various trades.
1. Electrical Subcontractor shall provide temporary light and power required to meet all working days and hours of all trades and such light and power shall be available fifteen (15) minutes before the start of the earliest scheduled work and will continue until fifteen (15) minutes after the end of the latest scheduled work on each and every day.
 2. Any additional cost associated with any temporary light and power required during additional shifts, weekends or holidays shall be the responsibility of the Prime Contractor / Prime Subcontractor(s), and shall be paid directly to the Electrical Subcontractor.
 3. The Prime General Contractor shall be liable for Liquidated Damages in an amount per day in accordance with the Contract Documents for any (Sub)Contractor(s) causing delay.
- H. The Electrical Work Subcontractor shall observe the requirements of the Federal Occupational Safety and Health Act of 1970 with regard to temporary light and power.
- I. Electric Welding Equipment, Terrazzo Grinders, Pipe Threading Equipment, Floor Sanders: The Electrical Work Subcontractor shall provide at locations acceptable to Prime (Sub)Contractors involved two (2) outlets - 208, 220, 230 volts 60 cycle - three phase (single phase if 3-phase not available), 7-1/2 HP maximum capacity for each of the Prime (Sub)Contractors using the referenced equipment. Should any Contractor desire additional outlets or service of this type beyond the specified two outlets or service of a greater capacity or of different characteristics or for any other power equipment, he/she shall arrange with the Electrical Work Subcontractor for the installation and pay all costs involved.
1. The Prime Contractor is obligated to employ standby personnel by trade agreement to which he/she is a party shall determine and include all such costs thereof in his/her bid proposal.
 2. Any conflict arising between the Prime Contractor with regard to financial obligations for standby personnel or standby supervisory employees when the maximum number of units are provided, shall be resolved between the parties involved in direct proportion to the number of units on the site by the respective (Sub)contractors.
 3. No Contractor shall at any time set up claim for an extra relating to costs of standby maintenance or standby supervision for electric motor driven equipment. The Owner under no conditions will entertain or consider an extra in this regard.

- a. The Prime General Contractor shall be liable for Liquidated Damages in an amount per day in accordance with the Contract Documents for any (Sub)Contractor(s) causing delay.

1.9 TOILET FACILITIES

- A. The Prime General Construction Work Contractor shall provide and maintain in a neat and sanitary condition temporary toilet facilities for the use of all Contractors and persons employed on the work or connected therewith.
 1. Such facilities shall comply with the regulations of the local Department of Health and other bodies having jurisdiction.
 2. Such facilities shall be in sufficient quantity to suit manpower working on site.
 3. Place units in a flat and easily accessible location.
 4. Provide servicing for units once per week as a minimum requirements.

1.10 TEMPORARY ROADWAYS

- A. The Prime General Construction Work Contractor shall provide and maintain temporary roads, parking areas and paths as may be necessary for the work. The GC shall construct temporary roads and ramps as may be required by Prime Subcontractors for crane and truck access. The roadways shall be suitable for large trucks to deliver items to the buildings. Other Contractors shall be allowed to use the temporary roadways. In location, the temporary roads and parking areas may coincide with the permanent roadways and parking areas. Stone used in the construction of temporary roadways and parking areas may be left in place only if it occurs below the subgrade elevation for the permanent work.

1.11 PROJECT IDENTIFICATION AND TEMPORARY SIGNS

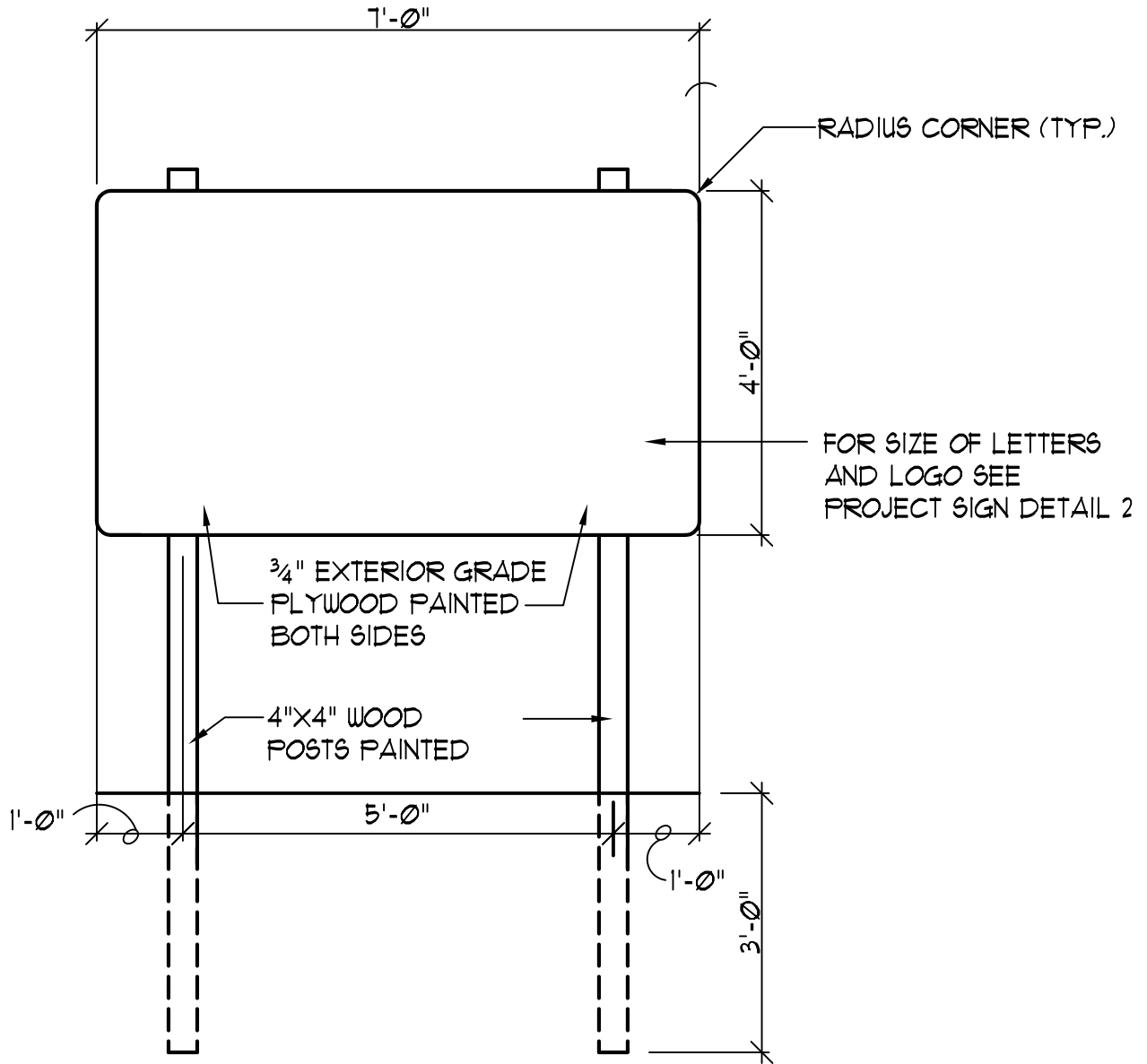
- A. The Prime General Construction Work Contractor shall prepare Project Identification Sign in size indicated. Provide sign(s) where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
 1. Engage an experienced sign painter to apply graphics for Project identification sign(s). Comply with details and colors as indicated or as directed by the Architect / Owner.
- B. Prepare temporary sign(s) to provide directional information to construction personnel and visitors.
- C. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
- D. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.

- E. No other signs will be allowed without Architect's approval.

1.12 REMOVAL AND RESTORATION

- A. Prior to acceptance of the Project, each Contractor shall remove the temporary work for which he/she has been responsible.
- B. Each Contractor shall restore all areas affected by temporary facilities which he/she has been responsible.

END OF SECTION 01505



PROJECT SIGN DETAIL 1


7'-0"

"SWOOSH" COLOR: GRIZZLE GRAY #SW T068 FADING TO REDBAY #SW 632 BY SHERWIN WILLIAMS AS INDICATED

ICON COLOR: REDBAY #SW 632 BY SHERWIN WILLIAMS

WINDOW COLOR: PASSIVE #SW T064 BY SHERWIN WILLIAMS

"PROJECT NAME"
"CLIENT NAME"



FVH D architects
planners
Fraytak Veisz Hopkins Duthie PC
New Jersey - 609.883.7101 | Pennsylvania - 610.933.6289

CONSULTING ENGINEER STRUCTURAL ENGINEER

"GENERAL CONTRACTOR"

"STEEL CONTRACTOR"

"HVAC CONTRACTOR"

"CONSTRUCTION MANAGER"

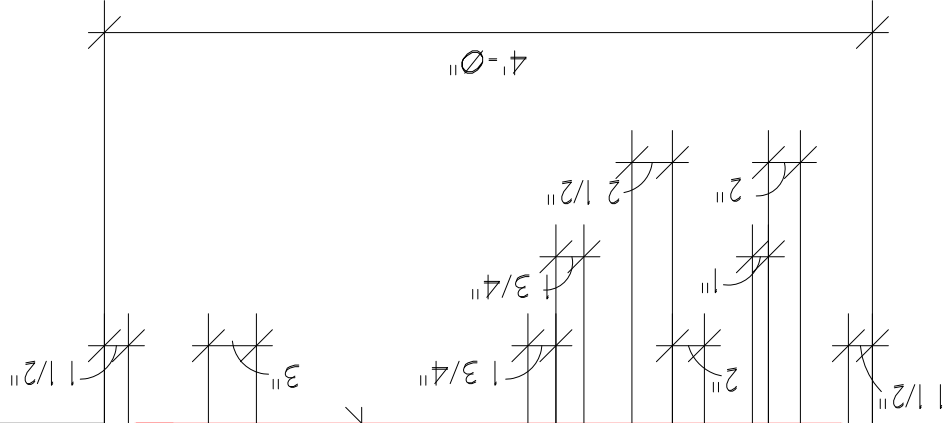
"PLUMBING CONTRACTOR"

"ELECTRICAL CONTRACTOR"

TEXT COLOR: BLACK EXCEPT AS NOTED

PLYWOOD BACKGROUND, SIGN BACK, SIDES & POST COLOR: PASSIVE #SW T064 BY SHERWIN WILLIAMS

BACKGROUND COLOR: GRAY MATTERS #SW T066 BY SHERWIN WILLIAMS



SECTION 01524 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. All of Division 1 and attached specifications and drawings that make a part of this contract.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.4 SUBMITTALS

- A. Waste Management Plan: Submit 4 copies of plan within 30 days of date established for the Notice to Proceed.

- B. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- C. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Qualification Data: For refrigerant recovery technician.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 2. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Owner / Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 1 Section "Temporary Facilities" for operation, termination, and removal requirements.

- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Sale and Donation: Not permitted on Project site.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area.
 - 4. Store components off the ground and protect from the weather.

5. Remove recyclable waste off Owner's property and transport to recycling receiving or processor.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials on site.

C. Burying: Do not bury waste materials on site.

D. Disposal: Transport waste materials off Owner's property and legally dispose of them.

E. Washing waste materials into sewers or drains is not permitted.

END OF SECTION 01524

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications sections included in Part-2 through Part-6.

1.2 SUMMARY

- A. Section Includes:
 - 1. General product requirements, including:
 - a. General specification requirements for all products.
 - b. General requirements and procedures for maintenance materials and tools.
 - 2. General requirements for product documentation, including:
 - a. Requirements and procedures for schedule of products.
 - b. General requirements for operation and maintenance data.
 - 3. General procedures for products including:
 - a. Procedures for transportation and handling.
 - b. Procedures for delivery and receiving.
 - c. Procedures for storage.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Components required to be supplied in quantity within a specification section shall be identical, interchangeable, and made by the same manufacturer.
- B. Do not use products removed from existing construction.

2.2 MAINTENANCE MATERIALS AND TOOLS

- A. Maintenance Materials: Parts and materials for repair and maintenance; specific items required are specified in product sections.
 - 1. Provide products and tools which are identical to those used in the work; if necessary to obtain identical items, order at the same time as products to be installed or tools to be used in the work.

- B. Package appropriately and label to show type and quantity of contents.
- C. Deliver, handle, and store in the same manner as products to be installed.
- D. Do not turn over to the Owner until date of substantial completion, unless otherwise approved by the Owner.
- E. Deliver to the Owner; unload.
- F. Obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 PRODUCTS

- A. It is the Contractor's responsibility to select products which comply with the contract documents and which are compatible with one another, with existing work, and with products selected by other Contractors.
 - 1. Verify that electrical characteristics of products are compatible with electrical systems; notify architect of all discrepancies.
 - 2. Where visual matching to an established physical sample is required, the Architect's decision will be final.
- B. Do not use any substitute products which have not been approved in accordance with the requirements of the contract documents.
- C. Where the specification is silent on whether substitutions will be considered, substitutions will be considered only when submitted in accordance with AIA A232 and Section 00800.
- D. Products Specified by Reference Standard: Use any product meeting the specification. Provisions of reference standards shall not modify the responsibilities of the Owner or Architect as defined in the contract documents.
- E. Products Specified by Performance Requirements: Use any product meeting the specification.
- F. Products Specified to Match a Physical Sample: Use any product that matches; obtain the Architect's approval.
- G. Products Specified by Listing a Brand Name Product(s) made by listed Manufacturer(s) as the "Basis of Design":
 - 1. Pursuant to N.J.S.A. 18A:18A-15(d) indicated basis of design brand name

product(s) or equivalent made by one of the manufacturers listed will be acceptable, as determined by the Architect.

- H. Products Specified by Listing Brand Name Product(s) Accompanied by Language Indicating that Substitutions Are Allowed: Provide a product meeting the specification; submit substitution request for any brand-name product, that is not listed, in accordance with AIA A232 and Section 00800.
- I. Products Specified by Listing Manufacturer(s): Provide a product meeting the specification and made by one of the manufacturers listed. Approval of substitutions will be in accordance with AIA A232 and Section 00800.
- J. Unless specified or noted otherwise in the Contract Documents and/or approved submittals, all Work is to be performed in accordance with the respective material Manufacturer's printed installation instruction. Work installed in variance with the Contract Documents, Approved Submittals and Manufacturer's printed installation instructions will be rejected, removed and replaced by the Contractor and at no additional cost to the Owner.

3.2 SCHEDULE OF PRODUCTS

- A. Prepare a complete schedule of products used, including the following for each product:
 - 1. Manufacturer's name.
 - 2. Brand or trade name.
 - 3. Model number, if applicable.
 - 4. Reference standard, if more than one is applicable.
 - 5. Arrange products in the schedule by specification sections; indicate paragraph where specified.
- B. Prepare and submit a preliminary schedule within 15 working days after award of contract; resubmit when revised; submit final schedule prior to final payment. See additional requirements and milestone dates in Section 01800.
- C. Schedule of products shall not be used to obtain approval of substitute products; make separate request for substitution.

3.3 OPERATION AND MAINTENANCE DATA

- A. Provide operation and maintenance data as specified in individual product sections.
 - 1. Provide data sufficient for operation and maintenance by Owner without further assistance from the manufacturer.
 - 2. Provide completed data in time for use during Owner instruction.

- B. Data Required For Products - General:
 - 1. Name of manufacturer and product.
 - 2. Name, address, and telephone number of subcontractor or supplier.
 - 3. Local source of replacements.
 - 4. Local source of replaceable parts and supplies.

- C. Product Data: Where product data is specified for inclusion in operation and maintenance data, provide manufacturer's data sheets marked to indicate specific product and product options actually installed; delete inapplicable data.

- D. Project Record Documents: Provide an additional copy of applicable record documents for inclusion with the operation and maintenance data.

- E. Coordination Drawings: When coordination drawings are prepared, include a copy with the operating and maintenance data.

- F. Custom Manufactured Products: Provide all information needed for reordering.

- G. Finish Materials: Manufacturer's product data, color/texture designations, and manufacturer's instructions for care, cleaning, and maintenance.

- H. Products Exposed to Weather and Products for Moisture Protection: Manufacturer's product data, recommended inspection schedule and procedures, maintenance and repair procedures, and maintenance materials required.

- I. Equipment: Provide at least the following information:
 - 1. Product data giving equipment and function description, with normal operating characteristics and limiting conditions.
 - 2. Starting, operating, and troubleshooting procedures.
 - 3. Cleaning and maintenance requirements and procedures.
 - 4. External finish maintenance requirements.
 - 5. List of maintenance materials required.
 - 6. List of special tools required.
 - 7. Parts list: List all replaceable parts, with ordering data.
 - 8. Recommended quantity of spare parts to be maintained in storage.

- J. Systems: Provide overall function description, with diagrams, prepared especially for this project.

- K. Form of Data: Prepare data in the form of an instructional manual.
 - 1. Arrange contents logically, using section numbers and sequence of sections indicated on the table of contents of this project manual.

2. When multiple volumes are used, arrange by related subjects; identify contents in cover title.
3. Assemble into 3-ring binders with maximum 2-inch ring size.
 - a. Hardback, cleanable plastic covers.
 - b. Identify each book with title "Operation and Maintenance Instructions" and project name.
 - c. Page size 8-1/2 by 11 inches, maximum.
 - d. Prepare special typewritten data on minimum 20-pound paper.
 - e. Provide tabbed divider for each product and system.
 - f. Drawings: Bind in with other data; provide reinforced binding edge; fold larger drawings to size of pages.
 - 1) Do not use pockets or loose drawings.
4. Provide table of contents for each volume listing:
 - a. Name of the project.
 - b. Name, address, telephone number, and contact name of:
 - 1) Architect.
 - 2) Contractor.
 - c. Index of products and systems included in volume.

3.4 TRANSPORTATION AND HANDLING

- A. Require supplier to package finished products in a manner which will protect from damage during shipping, handling, and storage.
- B. Transport products by methods which avoid damage.
- C. Deliver in dry, undamaged condition in manufacturer's unopened packaging.
- D. Provide equipment and personnel adequate to handle products by methods which prevent damage.
- E. Provide additional protection during handling where necessary to prevent damage to products and packaging.
- F. Lift large and heavy components at designated lift points only.

3.5 DELIVERY AND RECEIVING

- A. Arrange deliveries of products to allow time for inspection prior to installation.
- B. Coordinate delivery to avoid conflict with the work and to take into account both the conditions at the site and the availability of personnel, handling equipment, and storage space.

- C. Clearly mark partial deliveries to identify contents, to permit easy accumulation of entire delivery, and to facilitate assembly.
- D. Promptly inspect shipments and remedy damage, incorrect quantity, incompleteness, improper or illegible labeling, and noncompliance with requirements of contract documents and approved submittals.

3.6 STORAGE

- A. No indoor storage areas are available on site.
- B. General Storage Procedures:
 - 1. Store products immediately on delivery.
 - 2. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
 - 3. Store in a manner to prevent damage to the stored products and to the work.
 - 4. Store moisture-sensitive products in weathertight enclosures.
 - 5. Store indoors if necessary to keep temperature and humidity within ranges required by manufacturer.
 - 6. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
 - 7. Arrange storage to provide access for inspection and inventory.
 - 8. Periodically inspect and remedy damage and noncompliance with required conditions.
- C. Loose Granular Materials: Store on solid surfaces in well-drained area; prevent mixing with foreign materials.
- D. Exterior Storage:
 - 1. Cover products subject to weather damage with impervious sheet covering; provide ventilation to avoid condensation.
 - 2. Provide surface drainage to prevent runoff or ponded water from damaging stored products.
 - 3. Prevent damage and contamination from refuse and chemically injurious materials and liquids.

4. Store fabricated products on substantial platforms, blocking, or skids above the ground, sloped to drain.

END OF SECTION 01600

SECTION 01700 - PROJECT CLOSEOUT DOCUMENTS AND PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Specifications, Division 1 - Miscellaneous Requirements Sections, and Specification Sections included in Part-2 through Part-6.

1.2 SUMMARY

- A. Section Includes:
 - 1. Maintenance of Project Record Documents,
 - 2. Record drawings, including As-Built drawings,
 - 3. Record project manual (specifications),
 - 4. Operation and Maintenance Manuals,
 - 5. Warranties,
 - 6. Extra Materials,
 - 7. Submittals required prior to requesting for determining dates of substantial and final completion, and also prior to release of final payment(s),
 - 8. Transmittal of Closeout Project Documents to the Owner,
 - 9. Instructions of Owner's personnel,
 - 10. Final Cleaning.
- B. GENERAL REQUIREMENTS
 - 1. All submittals shall indicate reference to the appropriate Architect's Project Number.
- C. As-Built Drawings:
 - 1. Full-size paper set.
 - 2. Two (2) CD-Roms.

1.3 MAINTENANCE OF PROJECT RECORD DOCUMENTS

- A. Do not use record documents of any type for construction purposes.
- B. Maintain record documents in a secure location at the site while providing for access by the Contractor and the Architect during normal working hours; store in a fire-resistive room or container outside of normal working hours.
- C. Record information as soon as possible after it is obtained.
- D. Assign a person or persons responsible for maintaining record documents.

E. Record the following types of information on all applicable record documents:

1. Dimensional changes.
2. New and revised details.
3. Actual routing of piping and conduit.
4. Revisions to electrical circuits.
5. Actual equipment locations.
6. Sizes and routing of ducts.
7. Locations of utilities concealed in construction.
8. Particulars on concealed products which will not be easy to identify later.
9. Changes made by modifications to the contract; note identification numbers if applicable.
10. New information which may be useful to the Owner, but which was not shown in either the contract documents or submittals.

1.4 RECORD AND AS-BUILT DRAWINGS

A. During the progress of the installation, the Contractor shall keep a careful record of all changes and variations in the arrangement of his/her work from the layout shown on the Contract Drawings in order that the Owner may be provided with a complete set of all plans (As-Builts) showing the work as actually installed.

1. The Prime Contractor shall maintain two (2) complete sets of opaque prints of the contract drawings, marked to show changes which occur due to his/her work.
2. Where the actual work differs from that shown on the drawings, mark this set to show the actual work.
3. Mark location of concealed items before they are covered by other work.
4. Mark either record contract drawings or shop drawings, whichever are best suited to show the change.
5. Where changes are marked on record shop drawings, mark cross-reference on the applicable contract drawing.
6. When the Contractor is required by a provision of a modification to prepare a new drawing, rather than to revise existing drawings, obtain instructions from the Architect as to the drawing scale and information required.
7. Keep drawings in labeled, bound sets.
 - a. Mark with red pencil.
 - b. Mark work of separate contracts with different colors of pencils.

8. Incorporate new drawings into existing sets, as they are issued.
 9. Where record drawings are also required as part of operation and maintenance data submittals, make copies from the original record drawing set.
 10. As-Built Drawing Format to be submitted to the Architect:
 - a. One (1) complete, legible full-size paper (hard copy) As-Built drawing set with the following information on each page:
 - 1) Note: "As-Built" drawing,
 - 2) Contractor's Firm name,
 - 3) Date.
 - b. Two (2) copies, pdf format CD-Rom, scanned As-Built drawings of the hard copy furnished to the Owner (indicated above) shall be furnished to the Owner and the Architect and as directed by the Architect.
 11. Mechanical/ Electrical As-Built drawings must be submitted to the Engineer with a copy of the transmittal to the Architect. Approval must be obtained before issuing Final Certificate of Payment.
- B. Record drawings shall be provided for **all work** including but not limited to the following:
1. General Construction Work
 2. Structural Steel Work
 3. Plumbing and Drainage Work
 4. HVACR Work
 5. Electrical Work

1.5 PROJECT SPECIFICATION MANUAL

- A. The Prime Contractor shall maintain a complete copy of the project specification manual, marked to show changes which occur due to his/her work.
- B. Where the actual work differs from that shown in the project manual, mark the record copy to show the actual work.
 1. Include a copy of each addendum and modification to the contract.
 2. In addition to the types of information required on all record documents, record the following types of information:
 - a. Product options taken, when the specification allows more than one.
 - b. Product substitutions.
 - c. Proprietary name and model number of actual products furnished, for each product, material, and item of equipment specified.

- d. Name of the supplier and installer, for each product for which neither a product data submittal nor a maintenance data submittal was specified.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
 - 1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 - 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.
- C. Operation and Maintenance Manuals must be submitted to the appropriate Engineer with a copy of the transmittal to the Architect. Approval must be obtained before issuing Final Certificate of Payment.
 - 1. Contractors shall submit electronic version of the MEP/FP O&M manuals for review by the MEP/FP Consultant. *Paper copies should not be submitted as part of the MEP/FP review process.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of the Contractor.
 - 4. Warranty manual must be submitted to the Architect for review. Architect's approval must be obtained before issuing final payment.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.8 SUBMITTAL REQUIREMENTS - SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and digital images on CD Rom, damage or settlement surveys, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touch-up painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.9 SUBMITTAL REQUIREMENTS - FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to the requirements of the Contract Documents.

2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and signed by Contractor.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes. Provide statement signed by Owner's representatives stating that they have received required training.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. The cost of additional inspections required by the Architect or his/her consultants due to Contractor's failure to complete the punch list will be paid by the Contractor and will be deducted from the Contractor's final payment.
- C. The Prime General Contractor is required to obtain all final releases from governmental and regulatory agencies having jurisdiction over the project with the assistance from the Architect / Engineer and Owner (if required).

1.10 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list to the Architect. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, **starting with exterior areas first and proceeding from lowest floor to highest floor**, as applicable.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.11 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue - or black-line white prints of Contract Drawings and Shop Drawings.
 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Note related Change Orders, Record Drawings and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Drawings, and Record Specifications, where applicable.
- E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.12 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner, through Architect, with at least seven calendar days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

1.13 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
1. Refer to other Division 1 - specification sections for additional cleaning as required and where applicable.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid

disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

- g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- h. Sweep concrete floors broom clean in unoccupied spaces.
- i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
- j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- k. Remove labels that are not permanent.
- l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - (1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- n. Replace parts subject to unusual operating conditions.
- o. Plumbing Work Subcontractor shall clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- p. Heating, Ventilating Air Conditioning Work and Refrigeration Subcontractor shall replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - 1) Clean ducts, blowers, and coils if units were operated without filters during construction.
- q. Electrical Work Subcontractor shall clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

- r. Leave Project clean and ready for occupancy.
- s. The Prime General Construction Work Contractor, prior to Owner's occupancy, shall engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report and submit to the Owner. The General Construction Work Contractor shall also perform or have performed the following immediately prior to the Architect's inspection for Substantial Completion:
 - 1) Removal of all manufacturer's temporary labels from materials, equipment and fixtures.
 - 2) Removal of all stains from glass and mirrors; wash, polish, inside and outside.
 - 3) Removal of marks, stains, fingerprints, other soil, dust, dirt, from painted, decorated or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.
 - 4) Removal of spots, paint, soil from resilient flooring.
 - 5) Removal of temporary floor protections, clean, wax or otherwise treat as directed, polish all finished floors. Final vacuum all carpet.
 - 6) Clean all interior finished surfaces, including doors and window frames and hardware required to have a polished finish, of oil, stains, dust, dirt, paint and the like; leave without fingerprints, blemishes.
 - 7) Final site clean-up shall extend beyond the Contract Limit Lines as reasonable required to insure the complete removal of all construction debris from the entire site, including staging areas and shall be in accordance with requirements of the Contract Documents.
- t. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

1.14 TRANSMITTAL TO OWNER

- A. Collect, organize, label, and package ready for reference.
 - 1. Provide cardboard file boxes for submittals.
 - 2. Provide cardboard drawing tubes with end caps for transparencies.
 - 3. Bind print sets with durable paper covers.
 - 4. Label each document (and each sheet of drawings) with "PROJECT RECORD DOCUMENTS - This document has been prepared using information furnished by _____" [insert the contractor's name], and the date of preparation.

- B. Submit to the Architect for transmittal to the Owner, unless otherwise indicated.

1.15 REMOVE TEMPORARY FACILITIES

- A. At the completion of the work prior to final payment, remove all temporary facilities entirely from the site, including, but not limited to, the following:
 - 1. Field offices, trailers, shanties, sheds, job telephone, temporary toilets, temporary enclosures, dust barriers and other temporary protection devices.

1.16 SUBMITTALS REQUIRED PRIOR TO FINAL PAYMENT

- A. The Prime Contractor must satisfy all requirements of Sections 01700 and 01900 prior to submitting for Final Payment.
- B. A closeout checklist will be provided to the Prime Contractor when he/she is substantially complete. The Contractor is instructed to mark each submittal with the corresponding item number on the checklist. All warranties must have the Owner Name, Project Name, Architect Project Number and Warranty Periods. If all documents are not received in this format, the submittal will be rejected and the Contractor will be instructed to pick these documents up at the Architect's office for correction.
- C. Submittals required prior to final payment shall be in accordance with "Checklist" include, but are not limited to, the following items:
 - 1. Completed Operations Insurance Certificate - ACORD Form.
 - 2. Affidavit of Payment of Debts and Claims - AIA Document G706.
 - 3. Affidavit of Release of Liens - AIA Document G706A.
 - 4. Consent of Surety Company to Final Payment - AIA Document G707.
 - 5. Certification of Wages in accordance with New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.25.
 - 6. 10% two year Maintenance Bond on the form provided in this specification.
 - 7. Manufacturers' product warranties, Special written guarantees and warranties, maintenance warranty, etc. in accordance with Section 01900, various specification sections and the table of contents of the Project Manual. This is in addition to the two-year guarantee covered by the Maintenance Bond and in addition to the Contractor's **two-year guarantee**.
 - a. Guarantee shall be signed and sealed by Officer of the Contracting Firm and shall be notarized.

- b. Roofing Warranty: Manufacturer's Roofing Warranty must be accompanied by Contractor's proof of all payments to the Roofing System Manufacturer.**
8. Project Record Drawings, (As-Built Drawings), Record Specifications, Record Product Data, and Miscellaneous Record Submittals.
 - a. Note: As-Built Drawings shall be submitted to the appropriate Engineer(s)/ Architect.
9. Operation and Maintenance Manuals and Instructions.
 - a. Note: Operation and Maintenance Manuals shall be submitted to the appropriate Engineer(s) / Architect.
10. Balancing Reports for Heating, Ventilating, Air Conditioning and Refrigeration systems.
11. Certificate of Occupancy / Copies of all Building Department inspection approvals.
12. In accordance with requirements of N.J.S.A. 52:32-44. Contractor must submit accurate list of all subcontractors and suppliers. Contractor must provide a certification that all proofs of business registration for all subcontractors and suppliers are maintained on his/her file.
13. **Roofing Projects:** The Contractor must submit the following documents:
 - a. Copy of the paid statement from the roofing manufacturer for all materials including cost of the roofing warranty.
 - b. Original signed and notarized letter from the roofing manufacturer (on their letterhead) which certifies that the Contractor has paid the roofing manufacturer in full including cost of the roofing warranty.
14. All approvals and final releases from governmental and regulatory agencies have jurisdiction including, but not limited to: NJDCA, Local Construction Department, NJDEP, etc., as required.

END OF SECTION 01700

CLOSEOUT CHECKLIST

Owner		
Title		
Project #		Contract:
Contractor		
Substantial Completion Date:		Updated:
Refer to Specification Sections 01700 and 01900 for closeout requirements. All Warranties must have the Owner Name, Project Name, Project Number and Warranty Periods. As-built drawings, O&M manuals, reports, certifications, warranties, punch list must be submitted to Engineer for review.		
Item No.	Documents & Warranties Required For Closeout	Status
1	Completed Operations Insurance Certificate - ACORD Form	
2	Completed Operation Insurance Statement (Sample Enclosed)	
3	AIA Document G704 Certificate of Substantial Completion	
4	AIA Document G706 Affidavit of Payment of Debts & Claims	
5	AIA Document G706A Affidavit of Release of Liens	
6	AIA Document G707 Consent of Surety to Final Payment	
7	Certification that all wages have been paid - NJ Prevailing Wage Act, N.J.S.A. 34:11-56.25	
8	10% - two year Maintenance Bond - must be on form provided in spec book - sample attached	
9	Record Project Manual indicating changes or company letter stating no changes.	
10	One Year Contractor's Guarantee Covered by Maintenance Bond - Sample Attached	
11	Operation Instructions & Maintenance Manuals (2 each in 3-ring binder)	
12	Record Drawings. Indicate As-Built drawings with company name, address and date (1 Paper Set & 3 CD's)	
13	Final Payment Requisition & Board Voucher/Invoice (3) Contractor will not be closed out until all paperwork is submitted	
14	Certificate of Approval/Acceptance	
15	Confirmation that FVHD has received "hard copies" (not electronic) of all shop drawing submittals.	
16	Copies of all outstanding certified payroll reports or letter on Contractor's letterhead stating all outstanding certified payroll sheet and manning reports have been sent to the Owner.	
17	Letter on Contractor's letterhead stating date of substantial completion and requesting punch list review to Architect & Engineer	
18	Final Punch list signed and dated indicating completion of all work	
19	Accurate list of all subcontractors and suppliers	
20	Balancing & Testing Reports (HVAC)	
21	Fire Alarm Certification (ELECTRICAL)	
22	Warranties - Refer to Specification Section 01900 for required warranties for each trade	
23	All approvals and final releases from governmental and regulatory agencies have jurisdiction including, but not limited to: NJDCA, Local Construction Department, NJDEP, etc., as required.	

SECTION 01800 - TIME OF COMPLETION AND LIQUIDATED DAMAGES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes the requirements for completion of interim milestone events and final completion of all work required by the contract documents.
- B. Related Sections:
 - 1. Items of Work attached to the "Certificate of Substantial Completion" and establishing "Final Completion Time" as per Section 00800.
- C. This section also establishes the relation of liquidated damages for failure to complete the interim milestone events or final completion requirements within the time requirements stated herein.

1.2 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- A. It is understood that each Contractor has mutual responsibility to complete its work in sequence with the work of the other Contractor and to allow the other Contractor access to the work site so that it may complete its work within the times established.
- B. Completion of the Contract Work by the Contractor shall be time of the essence.
- C. The Contractor shall work overtime, additional shifts, weekends or holidays to complete the work on time with no additional cost to the Owner.
 - 1. Scarce resources will be no excuse for not completing the work on time.
 - 2. **No work may take place during the school day in any occupied area. All work, in occupied areas, shall be performed on second shift (3:00 PM - 11:00 PM) after December 23, 2019. Only limited/selective work is permitted. Contractor must review proposed work activities and have approval of Owner, Construction Manager and the Architect prior to proceeding.**
 - 3. **Work on the addition(s) may take place during regular shift and second shift (7:00 AM - 10:00 PM) after December 23, 2019 until July 9, 2021; however, the Contractor is required to review and coordinate all work activities with the Construction Manager, Architect and the School Facilities Director prior to commencing with the work.**
 - a. **Contractor to review permitted work hours to comply with the local "Noise Ordinance".**

4. **Contractor is required to include the cost of any premium time, second shift and weekend work which may be required in their bid to complete the work within the indicated milestone dates.**
- D. Substantial and final completion of the Work shall include, but is not limited to, final inspection and acceptance by the Local Building Officials.
- E. **Milestone No. 1**
1. Sign Contract, no later than **twenty (20) calendar days** from **Notice of Award**; on or about **November 20, 2019**.
 2. Contractor submits Bonds and Insurance **ten (10) calendar days** from **Notice of Award**.
 3. **Notice to Proceed** shall be within **three (3) business days** of date of signing Contract; on or about **December 12, 2019**.
- F. **Milestone No. 2**
1. **Time Critical submittals** for special equipment, fixtures, etc. shall be submitted within **twenty (20) calendar days from Notice to Proceed**.
- G. **Milestone No. 3**
1. Submission of all remaining technical shop drawing submittals shall be submitted within **forty-five (45) calendar days from Notice to Proceed**.
- H. **Milestone No. 4**
1. Physical work at the site shall commence on or about **December 23, 2019**.
- I. **Milestone No. 5**
1. Substantial Completion of the entire project shall be on or before **576 Calendar Days from the Notice to Proceed, July 9, 2021**.
 2. Liquidated Damages - \$500.00 / Calendar day of delay.
- J. **Milestone No. 6**
1. Final Completion of all Work including punch list items and closeout documents, no later than **31 Calendar Days from Substantial Completion, August 9, 2021**.
 2. Liquidated Damages - \$500.00 / Calendar day of delay.

- K. In accordance with N.J.S.A. 18A:18A-19, the Owner shall deduct from the Contract Price, for any wages paid by the Owner to any inspector or inspectors necessarily employed by for the work of this project, for any number of days in excess of the number of days or indicated dates allowed in milestones above. Such sums shall be part of the Liquidated Damages indicated herein after.
- L. The Liquidated Damages set for above shall be in addition to other consequential losses or damages the Owner may incur by reason of such delay, such as, but not limited to, the cost of additional architectural and engineering services resulting from the delay, additional costs to the Owner for payments to other Contractors resulting from delay, including acceleration costs by other contractors to recover the defaulting contractor's delay.
- M. The said Liquidated Damages are fixed and agreed upon by and between the Contractor and the Owner because of the impracticality and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amounts shall be retained from time to time by the Owner for the current periodical payments.
 - 1. The Liquidated Damages set for above are intended to compensate Owner for loss of use during the period of delay, for other delay during construction which may result further delay in substantial and/or final completion dates and for any acceleration costs by other contractors to recover the defaulting contractor's delay.
 - 2. In no way shall costs of Liquidated Damages be construed as a penalty to the Contractor.
- N. The Owner shall have the right to deduct the total amount any Liquidated Damages for which the Contractor may be liable from any monies otherwise due the Contractor, including any retainage under control of the Owner.
- O. The surety upon the Performance Bond furnished by the Contractor shall be liable for any such Liquidated Damages for the Contractor may be liable, to the extent that the Contractor shall not make settlement therefor with the Owner.

END OF SECTION 01800

SECTION 01900 - GUARANTEES AND WARRANTIES

PART 1 - GENERAL

1.1 THE CONTRACT

- A. Period for all guarantees and warranties shall commence at date of substantial completion for the entire project, as determined by the Architect.
- B. The Contractor's guarantee on all work, covered by Maintenance Bond. **Two (2) Yrs**
 - 1. The Maintenance Bond shall represent a continuing obligation of the Prime Contractor and his/her Subcontractor(s) to repair/replace defective materials and/or labor of products installed in the project for **two (2) years** from the date of Substantial Completion.
- C. Provide all required warranties indicated in specification sections which include but not limited to the following:

1.2 GENERAL CONSTRUCTION WORK

- A. Landscape Work as specified in Section 02480 **One (1) Yr.**
 - 1. Warranty all planted materials through the specified maintenance period extending **one (1) year** after final acceptance.
- B. Finish Grading & Seeding as specified in Section 02485.
 - 1. Warranty lawns and grasses unconditionally for **one full growing season** beginning from date of final acceptance.
 - 2. Beginning from the date of final acceptance, all lawns and grasses shall be alive and in satisfactory growth at end of warranty period.
 - 3. Replace any material that is diseased or 25% dead or more at no cost to the Owner.
- C. Grinder Pump as specified in Section 02532.
 - 1. The Manufacturer shall furnish a written warranty as follows for the grinder pump against any and all defects in material and factory workmanship provided product is installed, serviced, and operated under normal conditions according to Manufacturer's instruction. Defects found during the warranty period will be reported to the manufacturer by the owner. Repair or parts replacement required as a result of such defect will be made free of charge during this period upon return of defective parts or equipment to manufacturer.
 - 2. Pump shall be warranted for **30 months (2.5 years)** from date of manufacture **or 24 months (2 years)** from date of installation, whichever comes first.

D. Duplex Pump Station as specified in Section 02534.

1. The Manufacturer shall furnish a written warranty as follows for the complete package grinder pump sewage system against any and all defects in material and factory workmanship provided product is installed, serviced, and operated under normal conditions according to Manufacturer's instruction. Defects found during the warranty period will be reported to the manufacturer by the owner. Repair or parts replacement required as a result of such defect will be made free of charge during this period upon return of defective parts or equipment to manufacturer.
 - a. Basin shall be warranted for **24 months** from date of manufacture.
 - b. Mechanical components and electrical panel shall be warranted for **24 months** from date of manufacture.
 - c. Pump shall be warranted for **24 months** from date of manufacture.

E. Cement Based Self-Leveling Underlayment as specified in Section 03452. (Pour)

1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
 - a. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
 - 1) Warranty period: **One (1) year** after date of substantial completion.

F. Self-Drying Finishing Underlayment as specified in Section 03452. (Trowel)

1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
 - a. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
 - 1) Warranty period: Minimum **two (2) years** after date of substantial completion.

G. Unit Masonry Work as specified in Section 04200. **Five (5) Yrs.**

1. The Contractor shall warrant the exterior walls to be free from leakage due to any natural cause for a period of **five (5) years** from date of final acceptance of the building

and he shall, within such period at his own expense, upon written notification from the Owner, pursue such remedial measures as may be necessary to correct any condition of leakage and damage incidental thereto that may develop. The Contractor in signing this Contract accepts the above conditions. In so doing, he also agrees either that the materials and methods specified herein are such as to insure the results required or that he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the Contract.

2. Flexible Copper Flashing:

a. Special warranty:

- 1) Manufacturer shall warrant flexible flashing material for **life of the wall**.
- 2) Begin warranty from the Date of Substantial Completion.

H. Solid Polymer Fabrications as specified in Section 06650 **Ten (10) Yrs.**

1. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of **ten (10) years**, beginning at Date of Substantial Completion.

a. For fabrications with installed warranty coverage, identify by affixing manufacturer's fabrication/installation source plate.

I. Bentonite Waterproofing as specified in Section 07132. **Five (5) Yrs.**

1. Manufacturer's Warranty: Manufacturer's standard executed warranty, agreeing to repair or replace components of bentonite waterproofing system that fail in material within **five (5) years** starting at date of substantial completion. Failures include, but are not limited to the following:

- a. Water penetration into the building or structure.
- b. Deteriorated or displaced waterproofing material.

J. Fluid Applied Air / Vapor Barriers as specified in Section 07270.

1. Manufacturer's Single Source Warranty:

a. Fluid Applied Air and Vapor Barrier:

1). Product Warranty:

a) Manufacturer must warrant the material against product defect for a period of **one (1) year** from date of purchase.

2) Assembly Warranty:

a) Manufacturer must warrant the assembly against product defect for a period of **ten (10) years** from the date of substantial completion.

K. Agreement to Maintain Roofing

1. Roofing Contractor shall agree to maintain the roof systems and related roof sheet metal work in a weathertight and watertight condition for a period of **two (2) years** starting from the date of Owner's acceptance in accordance with special Maintenance Contract outlined herein.
2. During the Maintenance Period, the Roofing Contractor agrees that within 24 hours of receipt of notice from the Owner he will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing work. He further agrees that within a reasonable time, he will restore the affected items to the standard of the original specifications. All emergency and permanent work during the life of the agreements to maintain the roof systems will be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricanes, tornado, hailstorm, other unusual climatic phenomena of the elements, or failure of related work (except related roof sheet metal work included under the Agreement) installed by other parties.
3. Agreement to maintain roofing system shall be in a written form acceptable to the Owner.

L. Single Ply EPDM Roofing System as specified in Section 07530

1. Materials and Installation **Twenty (20) Yrs.**
 - a. Warranty must be an **NDL (no dollar limit)** and shall include all consequential damage to the Building and its contents.
2. Provide standard manufacturer's guarantee on the work, extending to flashings, metal edge copings, gravel stops, insulation and including all other materials for a single source warranty, (i.e. Carlisle's Gold Seal Warranty) signed by an authorized representative of the sheet manufacturer, guaranteeing the roofing materials against failures resulting from normal roof exposure, excluding unusual weather phenomena, failure of substrate, fire and abuse by traffic or other activities on the roof.

M. Modified Bitumen Roofing System (Cold Applied) as specified in Section 07535.

1. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's agreement including flashing endorsement (including metal), signed by an authorized representative of roofing system manufacturer, on form which was published with product literature as of date of Contract Documents, for the following period of time:
 - a. Total Roofing System Warranty: **Twenty (20) years** from approved date of substantial completion.
 - b. Warranty must be a **NDL (no dollar limit)**.

- c. The following exclusions are permitted in the warranty:
 - 1) Natural disasters such as lightning, hail, floods, tornadoes or earthquakes.
 - 2) Damage from traffic or storage of material or equipment on roof.
 - 3) Structural failure of roof deck, parapet or coping.
 - 4) Infiltration of moisture in, through or around walls, coping, or building structure.
 - 5) Damage to the building, (other than roofing system and specified components), or its components adjacent to roof areas.

- d. The warranty shall be supplemented by the following requirements:
 - 1) If upon proper notification, the warrantor fails to promptly repair the roof, the Owner may take temporary action for repairs to avoid damage the facility. Such action shall not be considered a breach of the provisions of the warranty.
 - 2) The Owner shall be permitted to make alterations, additions and repairs to the roof within the written approval guidelines of the warrantor without jeopardizing the unexpired portion of warranty's original term.

N. Flashing, Sheetmetal and Roof Accessories as specified in Section 07600.

- 1. Warrant Fluoropolymer coating to remain free, under various atmospheric conditions, from peeling, checking, or cracking, and chalking in excess of numerical rating of 8 when measured in accordance with ASTM D659-86, or fading in excess of 5 N.B.S. units during warranty period.
 - a. The Warranty period shall be **twenty (20) years** which starts on the approved date of Substantial Completion.

O. Joint Sealer Assemblies as specified in Section 07900.

- 1. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from date of Substantial Completion.

- 2. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from date of Substantial Completion.

 - b. Submit two (2) copies of written guarantee for all sealant work of this section signed by the Contractor and the sealant manufacturer for a period of **five (5) years** from the date of acceptance by the Owner.

- c. Guarantee shall further state that all exterior sealant will be guaranteed against:
 - 1) Adhesive or cohesive failure in joints where movement is under maximum 25% extension or compression.
 - 2) Any crazing greater than 3 mils in depth developing on surface of material.

- P. Wood Doors as specified in Section 08211 **Life of Installation.**
 - 1. Submit written agreement in door manufacturer's standard form signed by the manufacturer and contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or which show photographing of construction below its face veneers, or do not conform to tolerance limitations of NWMA.
 - 2. The warrant shall also include refinishing and reinstallation as may be required due to repair or replacement of defective doors.

- Q. Alum./FRP Doors and Alum. Framing System as specified in Section 08410. . **Ten (10) Yrs.**
 - 1. Provide written warranty signed by Manufacturer and Contractor, agreeing to replace aluminum entrances which fail in materials or workmanship within ten years of acceptance. Failure of materials or workmanship includes excessive leakage or air infiltration, excessive deflections, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering, and defects in hardware, weatherstripping and other components of the work.

- R. Windows as specified in Section 08520.
 - 1. Submit two (2) copies of written guarantee, signed by the Contractor, Installer and Manufacturer, agreeing to replace window work which fails in materials or workmanship within **ten (10) years** of the date of acceptance. Failure of materials or workmanship shall include but not be limited to excess air infiltration, excessive deflections, delamination of panels, deterioration of finish of metal in excess of normal weathering and defects in accessories, weatherstripping and other components of the work.

- S. Integrated Door Opening Assemblies as specified in Section 08170.
 - 1. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article will not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
 - 2. Special Warranty Periods: Manufacturer's standard written form, with the exceptions noted below, warranting integrated door opening assemblies to be free of defect in material or workmanship under normal use for a period of **five (5) years**.
 - a. Continuous Hinges: **Ten (10) years**.
 - b. Door Closers: **Ten (10) years**.

3. Warranty includes the manufacturer, at their sole option, agreeing to repair or replace products or parts found to be defective in material or workmanship according to details contained in the warranty certificate.
- T. Finish Hardware as specified in Section 08700.
1. Guarantee workmanship and material provided against defective manufacture. Repair or replace defective workmanship and material appearing within period of **one (1) year** after substantial completion.
 2. Provide **twenty-five (25) year** factory warranty on door closers against defects in material and workmanship from date of occupancy of project.
 3. Provide **five (5) year** factory warranty on exit devices, locksets and overhead stops against defects in material and workmanship from date of occupancy of project.
 4. Provide **ten (10) year** factory warranty on locksets against defects in material and workmanship from date of occupancy of project.
- U. Access Control Hardware as specified in Section 08740.
1. Special Warranty Period: **Two (2) years** for electromechanical and integrated access control door hardware.
- V. Glass and Glazing as specified in Section 08800.
1. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - a. Warranty Period: **Ten (10) years** from date of Substantial Completion.
 2. Fabricator's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass fabricator agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - a. Warranty Period: **Ten (10) years** from date of Substantial Completion.
 3. Manufacturer's Limited Warranty on Fire-Rated / Impact Glazing: Written warranty, made out to the Owner and signed by manufacturer, warrants only that the product will be free of manufacturing defects resulting in material obstruction through the glass area and/or edge separation and changes in properties of the interlayer for a period of **five (5) years** from the date of purchase, provided the Products have been properly shipped, stored, handled, installed and maintained.

- a. Limitation of Remedy - Inspection: The remedy for product proved to be defective under the terms of this warranty is limited to shipment of replacement product. With respect to all claims under this warranty, the Manufacturer shall have the right to inspect any and all products alleged to be defective.

W. Security Window Film as specified in Section 08870.

1. Manufacturer and the Authorized Window Film Dealer (collectively referred to as "Seller") warrant for **twelve (12) years** from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the Safety & Security Window Film will:
 - a. Maintain Adhesion Properties without blistering, bubbling, or delaminating from the glass,
 - b. Maintain Appearance without discoloration,
 - c. Maintain Strength, Tear, and Penetration Resistant Properties as defined in product literature.

Warranty Applicable with additional purchase & installation of Impact Protection System Adhesive or Profile:

2. With the purchase of Impact Protection Profile or Impact Protection Adhesive on all four (4) sides of the window, for the entire project, Manufacturer and the Authorized Window Film Dealer agree to extend the terms of this warranty an **additional two (2) years**, for a total of a **fourteen (14) year** warranty. This includes the film, attachment system, and labor. No changes are made to the glass breakage warranty.
3. The Impact Protection System Adhesive or Profile warranty applies to new Safety & Security Window Film installations. The adhesive or profile Product will meet Product specifications in effect at time of installation. The warranty period is **twelve (12) years** from the date of installation for a two sided application, and **fourteen (14) years** for a 4 sided application. This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminants, tampering or other modifications applied after installation.
 - a. Film warranty is void if the attachment system is removed for reasons other than to replace product found defective under this warranty. Application of Non-System Manufacturer wet glaze attachment system voids the Safety & Security Film Warranty. If the product does not conform to this warranty, the sole and exclusive remedy is:
 - 1) Replacement of the quantity of film proved to be defective; and,
 - 2) Provide removal and reapplication labor of like quality product free of charge.

4. Seller also warrants against glass failure due to thermal shock fracture, (maximum value of \$500 per window) caused only as a direct result of the application of Safety & Security Window Film provided the film is applied to recommended types of glass and the glass failure is reported to the Seller within the specified time (listed below) from the start of the installation. Glass breakage coverage is only valid for Safety & Security Window Films.
 - a. **Sixty (60) months** coverage against thermal shock fracture,
 - b. Any glass failure covered by this warranty must be reviewed by Seller prior to repair, and only covers film and glass replacement.

- X. Security Glazing (Alternate Bid) as specified in Section 08871.
 1. General: Submit warranties provided by the manufacturer agreeing to repair or replace defective material or workmanship within the specified warranty periods, starting from the date of substantial completion.
 - a. Laminated Security Glazing: Submit a **ten (10) year** warranty against delamination.
 - b. Insulated Security Glass Units: Submit a **ten (10) year** warranty against defects including loss of seal, interior clouding, and discoloration.

- Y. Glazed Curtain Wall System as specified in Section 08900.
 1. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
 - a. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1) Structural failures including, but not limited to, excessive deflection.
 - 2) Noise or vibration caused by thermal movements.
 - 3) Failure of system to meet performance requirements.
 - 4) Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 5) Failure of operating components to function normally.
 - 6) Water leakage.
 - 7) Glazing breakage.
 - b. Warranty Period: **Five (5) years** from date of Substantial Completion.

- Z. Architectural Column Covers as specified in Section 09290.
 1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the Contractor, and the installer, guaranteeing to correct failures in materials and

workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.

- a. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.

- 1) Warranty period: **Two (2) years** after date of substantial completion.

AA. Tile as specified in Section 09300.

1. Limited Warranty:

- a. Manufacturer warrants that manufactured products will be free from defect for a period of **one (1) year** from date of purchase.

- 1) Defect is defined as a shortfall in the product to perform to manufacturer's specifications as disclosed in product literature, within industry allowable tolerances as set forth in standard, national industry protocols.

- 2) Manufacturer provides detailed information in its product literature regarding appropriate tile and stone applications. Failure to comply with recommended applications voids this warranty.

BB. Acoustical Ceilings and Suspension System as specified in Section 09510.

1. Special Manufacturer's Warranty: Written warranty, signed by the ceiling manufacturer agreeing to furnish ceiling materials and replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

2. Warranty Period: **Thirty (30) year** System Performance Guarantee against visible sag, Mold/Mildew and Bacteria Growth.

CC. Resilient Flooring as specified in Section 09650.

1. Vinyl Enhanced Tile Flooring (VET)

- a. **Limited ten (10) Year** Commercial Warranty for Manufacturing Defects: Manufacturer warrants from the date of purchase for a period of ten (10) years of Commercial use that vinyl tile flooring products conform to written specifications and are free of manufacturing defects, subject to the terms and conditions specified herein.

- 1) The customer must notify Manufacturer of any obvious visual defects prior to installation; otherwise this warranty will not apply. If the defect is found and Manufacturer is notified in writing prior to installation, Manufacturer will replace

any defective product, at no charge. If the customer believes the product to be defective after installation, the customer must promptly notify Manufacturer and permit an inspection of the product. If, upon inspection, Manufacturer determines that the product is defective, Manufacturer will replace or repair the defective product at its own cost, subject to the limitations in this warranty, and prorated as follows: Material and 100% Reasonable Labor Costs (Year 1); Material and 50% Reasonable Labor Costs (Year 2); and Material Only (Years 3-10).

- 2) Manufacturer warrants that the products will not wear through for the warranty period of ten (10) years of Commercial use. For claims based on wear-through, the customer must notify Manufacturer and permit an inspection of the flooring. If Manufacturer determines that the original flooring is worn through, Manufacturer will replace or repair the worn flooring at its own cost; however, labor costs will be the customer's responsibility except as provided on the prorated basis described in the prior paragraph.

2. Luxury Vinyl Tile (LVT) - Alternate Bid

a. Warranty:

- 1) **Within One(1) Year** of Purchase: If a defect covered by this warranty is reported to Manufacturer in writing within one(1) year of purchase, Manufacturer will replace/repair at its discretion the defective product including reasonable labor charges for installation. Manufacturer will replace it with similar quality first grade material or repair the defect. The replaced or repaired material is warranted for the time then remaining under this original Warranty.
- 2) **Within Two(2) Years** of Purchase: If a defect covered by this warranty is reported to Manufacturer in writing within two(2) years of purchase, Manufacturer will replace or repair at its discretion the defective product and pay 50% of a reasonable labor charge for installation.
- 3) **After Two(2) Years** of Purchase: If a defect covered by this warranty is reported to Manufacturer in writing after two(2) years but within ten(10) years of purchase, Manufacturer will replace or repair at its discretion defective material only (excluding cost of installation).
- 4) Otherwise: **Within Five(5) Years** of Purchase: Installation is not according to Manufacturer's Engineered Installation Systems. If a defect covered by this warranty is reported to Manufacturer in writing within five(5) years of purchase, Manufacturer will replace or repair at its discretion defective material only (excluding cost of installation).

DD. Dry Marker Boards / Exhibition Boards as specified in Section 10100.

1. Submit a "**Life of Building**" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and

recommendations, porcelain enamel steel markerboard and chalkboard writing surfaces are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards, but does not include cost of removal or reinstallation.

2. Submit a standard warranty, stating that when installed in accordance with manufacturer's instructions and recommendations, exhibition boards are guaranteed for **one (1) year** against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material, but does not include cost of removal or reinstallation.
3. Writing Surface Warranty Period: Lifetime of the building commencing on the Date of Substantial Completion.

EE. Solid Plastic Toilet and Bath Partitions as specified in Section 10161.

1. Submit manufacturer's written guarantee to the Architect and the Owner which guarantees its plastic against breakage, corrosion and delamination under normal conditions for **twenty-five (25) years** from date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge (labor not included in warranty).

FF. Metal Lockers as specified in Section 10500. **Lifetime.**

1. The manufacturer warrants to the Owner that all items pertaining to the lockers shall be free of defective material or faulty workmanship for the **life of the product** when used in accordance with the manufacturer's specification and/or operating instructions.
 - a. This warranty applies to the original purchaser only.
 - b. Warranty excludes consequential, incidental or any other damages directly or indirectly resulting from failure or loss of use of products.

GG. Operable Partitions as specified in Section 10650 **Two (2) Yrs.**

1. Submit Manufacturer's / Installers written guarantee to the Architect and the Owner agreeing guarantee the work and to replace defective materials and workmanship for Operable Partitions including hardware assemblies, for a period of **two (2) year** which starts from the date of Architect's or Owner's Acceptance of work.

HH. Toilet and Bath Accessories as specified in Section 10800.

1. Washroom Accessories: Warranty is limited to replacing or repairing, at the manufacturer's option, transportation charges prepaid by the purchaser, any washroom accessory unit or part thereof which their inspection shall show to have been defective within the limitation of the warranty. Period of warranty is measured from the date of their invoice as follows:

- a. Complete unit (except mirrors) - **One (1) year**.
- b. Stainless Steel Mirror Frames - **Fifteen (15) years** - against corrosion.
- c. Tempered Glass Mirrors - **Five (5) years** - against silver spoilage.
- d. Polished #8 Architectural Grade Finish on 304 Series Stainless Steel - **One (1) year** against corrosion.
- e. Bright Annealed Finish on 430 Series Stainless Steel - **One (1) year** against corrosion.

* Warranty does not cover installation labor charges and does not apply to any units which have been damaged by accident, abuse, improper installation, improper maintenance, or altered in any way.

- 2. Hand Dryer(s) - Manufacturer's standard warranty to be free from defects for a period of **ten (10) years**.

1.3 CASEWORK AND EQUIPMENT WORK

- A. Casework (Solid Wood) as specified in Section 11011.....**Three (3) Yrs.**
 - 1. Manufacturer shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of delivery.
 - a. Within the warranty period, manufacturer shall repair, replace, or refund the purchase price of defective casework.

1.4 PLUMBING & DRAINAGE WORK

- A. Fuel-Fired, Domestic-Water Heaters as specified in Section 15486.
 - 1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.
 - a. Failures include, but are not limited to, the following:
 - 1) Structural failures including storage tank and supports.
 - 2) Faulty operation of controls.
 - 3) Deterioration of metals, metal finishes, and other materials beyond normal use.
 - b. Warranty Periods: From date of Substantial Completion.
 - 1) Commercial, Gas-Fired, Storage, Domestic-Water Heaters:
 - a) Storage Tank: **Five (5) years**.
 - b) Controls and Other Components: **Two (2) years**.

1.5 HEATING, VENTILATING, AIR CONDITIONING AND REFRIGERATION WORK

- A. Packaged, Outdoor, Rooftop & Energy Recovery Units as specified in Section 15732.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTUs that fail in materials or workmanship within specified warranty period.
 - a. Warranty Period for Compressors: Manufacturer's standard, but not less than **five (5) years** from date of Substantial Completion.
 - b. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than **fifteen (15) years** from date of Substantial Completion.
 - c. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than **three (3) years** from date of Substantial Completion.
 - d. Warranty Period for Control Boards: Manufacturer's standard, but not less than **three (3) years** from date of Substantial Completion.

B. Variable Refrigerant Flow System as specified in Section 15738.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
 - a. Warranty Period:
 - 1) For Compressor: **Six (6) years** from date of Substantial Completion.
 - 2) For Parts: **One (1) year** from date of Substantial Completion.
 - 3) For Labor: **One (1) year** from date of Substantial Completion.

C. Instrumentation and Control for HVAC as specified in Section 15900.

1. The ATC contractor shall warrant, from the date of final acceptance by the customer, that all systems, subsystems, component parts, and software are fully free from defective design, materials, and workmanship.
2. Provide a one-year labor and material warranty on the ATC.
3. If within **twelve (12) months** from the date of acceptance of product, upon written notice from the owner, it is found to be defective in operation, workmanship or materials, it shall be replaced, repaired or adjusted at the option of the ATC Contractor at the cost of the ATC Contractor.
4. Warranty work shall be done during ATC Contractor's normal business hours.

1.6 ELECTRICAL WORK

A. Lighting Control Devices as specified in Section 16145.

1. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.

- a. Failures include, but are not limited to, the following:
 - 1) Faulty operation of lighting control software.
 - 2) Faulty operation of lighting control devices.
 - b. Warranty Period: **Five (5) years** from date of Substantial Completion.
- B. Enclosed Switches as specified in Section 16410.
- 1. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - a. Warranty Period: **One (1) year** from date of Substantial Completion.
- C. Panelboards as specified in Section 16442.
- 1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace devices that fails in materials or workmanship within specified warranty period.
 - a. Warranty Period: **Three (3) years** from date of Substantial Completion.
- D. LED Interior Lighting as specified in Section 16511.
- 1. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 2. Warranty Period: **Five (5) years** from date of Substantial Completion.

END OF SECTION 01900

SECTION 01950 - SUBSOIL

1. GENERAL

- A. The attached subsurface investigation was developed by Professional Engineers at the request of the Owner.
- B. Additional surveys, test borings and other exploratory operations may be made by Contractor at no cost to Owner.
- C. The Architect and Owner assume no liability or responsibility for the accuracy of this report and for conclusions drawn therefrom.
- D. See Report for Test Boring Location Plan.

END OF SECTION 01950



GEOTECHNICAL ENGINEERING REPORT

THOMAS R. GROVER MIDDLE SCHOOL

PROPOSED ADDITIONS & IMPROVEMENTS

WEST WINDSOR TWP., MERCER CO., NEW JERSEY

PREPARED FOR:

**MR. HERBERT SEEBURGER, P.E.
VAN CLEEF ENGINEERING ASSOCIATES, LLC
4 AAA DRIVE, SUITE 103
HAMILTON, NJ 08691**

MAY 18, 2019

A handwritten signature in black ink that reads "William F. Mercurio". The signature is written in a cursive style and is positioned above a horizontal line.

**WILLIAM F. MERCURIO, P.E.
NEW JERSEY PROFESSIONAL ENGINEER
LICENSE NUMBER GE29247**

VCEA PROJECT NUMBER: 18-09-WW-01

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EXECUTIVE SUMMARY

The following is a summary of the geotechnical engineering conclusions and recommendations based on the results of the subsurface investigations for the proposed Additions & Improvements to the Thomas R. Grover Middle School site. The proposed improvements include a 2-story addition and stormwater management. The school site is located at 10 Southfield Road, West Windsor Township, Mercer County, New Jersey. This summary should be read in complete context with the accompanying report for proper interpretation.

Subsurface Conditions

- A subsurface exploration program was conducted on April 24, 2019 in the area of the proposed addition. The subsurface exploration program consisted four (4) test borings advanced to a maximum depth of 30 feet.
- The test borings encountered either 6 inches of topsoil at the ground surface. Loose to medium dense silty sands were encountered below the ground surface material to depths of 6 to 8 feet below existing grades. Medium dense sands were encountered below the silty sands to depths of 13 to 18 feet below existing grades. Loose sands were encountered below the medium dense sands to a depth of 30 feet, the maximum depth explored.
- Groundwater was encountered in all test borings at a depth of 13 feet below existing grades.

Foundation & Slab On-Grade

- Shallow and spread footings bearing on proofrolled natural soils of Stratum A, Stratum B or on compacted structural fill may be considered suitable for foundation support after approval by the Geotechnical Engineer.
- Shallow and spread footings can be designed with a maximum net allowable soil bearing capacity of 3,000 psf (1.5 tsf) for Stratum A, Stratum B or on compacted structural fill.
- A modulus of subgrade reaction of 150 pci, based on a 1-foot square steel plate, may be used for design of concrete floor slabs.
- In accordance with the provisions of the 2015 International Building Code, New Jersey Edition Section 1613.3.2 Seismic Requirements, the design is subject to the seismic design requirements of ASCE 7 Table 20.3-1 (Site Class Definitions). The site can be classified as Class D, dense soil profile.

1.0 INTRODUCTION

This report presents the results of a geotechnical subsurface investigation conducted by Van Cleef Engineering Associates (VCEA) for proposed Additions & Improvements to the Thomas R. Grover Middle School site. The proposed improvements include a 2-story addition and stormwater management. The school site is located at 160 West Windsor Road East, West Windsor Township, Mercer County, New Jersey. The site location is shown on the attached Site Location Plan – Figure 1, Appendix A

The purpose of this study was to determine the subsurface soil conditions beneath the site of the proposed improvements in order to provide geotechnical recommendations for foundation support and site development. General comments and other limitations relative to the contents of this report are presented in the Limitations Section of this report, Appendix C.

No construction or loading information was provided at the time this report was prepared.

2.0 SUBSURFACE INVESTIGATION PROGRAM

In order to determine the subsurface conditions at the proposed 2-story addition, VCEA's subcontractor, Sano Drilling, Inc. of Sewell, New Jersey, performed a subsurface investigation on April 24, 2019 using a truck mounted drill rig. The investigation included advancing four (4) Standard Penetration Test (SPT) borings. These borings are identified as B-1 through B-4. The borings were drilled to a maximum depth of 30 feet below the existing ground surface utilizing the hollow stem auger drilling method. The boring locations are shown on the attached Test Boring Location – Figure 2, Appendix A.

During the execution of the soil boring work, a field engineer from VCEA was present to monitor the drilling work, receive samples, prepare boring logs, and record all pertinent data. Detailed logs are presented in Appendix B of this report.

Soil samples were obtained from all the borings by the Standard Penetration Test (SPT) method with a 1½ inch inside diameter split spoon sampler, driven with a 140 lb. drop hammer free falling 30 inches (ASTM D-1586). The number of blows required to drive the split spoon every 6 inches into the soil were recorded and are shown on the logs. The sum of blows for the middle one-foot is the N value. The SPT N-value indicates the soil resistance encountered at each particular layer. Soil samples were obtained continuously. General notes for the test boring logs are included in Appendix B.

3.0 SOILS LABORATORY TESTING

All soil samples obtained were delivered to the VCEA office in Freehold, New Jersey for further identification and classification. Visual identification of the soil samples obtained from the borings is in accordance with procedures of the Modified Method of Identification of Soils as described by Prof. Donald M. Burmister (Modified Burmister) and Unified Soil Classification System (USCS). A summary of the Burmister Soil Identification System and USCS are included in Appendix B.

VCEA will dispose of the soil samples 60 days (September 30, 2019) after the issue of this report. Further storage or transfer of samples can be made at the Client's expense upon timely written request.

4.0 GENERAL SITE GEOLOGY

The general site geology information was obtained from the "Engineering Soil Survey of New Jersey, Report Number 34, Mercer County," prepared by Rutgers, The State University of New Jersey, May 1955.

The soils at this site are mapped with the symbol "AM-24" designating a discontinuous mantle of alluvial material deposited during the Quaternary period. The soils are an assorted material composed of silt with minor amounts of intermixed sand and gravel. The silty soil overlies coarser, stratified material consisting of intermixed sand and gravel with occasional boulders in some places. The depth to bedrock is usually greater than 10 feet.

5.0 DESCRIPTION OF SUBSURFACE CONDITIONS

The test borings encountered 6 inches of topsoil at the ground surface. The generalized subsurface conditions at this site may be described as follows, in order of depth:

Stratum A – Silty Sand: Stratum A was encountered directly below the ground surface material. The soils of this stratum consist of loose to medium dense, brown to orange brown sand (SC-SM material per USCS) with varying amounts of clay, silt and gravel. The SPT N-values of this stratum range from 5 to 15 with an average value of 10, indicating an overall medium density. This stratum extends to depths of 6 to 8 feet below the existing ground surface. Stratum B in turn underlies this Stratum.

Stratum B –Medium Dense Sand: Stratum B was encountered directly below Stratum A in all borings. The soils of this stratum consist of medium dense, yellow to orange brown sand (SP material per USCS) with varying amounts of clay, silt and gravel. The SPT N-values of this stratum range from 10 to 21 with an average value of 13, indicating an overall medium density. The stratum extends to depths of 13 to 18 feet below the existing ground surface. Stratum C in turn underlies this Stratum.

Stratum C –Loose Sand: Stratum C was encountered directly below Stratum B in all borings. The soils of this stratum consist of loose, yellow brown sand (SP material per USCS) with varying amounts of clay, silt and gravel. The SPT N-values of this stratum range from 2 to 5 with an average value of 4, indicating an overall loose density. The stratum extends to a depth of 30 feet below the existing ground surface, the maximum depth explored.

It should be noted that the soils of Stratum C is indistinguishable from Stratum B and the low SPT n-values were all encountered below the water table. VCEA does not believe the low SPT n-values are representative of the existing soil densities below the water table.

6.0 GROUNDWATER CONDITION

Groundwater was encountered in all test borings at a depth of 13 feet below existing grades. No long-term water level readings were obtained, as the test borings were backfilled upon completion.

Soil moisture and groundwater conditions should be expected to fluctuate with season, precipitation amounts, and other on-site and off-site factors including site utilization. Groundwater seepage may be encountered during earthwork excavation, utility installation or other deep excavations.

7.0 FOUNDATION RECOMMENDATIONS

Test boring data revealed that the subsurface conditions are favorable for the proposed construction.

7.1 SUBGRADE PREPARATION PROCEDURES

The subgrade preparation procedures will include:

- Remove vegetation and strip topsoil within the area of the proposed addition and 5 feet beyond the proposed footprint;
- Grade site to proposed subgrade elevation(s). Use only track-mounted equipment on the native soils, as they will soften under vehicle traffic and exposure to weather. Do not leave the soil subgrade exposed to wet weather for extended periods;
- The exposed subgrade soils should be proofrolled and compacted using a heavy duty 10-ton roller;
- Any areas which exhibit signs of instability during the compaction operations or contain excessive unsuitable materials, as determined by the Geotechnical Engineer, should be selectively over-excavated to suitable bearing material and backfilled with approved compacted structural fill;
- The excavated soil may be reused as the structural fill following removal of any oversized material, if encountered. Upon completion of proofrolling, structural fill can be placed and compacted to the design subgrade;
- All structural fill should be compacted to 95% of the Modified Proctor Density (ASTM D 1557); and
- The subgrade preparation procedures should be under the supervision of a Geotechnical Engineer.

7.2 SHALLOW FOOTING FOUNDATION

Conventional spread and strip footings may be designed for a maximum net allowable soil bearing pressure of 3,000 psf (1.5 tsf) for the natural soils Stratum A, Stratum B or compacted structural fill. Loose soil is not considered suitable for foundation support and if encountered, should be excavated and replaced with structural fill. See Section 8.4 - Compacted Structural Fill of this report for further details.

Footings may be stepped up or down at 2H: 1V to achieve any necessary grade changes. Actual footing grades should be evaluated in the field based on observation and probing by the Geotechnical Engineer.

Wall and column footing widths should not be less than 1.5 and 3.0 feet, respectively, or less than applicable code requirements, whichever is greater. Exterior footings should be founded at a minimum depth of 3.0 feet beneath the outside finished grades for frost protection. All footing subgrades should be compacted using a "Jumping Jack" or similar compactor upon completion of footing excavation.

The bottom of the excavation will consist predominantly of granular material, and if the excavation is to be left open overnight, a work mat should be used to protect the foundation subgrade at the bottom of footing excavations. Installation of the work mat should be as directed by the Geotechnical Engineer. A work mat may consist of a 2-inch lean concrete mud mat, or 6 inches clean crushed stone, which will serve to level the footing subgrade, as well as to prevent subgrade softening if the subgrade is exposed to the elements for prolonged periods.

New footings for the proposed addition should be founded at the same depth as the existing footings so as not to exert additional pressure on the existing foundation.

To confirm the design allowable soil bearing pressure, a Geotechnical Engineer, prior to the placement of concrete, must inspect the footing subgrade. The contractor should exercise extreme caution not to disturb the subgrade soils. Should the footing subgrade be disturbed, the loosened soil should be compacted in-place. Backfilling against footings and under floor slabs should be accomplished using structural fill placed and compacted under engineering inspection. Any water that accumulates in the bottom of the excavation should be removed within 24 hours.

7.3 AT-GRADE FLOOR SLABS

The at-grade floor slabs of the proposed addition may be supported on the firm soils of Stratum A, Stratum B or on new compacted structural fill following subgrade preparation as specified in Section 7.1 of this report.

Saw joints or construction joints should isolate each bay to control shrinkage cracks. A minimum of 6 inches of $\frac{3}{4}$ -inch clean, crushed stone or a 12-inch thick layer (minimum) of well-graded sand and gravel with no more than 10% non-plastic fines is recommended below the slab-on-grade to assure uniform curing conditions. A 6-mil

PVC vapor retarder may be placed between the slab and base course to minimize moisture migration to the surface.

All structural fill supporting the floor slab should be compacted to 95% of the Modified Proctor Density (ASTM D 1557). A modulus of subgrade reaction of 150 pci, based on a 1-foot square steel plate, may be used for design of concrete floor slabs.

7.4 SETTLEMENT

VCEA estimates that post construction settlement for foundations supported on natural soils or compacted structural fill and constructed in accordance with VCEA's recommendations will be 1/2-inch or less, and estimated post construction differential settlement will be minimal.

7.5 LATERAL EARTH PRESSURES

The following soil parameters can be used to determine lateral earth pressure for design of below grade and retaining walls assuming a SM or better quality material in accordance with ASTM D2487 is utilized as backfill. At-rest earth pressure (K_o) should be used for design of non-yielding walls.

Soil Parameters
Total unit weight $\gamma_T = 130$ pcf
Angle of internal friction $\phi = 32^\circ$
Active earth pressure $K_a = 0.31$
Passive earth pressure $K_p = 1.6$ *
At rest earth pressure $K_o = 0.47$
Base friction coefficient = 0.30

Note: * Includes a factor of safety equal to 2.0

Base friction can be increased to 0.4 if a layer of crushed stone, 6 inches in thickness, is placed between the concrete footing and soil subgrade.

The Geotechnical Engineer predicates the use of the above parameters upon the assumption that backfill within 5 feet of the wall will consist of structural type fill and/or predominantly granular on-site blended material, as approved. Fill placed within this 5-foot zone should be compacted with hand or plate tampers. No heavy rollers should be allowed within 5 feet of any structure.

The recommended lateral pressure does not include hydrostatic pressure since the water table is below the recommended footing elevation. To prevent water development behind any retaining walls, a permanent subdrain should be provided behind the perimeter of below grade retaining walls in accordance with the manufacturers requirements. The drain should be a continuous perforated 4-inch diameter pipe surrounded on all sides by a minimum of 6 inches of clean crushed

stone wrapped in filter fabric. The pipe should be sloped to drain by gravity to the storm sewer system.

Furthermore, no surcharge loads adjacent to the walls or at the ground surface were considered in the recommended lateral pressures above. VCEA recommends adding a uniform (i.e., rectangular) lateral pressure distribution of 0.40 times the surcharge load to the lateral earth pressure distribution. The factor of 0.40 takes into account the increase in lateral force due to dynamic loading. The Structural Engineer should determine the magnitude of the surcharge loads (i.e., live loads).

7.6 SEISMIC COEFFICIENTS

In accordance with the provisions of the 2015 International Building Code, New Jersey Edition Section 1613.3.2 Seismic Requirements, the design is subject to the seismic design requirements of ASCE 7 Table 20.3-1 (Site Class Definitions). The site can be classified as Class D, dense soil profile.

8.0 SITE DEVELOPMENT CONSIDERATIONS

8.1 EXCAVATION AND BACKFILL

A Geotechnical Engineer shall inspect the footing subgrade prior to the placement of concrete to confirm the design allowable soil bearing pressure, verify that the existing soil is suitable, and any soft soil conditions encountered are stabilized. Once excavated, the exposed footing subgrade should be thoroughly compacted utilizing a mechanical compactor such as a “jumping jack” or similar device as specified by the Geotechnical Engineer. The contractor should exercise extreme caution not to disturb the subgrade soils. Should the footing subgrade be disturbed or soft soils encountered, the unsuitable soil should be over-excavated to firm soils and replaced with appropriate compacted structural fill.

Backfilling against footings and under floor slabs should be accomplished using structural fill placed and compacted under geotechnical engineering inspection. Any water that accumulates in the bottom of the excavation should be removed within 24 hours.

All excavation operations and backfill requirements shall be performed in accordance with requirements discussed in Section 8.0 – Site Development Considerations.

8.2 SITE DRAINAGE AND SURFACE WATER CONTROL

Adequate temporary and permanent control of surface water runoff will be required in order to allow site access, grading, and construction to proceed. Excavation, filling, subgrade and grade preparation should be performed in a manner and sequence that will provide drainage at all times as well as proper control of erosion. Surface water shall be pumped or drained to provide a suitable working platform. Any water accumulating in the open excavation shall be removed within 24 hours.

8.3 EXISTING UTILITIES

All existing underground utilities should be relocated within the proposed addition construction area because it is not practical to perform corrective actions on these utilities once the addition is constructed. In particular large diameter piping (greater than 4 inches in diameter) provide a possible means for soil movement beneath the building. Those utilities, which are not to be reused, should be removed from and within 5 feet beyond the proposed construction area.

The utility trenches that are in the influence zone of new construction should be backfilled with compacted structural fill. A structural engineer should evaluate underground utilities, which are to be reused. A Geotechnical Engineer should evaluate the suitability of the utility backfill for support of the planned construction. Existing utilities that are to be preserved shall require grading operations to be performed in a manner so as not to disturb or damage the existing utility.

8.4 COMPACTED STRUCTURAL FILL

Before placement of new fills, or construction of foundations, all vegetation and any miscellaneous debris shall be removed. Any unsuitable soils thus detected should be excavated and replaced with compacted granular fill (SM or better).

The on-site excavated soils are generally considered suitable for use as structural fill. It should be anticipated that some drying and reworking of the on-site soils will be necessary to achieve the required compaction as outlined below. Controlling the moisture of the on-site excavated is vital to success of using this material as structural fill. Controlled structural fill shall consist of inorganic, readily compactable, predominantly well graded, granular soils with no more than 15% fines (material passing through the No. 200 sieve). Off-site borrow, if required, should meet Unified Soil Classification System (USCS) designation SM, SP, GP, GM, GW and be approved by the Geotechnical Engineer prior to use.

It is recommended that fragments having a maximum dimension greater than 3 inches be excluded from the fill. The moisture content of the fill materials should be controlled to within 3% of the optimum by wetting, aeration or blending to facilitate compaction.

All load-bearing fill should be controlled fill. Controlled fill should be placed in loose horizontal lifts with a maximum thickness of 8 inches. It is recommended that controlled fill within the construction area be compacted with a heavy duty 10-ton roller to at least 95% of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557). In addition, VCEA recommends that all fills be stable without significant movement under construction traffic, as judged by the Geotechnical Engineer. Quality control testing of in-place fill densities should be conducted throughout the entire earthwork operation.

Compaction within 5 feet from the existing facilities should be conducted using a light compactor such as a "Jumping Jack" in order not to cause any damage. The soil should be compacted to the same criteria described above.

8.5 EXCAVATION SUPPORT CONSIDERATIONS

It should be stated in the contract document that the contractor is responsible for maintaining the integrity of the existing above-grade and below-grade structures and/or dewatering operations. All construction excavations should be performed in conformance with applicable local, state and federal OSHA safety regulations.

The design of all temporary excavation support systems should be the responsibility of a licensed New Jersey Professional Engineer retained by the foundation contractor. All excavations of temporary support systems should conform to pertinent OSHA and local safety regulations. The Owner's geotechnical engineer prior to construction of the temporary support structures should review the design of soil loads.

Movement of workmen and construction machinery across the bottom of the excavation (footing subgrade) could disturb the subgrade soil. If the subgrade soil is disturbed, the disturbed soil should be removed and backfilled with gravel as directed by the engineer.

Regardless of the excavation option chosen, excavated soils should not be stockpiled adjacent to the sides of the excavations to avoid the imposition of additional loads, unless temporary shoring or side slopes are designed for such a surcharge load.

8.6 CONSTRUCTION DEWATERING

Groundwater was not encountered at either of the test boring locations. Groundwater and/or perched water levels may however be encountered during excavation and construction due to soil conditions, seasonal variations, and/or climatic conditions. Due to the possibility of encountering perched water or groundwater during construction, a dewatering system using sump pits and sump pumps may be necessary. Dewatering specifications shall be of the performance type requiring the contractor to lower the water level a minimum of two (2) feet below prevailing depths of excavations. Any water accumulating in the bottom of excavations shall be removed within 24 hours.

9.0 STORMWATER MANAGEMENT

The results of VCEA's Stormwater Management investigation and recommendations shall be presented in a separate report.

10.0 CONSTRUCTION OBSERVATION AND TESTING

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions between the borings and below the depths explored may be different from those encountered in the borings, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation on a full time basis should be performed under the supervision of a Geotechnical Engineer who is familiar with the intent of the recommendations presented herein. This observation is recommended to evaluate whether

the conditions anticipated in the design actually exist or whether the recommendations presented herein should be modified where necessary.

11.0 GENERAL

The conclusions and recommendations of this report are based on the information revealed by this exploration. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction. An allowance should be established to account for possible additional costs that may be required to construct foundations and earthwork as recommended herein. Additional costs may be incurred for various reasons including undercutting of unsuitable soils, inability to use on-site soils due to the weather conditions during the period earthwork proceeds, and variation of soil between borings.

This study should be made available to prospective bidders for informational purposes. VCEA recommends that the project specifications contain the following statement:

"A geotechnical engineering report has been prepared for this project by VCEA. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent VCEA's interpretation of the subsoil conditions, and the results of analyses, which have been conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make their own investigation, tests, and analyses at their own cost prior to bidding. This report may be examined by bidders."

VCEA strongly advises that the Subsurface Exploration Data of all Appendices should be included in the contract documents.

APPENDIX

A



FIGURE 1

Site Location Plan

**Thomas R. Grover Middle School
Proposed Additions & Improvements
West Windsor Twp., Mercer County, NJ**



SCALE	DATE	DRAWN BY	FILE NO.
Not to Scale	May 2019	ETD	18-09-WW-01

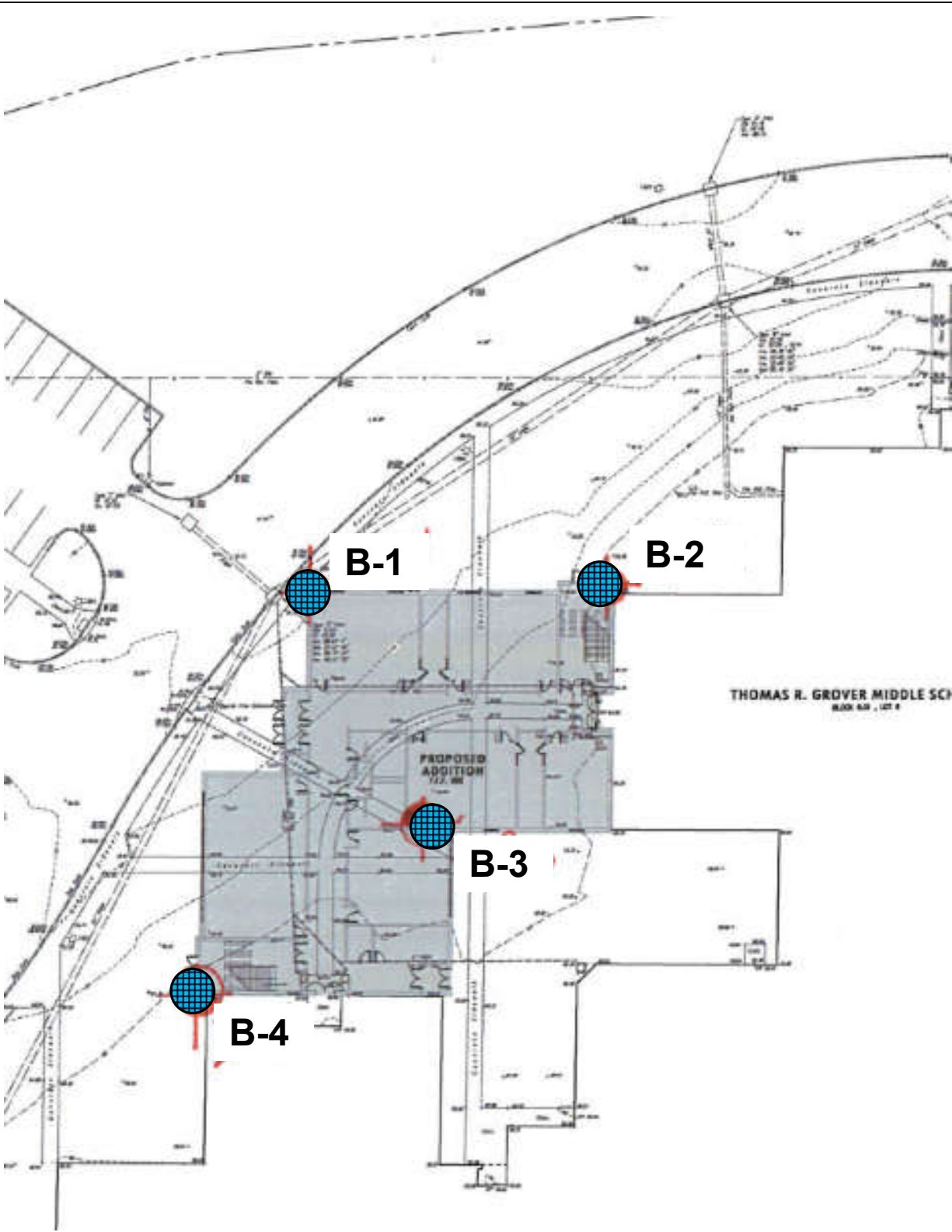


FIGURE 2

Test Boring Location Plan

**Thomas R. Grover Middle School
Proposed Additions & Improvements
West Windsor Twp., Mercer County, NJ**



LEGEND

 **B-1 = Test Boring Location**


SCALE	DATE	DRAWN BY	FILE NO.
Not to Scale	May 2019	ETD	18-09-WW-01

APPENDIX B

BORING LOG

Boring # B-1

Drilling Contractor: Sano Drilling, Inc.
Drilling Rig Operator: N. Parisano
Drilling Method: 3 1/4" HSA
Casing Size/Type: /
Drilling Equipment: Mobile B-57
CW Representative: E. DeRicco
Dates: Started: 4/25/2019
Completed: 4/25/2019
Ground Surface Elevation (ft): ±



Project: Thomas R Grover Middle School
Project Number: 18-09-WW
Project Location: 10 Southfield Rd
 West Windsor, New Jersey
Boring Location: See Location Plan


GROUNDWATER OBSERVATIONS	DEPTH (FEET)
▽ Encountered: 4/25/19	13
▼ Completion: Caved at 8'	Dry
▽ 24 Hour Reading:	

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
			1							6 inches TOPSOIL.			
	S1		2-3-3	5				A	Orange brown coarse to fine SAND, some Clayey Silt, trace medium to fine Gravel. (SC-SM)	▽	13	SILTY SAND	
	S2		6-4-5-7	9			Same, little medium to fine Gravel.						
5	S3		3-3-6-6	9			Same.						
	S4		4-4-7-4	11			B	Orange brown coarse to fine SAND, little medium to fine Gravel, little Clayey Silt. (SP)	▽	13	MEDIUM DENSE SAND		
10	S5		3-5-5-5	10				Same.					
	S6		3-2-2-2	4			C	Yellow brown coarse to medium SAND, trace fine Gravel, trace Clayey Silt. (SP)	▽	13	LOOSE SAND		
15	S7		1-1-1-1	2				Same.					
20	S8		1-1-2-1	3				Same.					
25	S9		1-2-3-3	5			Same.						
30	Bottom of Boring at 30'												

BORING LOG

Boring # B-2

Drilling Contractor: Sano Drilling, Inc.
Drilling Rig Operator: N. Parisano
Drilling Method: 3 1/4" HSA
Casing Size/Type: /
Drilling Equipment: Mobile B-57
CW Representative: E. DeRicco
Dates: Started: 4/25/2019
Completed: 4/25/2019
Ground Surface Elevation (ft): ±



Project: Thomas R Grover Middle School

Project Number: 18-09-WW

Project Location: 10 Southfield Rd
West Windsor, New Jersey

Boring Location: See Location Plan


GROUNDWATER OBSERVATIONS	DEPTH (FEET)
▽ Encountered: 4/25/19	13
▼ Completion: Caved at 8'	Dry
▽ 24 Hour Reading:	

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
5	S1		4-6-5	10				A	Orange brown coarse to fine SAND, some Clayey Silt, little coarse to fine Gravel. (SC-SM)	▽	13	SILTY SAND	
	S2		6-9-6-7	15			Same.						
	S3		4-4-6-5	10			Same.						
	S4		6-8-6-6	14			Same.						
10	S5		6-6-7-6	13			B	Orange brown coarse to fine SAND, little medium to fine Gravel, little Clayey Silt. (SP)			MEDIUM DENSE SAND		
15	S6		2-2-2-2	4			B	Yellow brown coarse to medium SAND, little fine Gravel, trace Clayey Silt. (SP)			LOOSE SAND		
20	S7		2-2-2-2	4			B	Same.					
	Bottom of Boring at 20'												

BORING LOG

Boring # B-3

Drilling Contractor: Sano Drilling, Inc.
Drilling Rig Operator: N. Parisano
Drilling Method: 3 1/4" HSA
Casing Size/Type: /
Drilling Equipment: Mobile B-57
CW Representative: E. DeRicco
Dates: Started: 4/25/2019
Completed: 4/25/2019
Ground Surface Elevation (ft): ±



Project: Thomas R Grover Middle School

Project Number: 18-09-WW

Project Location: 10 Southfield Rd
West Windsor, New Jersey


Boring Location: See Location Plan




GROUNDWATER OBSERVATIONS	DEPTH (FEET)
▽ Encountered: 4/25/19	13
▼ Completion: Caved at 8'	Dry
▽ 24 Hour Reading:	

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
5	S1		3-3-3	6				A	Orange brown coarse to fine SAND, some Clayey Silt, trace medium to fine Gravel. (SC-SM)	▽	SILTY SAND		
	S2		4-6-8-9	14			Same.						
	S3		4-3-3-4	6			Same.						
	S4		4-3-3-4	6			Same.						
10	S5		4-5-5-4	10			A	Yellow brown coarse to medium SAND, trace fine Gravel, trace Clayey Silt. (SP)	▽	MEDIUM DENSE SAND			
	S6		4-5-5-7	10				Same.					
20	S7		1-2-3-3	5			B	Yellow brown coarse to medium SAND, trace fine Gravel, trace Clayey Silt. (SP)		LOOSE SAND			
Bottom of Boring at 20'													

BORING LOG

Boring # B-4

Drilling Contractor: Sano Drilling, Inc. Drilling Rig Operator: N. Parisano Drilling Method: 3 1/4" HSA Casing Size/Type: / Drilling Equipment: Mobile B-57 CW Representative: E. DeRicco Dates: Started: 4/25/2019 Completed: 4/25/2019 Ground Surface Elevation (ft): ±		Project: Thomas R Grover Middle School Project Number: 18-09-WW Project Location: 10 Southfield Rd West Windsor, New Jersey Boring Location: See Location Plan
GROUNDWATER OBSERVATIONS		DEPTH (FEET)
▽ Encountered: 4/25/19		13
▼ Completion: Caved at 8'		Dry
▽ 24 Hour Reading:		

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
5	S1		3-7-7	10					A	Brown coarse to fine SAND, some Clayey Silt, trace medium to fine Gravel. (SC-SM)			SILTY SAND
	S2		9-8-4-4	12					A	Same.			
	S3		3-5-6-7	11					A	Same, orange brown.			
10	S4		8-10-9-8	19					A	Yellow brown medium to fine SAND, little Clayey Silt, Trace fine Gravel. (SP)			MEDIUM DENSE SAND
	S5		12-12-9-11	21					A	Yellow brown coarse to fine SAND, some coarse to fine Gravel, trace Clayey Silt. (SP)			
15	S6		3-2-2-2	4					B	Yellow brown coarse to medium SAND, trace fine Gravel, trace Clayey Silt. (SP)			LOOSE SAND
	S7		2-2-2-2	4					B	Yellow brown medium to fine SAND, trace fine Gravel, trace Clayey Silt. (SP)			
20	Bottom of Boring at 20'												
25													
30													



**MODIFIED METHOD
FOR
IDENTIFICATION OF SOILS
AFTER
DR. D.M. BURMISTER**

Soil Component	Descriptive Terms As Written on Log	Range of Proportions
PRINCIPAL COMPONENT (All Letters Capitalized)	--	35% of more
MINOR COMPONENTS (First Letter Capitalized)	and (a.) some (s.) little (l.) trace (tr.)	35% to 50% 20% to 35% 10% to 20% 1% to 10%

Gradation of Components

Coarse to fine	Coarse to fine	cf	All sizes
Coarse to medium	Coarse to medium	cm	Less than 10% fine
Medium to fine	Medium to fine	mf	Less than 10% coarse
Coarse	Coarse	c	Less than 10% medium & fine
Medium	Medium	m	Less than 10% coarse & fine
Fine	Fine	f	Less than 10% coarse & medium

Component	U.S. Standard Sieve Range
Boulders	9" and larger
Cobbles	3" to 9"
Gravel	
Coarse	3" to 1"
Medium	1" to 3/8"
Fine	3/8" to #10
Sand	
Coarse	#10 to #30
Medium	#30 to #60
Fine	#60 to #200
Silt	< #200

Fine Grained Soils-Plasticity of Components

Component	Symbol	Overall Plasticity	Plasticity Index
SILT	S	Non-Plastic	0
Clayey Silt	CyS	Slight	1 to 5
SILT & CLAY	S & C	Low	5 to 10
CLAY & SILT	C & S	Medium	10 to 20
Silty Clay	SyC	High	20 to 40
CLAY	C	Very High	Over 40

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FILES.
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDS CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT <u>GREATER</u> THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGH ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADATION*

COMPACTNESS*
SAND AND/OR GRAVEL

CONSISTENCY*
CLAY AND/OR SILT

% FINER BY WEIGHT

RELATIVE DENSITY

RANGE OF SHEARING STRENGTH
IN POUNDS PER SQUARE FOOT

TRACE..... 0% TO 10%
LITTLE 10% TO 20%
SOME 20% TO 35%
AND 35% TO 50%

LOOSE..... 0% TO 40%
MEDIUM DENSE 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE 90% TO 100%

VERY SOFT LESS THAN 250
SOFT 250 TO 500
MEDIUM 500 TO 1000
STIFF 1000 TO 2000
VERY STIFF 2000 TO 4000
HARD..... GREATER THAN 4000

* VALUES ARE FROM LABORATORY OR FILED TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

UNIFIED SOIL CLASSIFICATION SYSTEM
SOIL CLASSIFICATION CHART

GENERAL NOTES FOR TEST BORING LOGS

1. NUMBERS IN SAMPLING DATA COLUMN (3+6+27) INDICATE BLOWS REQUIRED TO DRIVE A 2 INCH O.D., 1 3/8 INCH I.D. SAMPLING SPOON 6 INCHES USING A 140 POUND HAMMER FALLING 30 INCHES ACCORDING TO ASTM D1586.
2. VISUAL CLASSIFICATION OF SOILS IS IN ACCORDANCE WITH TERMINOLOGY SET FORTH IN "IDENTIFICATION OF SOIL." THE GROUP CLASSIFICATION SYMBOLS SHOWN IN THE CLASSIFICATION COLUMN ARE BASED ON VISUAL INSPECTION AND AVAILABLE LABORATORY DATA.
3. GROUNDWATER OBSERVATIONS: THE DEPTH OF WATER BELOW GRADE WAS MEASURED AT THE TIMES INDICATES. THE DEPTHS MAY VARY WITH PRECIPITATION, POROSITY OF THE SOIL, SITE TOPOGRAPHY, ETC.
4. REFUSAL AT THE SURFACE OF ROCK, BOULDER, OR OBSTRUCTION IS DEFINED AS A RESISTANCE OF 100 BLOWS FOR 2 INCHES PENETRATION OR LESS.
5. THE BORING LOGS AND RELATED INFORMATION DEPICT SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC LOCATIONS AND AT THE PARTICULAR TIME WHEN DRILLED. SOIL CONDITIONS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE BORING LOCATIONS. ALSO, THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN THE SUBSURFACE SOIL AND GROUNDWATER CONDITIONS AT THESE BORING LOCATIONS.
6. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES AS DETERMINED FROM THE DRILLING AND SAMPLING OPERATION. SOME VARIATION MAY ALSO BE EXPECTED VERTICALLY BETWEEN SAMPLES TAKEN. THE SOIL PROFILE, WATER LEVEL OBSERVATIONS, AND PENETRATION RESISTANCES PRESENTED ON THESE BORING LOGS HAVE BEEN MADE WITH REASONABLE CARE AND ACCURACY AND MUST BE CONSIDERED ONLY AS AN APPROXIMATE REPRESENTATION OF SUBSURFACE CONDITIONS TO BE ENCOUNTERED AT THE PARTICULAR LOCATION.
7. TEST BORINGS DRILLED BY SANO DRILLING, INC. OF SEWELL, NEW JERSEY, UNDER THE INSPECTION OF **VAN CLEEF ENGINEERING ASSOCIATES**.
8. KEY TO SYMBOLS AND ABBREVIATIONS:



3 + 6 + 27

STANDARD PENETRATION TEST, ASTM D1586 DESIGNATION

DO = DITTO

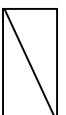


3T
24/18

2" OR 3" UNDISTURBED TUBE SAMPLE, ASTM D1587 (LENGTH SAMPLED INCHES/SAMPLE RECOVERED INCHES)

RQD = ROCK QUALITY DESIGNATION

REC = RECOVERY (%) (LENGTH RECOVERED/LENGTH SAMPLED)



REC
RQD

NQ2, NX OR 2 INCH O.D. ROCK CORE RUN, ASTM D2113 (RECOVERY AND RQD AS SHOWN)

w = NATURAL MOISTURE CONTENT (%)

* = NO SAMPLE RECOVERY

APPENDIX C

LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical design practices for specific application to this project. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available.

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. The validity of the projections, conclusions, and recommendations contained in this report is necessarily limited by the scope of field investigation and by the number of borings that were performed. Should conditions arise which differ from those described in this report, Van Cleef Engineering Associates should be notified immediately and provided with all information when available regarding subsurface conditions.

Van Cleef Engineering Associates' recommendations are based upon the assumption that the services of a qualified geotechnical engineer will be retained for the observation of stripping operations, proofrolling, structural fill placement, and all critical earthwork operations.

The scope of this investigation was limited to the evaluation of the load-carrying capabilities and load stability of the subsurface soils. Oil, hazardous/contaminated waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied, inferred or suggested by this report or results of this study.

PART 2 - GENERAL CONSTRUCTION WORK

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of selective demolition work is indicated on the drawings.
- B. Type(s) of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:
 - 1. Portion(s) of building structure, as indicated on drawings and as required, to accommodate new construction.
 - 2. Removal and protection of existing fixtures and equipment items indicated as "salvage".
- C. Removal Work Specified Elsewhere:
 - 1. Mechanical and Electrical Work - Cutting non-structural concrete floors and masonry walls for underground piping, conduit, and for above grade piping, conduit, is included with the work of the respective mechanical and electrical.
- D. Related Work Specified Elsewhere:
 - 1. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.

1.3 SUBMITTALS

- A. Proposed Demolition Activities: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work. Provide starting and ending dates for each activity as appropriate.
 - 1. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
 - 2. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 - 3. Sequence construction so as to minimize obstruction of exits and provide temporary alternate exits, as required by authorities having jurisdiction.
 - 4. Coordinate with Owner's continuing occupation of portions of existing building, and with Owner's reduced usage during summer months.

- B. Photographs: Photograph existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.
- C. Project Record Documents:
 - 1. Indicate unanticipated structural, electrical, or mechanical conditions.

1.4 JOB CONDITIONS

- A. Occupancy: Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
 - 1. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
 - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.
 - 2. Protect existing finish work, from being damaged during the project, which is to remain in place and becomes exposed during demolition operations.
 - 3. Protect floors with suitable coverings so as to leave the flooring in same condition at end of job.
 - 4. Construct temporary insulated solid dustproof partitions, where required, to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors, if required.
 - 5. Remove protections at completion of work.
- D. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner, including but not limited to concealed interior and exterior utility lines not properly investigated by the contractor, prior to commencement of demolition work.
- E. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- F. Explosives: Use of explosives will not be permitted.
- G. Utility Services: Maintain existing interior and exterior utilities indicated to remain, keep in service, and protect against damage during demolition operations.
1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 INSPECTION

- A. Prior to commencement of selective demolition work, inspect areas in which work will be performed.
1. **Photograph existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.**
 2. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the Owner.
 3. Prior to the commencement of work review the demolition activities with the Owner's representative to identify additional salvage items requested by the Owner.

3.2 PREPARATION

- A. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- B. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
1. Provide weatherproof closures for exterior openings resulting from demolition work.
- C. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
1. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shut-down of service is necessary during change-over.

3.3 DEMOLITION

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
 - 1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
 - a. The Contractor shall use caution when cutting into existing masonry construction (eg.: concrete slabs, single wythe and cavity wall construction) as there may be undocumented utilities within the cavity or built into the cores of cmu wall construction or under the floor slab. The contractor shall perform all necessary investigation prior to demolition work to determine the presence of existing utilities within construction to be demolished, including but not limited to radar, thermal, impact echo, etc. The Contractor shall pay for restoring / repairing the existing construction if utilities are cut and proper selective demolition investigation work was not performed. Refer to Section 01050.
 - 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
 - 3. Provide services for effective air and water pollution controls as required by authorities having jurisdiction.
 - 4. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
- B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative / Architect in written, accurate detail. Pending receipt of directive from Owner's Representative / Architect rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.4 SALVAGE MATERIALS

- A. Salvage Items: Where indicated on Drawings as "Salvage-Deliver to Owner", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.
 - 1. Unless otherwise indicated all materials, items, equipment, etc. resulting from demolition work shall be removed from the site at the Contractor's expense.
- B. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.
- B. If hazardous materials are encountered during demolition operations, notify the Owner's Representative immediately, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- C. Burning of removed materials is not permitted on project site.

3.6 CLEAN-UP AND REPAIR

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02070

SECTION 02200 - EARTHWORK

1. PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of earthwork is indicated on drawings.
 - 1. Rough grading.
 - 2. Unclassified Excavation
 - 2. Preparation of subgrade for building slabs, pads, pavements, and lawns is included as part of this work.
- B. Conform to the requirements of "Standards for Soil Erosion and Sediment Control in New Jersey," latest edition.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction, and in accordance with all recommendations of Section 02200
- B. Governing Regulations: Comply with applicable requirements of "Standards for Soil Erosion and Sediment Control, in New Jersey", latest edition.
- C. Testing and Inspection Service:
 - 1. Employ, at Contractor's expense, an independent testing laboratory acceptable to the Architect to perform soil testing and inspection service for quality control testing during earthwork operations. Include the services of a qualified Licensed Soils Engineer as herein specified.

1.4 SUBMITTALS

- A. Test Reports: Testing service will submit following reports directly to Architect with copy to Contractor:
 - 1. Test reports on borrow material as outlined herein.

2. Field density test reports.
3. One optimum moisture-maximum density curve for each type of soil encountered, including borrow soils.
4. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.5 JOB CONDITIONS

- A. Test pits and other common exploratory operations may be required by the Architect/Engineer to be made by Contractor at no cost to Owner.
- B. Existing Utilities
 1. Locate existing underground utilities in areas of work. Contact utility companies mark-out service, Garden State Underground Plant Location Service, Inc. at 1-800-272-1000, as required by law, to locate all utilities prior to start of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 3. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.
- C. Use of Explosives
 1. Do not bring explosives onto site, or use in work, without prior written permission from authorities having jurisdiction and from the Owner.
 2. Contractor is solely responsible for handling, storage, and use of explosive materials if and when their use is permitted. Comply with applicable requirements of NFPA 495, "Explosive Material Code".
- D. Protection of Persons and Property
 1. Install barricades and operate warning lights as recommended by authorities and agencies having jurisdiction.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from

damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.6 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to perform earthwork.

1.7 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02600 – Soil Erosion and Sediment Control
- C. Section 02248 – Shoring and Bracing
- D. Section 02485 – Finished Grading
- E. AIA A201 & Section 00800 - Submittals

2. PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Allowable Gradational Envelope, Type "S" Fill (Structural Fill):

U.S. Standard Sieve Size	Percent Finer by Weight
1"	100
3/8"	65-100
No. 10	40-85
No. 30	20-65
No. 60	10-45
No. 200	5-12

- B. Allowable Gradational Envelope, Type "G" Fill (Granular Fill):

U.S. Standard Sieve Size	Percent Finer by Weight
2"	100
1"	80-100
3/8"	70-100
No. 10	50-100
No. 30	30-85
No. 60	15-65
No. 200	5-15

- C. NJDOT Paving and Subgrade Materials: All materials shall meet or exceed the NJDOT Standard Specifications for Road and Bridge Construction, as amended or supplemented.
- D. Porous Fill: Coarse Aggregate, crushed stone or gravel, poorly graded with

100% passing a 1-½" sieve and not more than 10 percent of material that passes through No. 4 sieve.

- E. Impervious Fill: All materials shall be fine grained inorganic silts and clays, meeting class ML/CL specification of the Unified Classification System.
- F. Prior to importation activities, all soil materials proposed to be imported to the site shall be certified by an independent testing agency to be free from contamination, in accordance with the standards of the N.J.D.E.P., and the U.S. Environmental Protection Agency. Written certification to be received prior to any importation activity. See also subsection 3.3E.3 below.

3. PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavation is Unclassified, and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
 - 1. Earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and to be removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.
- B. Excavation Classifications: The following classifications of excavation will be made when rock excavation is encountered in work:
 - 1. Rock Excavation
 - a. Footing Rock Excavation: All boulders or rock above the bottom of the footing elevations which can be removed by a 1 cubic yard power shovel or backhoe using a prime mover equal in size to a Bucyrus Erie 30B Series 3, or a pneumatic hammer using a pavement breaker shall be classified as earth excavation.
 - b. General Rock Excavation: Removal of boulders or rock encountered in the excavation by a 1 cubic yard power shovel or backhoe using a prime mover equal in size to a Caterpillar 325, or a hydraulic hammer using a pavement breaker, or a D-8N bulldozer, or equivalent, equipped with ripper teeth, shall be classified as earth excavation. All boulders and rock which cannot be removed by the foregoing equipment and require blasting for their removal, shall be classified as general rock excavation.
 - c. All three of the aforementioned methods of excavation must be tried and proven unsatisfactory in the presence of the Engineer, before removal by blasting will be authorized.

- d. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
- C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.
1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect/Engineer.
 2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect/Engineer.
- D. Additional Excavation: When excavation has reached required sub-grade elevations, notify Architect/Engineer who will make an inspection of conditions.
1. If unsuitable bearing materials are encountered at required sub-grade elevations, Contractor must notify the Architect/ Soil Engineer.
 - a. In pavement areas, proof roll prepared sub-grade surface to check for unstable areas and areas requiring additional compaction. Proof rolling shall be accomplished by the application of a three (3) wheel, ten (10) ton roller over the subgrade. Proof rolling shall be performed in the presence of the Engineer, or his representative, to locate unstable areas and to achieve uniform compaction immediately prior to placement of base paving materials. Proof rolling will not be used as a substitute for field moisture and density tests, if required. Finish grade sub-grade to required slope at proper distance below finish surface. Unsuitable soils shall be over excavated to a depth required by the Soils Engineer and replaced with borrow excavation as specified by NJDOT. In certain instances, replacement material may require larger stone aggregate per NJDOT specifications, at the discretion of the Soils Engineer.
 2. Contractor shall carry excavations deeper to elevations as directed by the Soil Engineer, replace excavated material with Type "S" structural fill as described herein.
 3. Additional fill shall be provided, placed and compacted to required elevations.

4. Additional excavation and compacted fill work, when authorized by the Architect/Engineer, shall be in the form of change order(s) using Unit Prices, when accepted, adjusted or established by the Contract.
- E. Excavation for Structures:
1. Prior to foundation construction, all superficial materials including asphalt and topsoil shall be stripped from the limits of construction.
 2. All excavations within the building area shall be backfilled with a clean bankrun sand and gravel conforming to the gradational requirements for Structural (Type S) Fill, unless Soils Report indicates on site materials may be used as structural fill. The Type S fill shall also be used for filling within the building limits to attain proposed porous fill subgrade elevation. All imported fill materials and on-site material shall be placed in a controlled manner, utilizing maximum lift thickness of twelve (12) inches and be compacted with vibratory compaction equipment. All Type S fill shall be compacted to a minimum of 95% of their Modified Proctor Density. On-site materials placed as backfill outside the building limits shall be compacted to 90% of its Modified Proctor Density. The compaction levels shall be confirmed in the field in accordance with ASTM Designation D-1557. Moisture-density relationships shall be established in accordance with ASTM Designation D-1556 and be observed in the field during placement procedures.
- F. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
1. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- G. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
1. It will be the Contractor's responsibility to provide sheet piling and other shoring as required to protect existing facilities from damage during excavation. Such work shall be designed by a professional engineer licensed in New Jersey, and shop drawings submitted to Architect for information purposes. Damage to existing structures or pavement caused by earthwork operations shall be repaired to Architect's satisfaction.
 2. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
 3. Maintain shoring and bracing in excavations regardless of time period

excavations will be open. Carry down shoring and bracing as excavation progresses.

- H. All existing construction debris, old foundations, floors and any other old construction encountered shall be removed entirely from the building and paved areas; replaced with Type S structural fill.
- I. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Contractor to provide all necessary material and labor to dewater construction excavations.
 - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
 - 3. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
 - a. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- J. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown. Also see paragraph D.1.a. above.
- K. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room and per typical trench detail where shown.
- L. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees.
- M. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
 - 1. Remove and replace, or scarify and air dry, soil material that is too wet to

permit compaction to specified density.

2. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.2 COMPACTION

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
- B. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 1557.
 1. Structures, Building Slabs and Steps, Pavements: Compact top 12" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with ASTM D-1557.
 2. Foundation, Utility trenches: Compact top 6" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with ASTM D-1557.
 3. Infiltration Basin / Bioretention Basin / Raingarden / Porous Pavement: No compaction of native subgrade soils is permitted.
 4. Lawn and Grass Recreation Area: Compact top 12" of subgrade and each layer of backfill or fill material at 85% Modified Proctor in accordance with ASTM D-1557.
 5. Landscape Planting Areas: Compact top 12" of subgrade and each layer of backfill or fill material at 70% Modified Proctor in accordance with ASTM D-1557.
 6. Walkways: Compact top 6" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with specification section ASTM D-1557.
 7. In Detention Basin Embankments: Compact top 6" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with ASTM D-1557.
- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or

layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
2. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.3 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
 1. Under grassed areas, use satisfactory excavated or borrow material.
 2. Under steps and building slabs, use compacted structural fill or on site materials permitted for use as structural fill as recommended in Soils Report.
 3. Under pavements use borrow excavation as specified by NJDOT.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 2. Inspection, testing, approval, and recording locations of underground utilities.
 3. Removal of concrete formwork.
 4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
 5. Removal of trash and debris.
 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
 7. Maintain carefully all bench marks, monuments and other reference points; if disturbed or destroyed, replace as directed.

- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers and /or in confined areas.
1. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density per ASTM D-1557 test procedure or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.
 3. Proof rolling of soils within 10 feet of existing building shall be performed with vibrator disengaged.
- E. Additional material required for filling, backfilling and grading:
1. The on-site soils removed during excavation are suitable for reuse as fill outside the building and other pavement areas when placed in a controlled manner.
 2. Material which may be required in addition to that obtained from excavations, shall be provided by the contractor. Such material shall be as specified hereinbefore. Such material shall be provided at no additional cost to the Owner, in sufficient quantity to compensate for the "fluff factor", to provide compacted grade at the elevations shown.
 3. Imported fill material must include a written certification from the supplier stating that the fill is virgin material, and if it is from an agricultural, commercial or non-commercial source. The material shall also be tested and

be certified free of contamination or hazardous materials. Testing shall be based on the source of the material. The Architect/Engineer may require supplemental testing by Contractor prior to importation at no cost to the Owner.

3.4 GRADING

- A. Areas which will receive the floor slabs or pavement shall be graded and proof-rolled with vibratory compaction equipment to densify the soil surface and delineate potential soft areas.
 - 1. Any soft areas encountered during the proof-rolling operations shall be removed and replaced with structural fill in a controlled manner, compacted as specified by the Soils Engineer.
- B. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- C. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
 - 1. Finish surfaces free from irregular surface changes, and as follows:
 - a. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations. Plan grades and spot elevations are to final surface.
 - b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.
 - c. In addition to the above tolerances, slope between any two points shall not vary more than 1.5 inches in 100 feet from the slope indicated.
- D. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.
- E. The cutting, filling and grading within the building area, together with sufficient area outside of the filled areas of the building to provide a slope of 1 vertically to 4 horizontally beyond the building walls, shall be done before excavations are made for footings and foundation walls.

3.5 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. All work within the above section shall be performed as approved by the Soils Engineer. The Contractor shall cooperate in every way with the Soils Engineer as required for the performance of this work and shall give not less than 48 hours notice to schedule operations requiring sampling, inspection certification and testing.

- B. The Soils Engineer shall provide direction and all equipment and apparatus necessary for laboratory and field testing, sampling, inspection and reports on soil inspection. He will identify and document the removal of unsuitable material which may remain within the bottom of excavation after limits of the excavated area have been reached.
 - 1. Field density testing and soil analysis at the rate of one compaction test per 2,500 square feet minimum for each lift of compacted fill within building areas.
 - 2. Laboratory compaction tests for each type of on-site soil and/or borrow material to be used throughout the site.
 - 3. Field C.B.R. testing in pavement areas at the rate of one per 500 square yard of pavement.
 - 4. Field inspection control and certification of bottom of footings, trenches, subgrades or under slabs, parking area, athletic areas and landscaped areas, as applicable.
 - 5. When required, soil materials and rock-definition testing to be performed in accordance with ASTM E 329 and documented according to ASTM D 3740 and ASTM E 548.

- C. The Soils Engineer shall provide a signed and certified written report at the completion of each phase of construction, verifying that all soils operations have been completed within the design parameters as noted in the contract documents and in accordance with accepted engineering practices.

- D. The Soil Engineering Firm must show adequate credentials as approved by the Owner, but as a minimum, shall be as follows:
 - 1. Must have as a principal a Professional Engineer registered in New Jersey, with 10 years responsible experience in Soils Engineering.
 - 2. Provide certificates of professional liability insurance of \$750,000.00 minimum.
 - 3. All technical staff personnel performing services on the project are to be under the direct supervision of the Soils Engineer.

3.6 MAINTENANCE

A.

Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

1. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
2. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.7 DISPOSAL OF WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including excess excavated material, trash and debris, and dispose of it off Owner's property in a legal manner.

3.8 RECORD DRAWING

A. As the work progresses, record on one set of grading drawings all changes and deviations from the Contract Drawings in line and finished grade.

B. All record drawing verifications must be executed by a NJ licensed professional land surveyor.

C. Record Drawings shall be submitted to Architect when all parking lots, sidewalks and rough grading are complete. Contractor shall not spread topsoil until written notice to proceed is issued by Architect.

D. At the completion of the work, transfer accurately all such records in waterproof ink on mylar reproducibles of the grading drawings, have them certified by the NJ licensed Professional Land Surveyor and deliver same to Architect.

END OF SECTION 02200

SECTION 02231 - MOBILIZATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Mobilization shall consist of any preparatory work and operations, necessary for the movement of personnel, equipment, supplies and incidentals to, from and within the project site, maintenance and protection of traffic and pedestrians, and other work performed or costs incurred prior to beginning the work.

1.3 JOB CONDITIONS

- A. The Contractor shall notify the property owner, a minimum of seventy-two (72) hours prior to the start of construction.
- B. Subsequent notifications shall be given to property owners a minimum of twenty four (24) hours prior to the start of work affecting direct access to their property.
- C. The contractor shall provide for the protection of traffic and pedestrians during all work.
- D. Administrative Requirements: Verification of existing conditions before starting work.
- E. Verify all utility markouts are completed. Call 1-800-272-1000 for markouts.
- F. Verify all soil erosion measures are complete.

1.4 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials mobilization, demobilization, removal, disposal, and/or relocation as specified.

PART 3 – EXECUTION

- A. Pavement, concrete and structures shall be removed and disposed of by the Contractor in accordance with local, state and federal requirements

- B. The Contractor shall obey all traffic laws and highway load size/weight restrictions.
- C. Traffic control and pedestrian control devices shall be installed and maintained in accordance with the Manual of Uniform Traffic control devices at times during construction.

END OF SECTION 02231

SECTION 02232 – SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This work shall consist of clearing the site within the project limits as shown on the plans or the herein specified limits. Site clearing shall include but not be limited to surface debris, trees, topsoil stripping, topsoil stockpiling, shrubs, sidewalk, curb, curb and gutter, pavement, fences, driveways, landscaping, mailboxes, signs, drainage structures, pipes, structures and all other appurtenances related thereto.

1.3 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials mobilization, demobilization, removal, disposal, and/or relocation as specified.

1.4 RELATED SECTIONS

- A. Section 02600 – Soil Erosion and Sediment Control
- B. Section 02248 – Shoring and Bracing

PART 2 - PRODUCTS

- A. All items designated to be relocated shall be relocated using in-kind materials approved by the engineer. All items designated for relocation or reuse shall be stockpiled safely and protected until time of use. If any material is damaged it shall be replaced in-kind by the contractor.

PART 3 - EXECUTION

- A. All areas designated for site clearing shall be cleared of all vegetation including roots and stumps. All removed vegetation shall become the property of the contractor and shall be disposed of.
- B. All construction areas shall be stripped of topsoil prior to construction. All topsoil shall be stockpiled as shown on the plans, if required.
- C. Pavement, concrete and structures shall be removed and disposed of by the contractor in accordance with local, state and federal requirements.

- D. Before hedges, shrubs, and privately owned fences, mailboxes and signs are removed, the Engineer shall determine whether or not said items are to be reset. If so, the Contractor shall use reasonable care in removing and storing the item so as not to damage same. Privately owned fences, signs, shrubs, etc., scheduled to be reset, and damaged beyond repair during removal or storage, shall be replaced in kind and quality acceptable to the Engineer and without additional compensation.
- E. Call Local Utility Line Information service at 800-272-1000 not less than three working days before performing Work.
- F. Protect trees, plant growth, and features designated to remain, as final landscaping.

END OF SECTION 02232

SECTION 02248 - SHORING AND BRACING

1. PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of shoring and bracing work includes, but is not limited to, the following:
 - 1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.
 - 2. Maintenance of shoring and bracing.
 - 3. Removal of shoring and bracing, as required.
- B. Types of shoring and bracing system includes, but is not limited to, the following:
 - 1. Soldier piles.
 - 2. Lagging.

1.3 SUBMITTALS

- A. Layout Drawings: Provide layout drawings for shoring and bracing system and other data prepared and sealed by a registered Professional Engineer licensed in the State of New Jersey. System design and calculations must be acceptable to local authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- A.. Regulations: Comply with local codes and ordinances of governing authorities having jurisdiction.

1.5 JOB CONDITIONS

- A. Before starting work, check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs to record any prior settlement or cracking of structures, pavements, and other improvements.

Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

- B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by movement resulting from excavation operations.
- C. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor or registered Professional Engineer, licensed in the State of New Jersey. Maintain accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags or other damage is evident.

1.6 EXISTING UTILITIES

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal and discontinuing of services, as affected by this work.

1.7 PAYMENT

- A. The lump sum price bid shall include all material, equipment and labor necessary to install and maintain shoring and bracing during construction.

1.6 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02200 – Earthwork
- E. Section 02071 – Selective Site Demolition
- F. AIA A201 & Section 00800 - Submittals

2. PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.

- B. If wood is part of shoring system near existing structures, use pressure preservative treated materials or remove before placement of backfill.

3. PART 3 - EXECUTION

3.1 SHORING

- A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.
- B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

3.2 BRACING

- A. Locate bracing to clear permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
- B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Architect.
- C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.
- D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.
- E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.
- F. Repair or replace, as acceptable to Architect, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

END OF SECTION 02248

SECTION 02480 - LANDSCAPE WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Extent of landscape development work is shown on drawings and in schedules.
- B. Subgrade Elevations: Excavation, filling and grading required to establish elevations shown on drawings are not specified in this section. Refer to Earthwork Section 02200.
- C. Work Included:
 - 1. The work of this Section includes providing and installing or performing all work and equipment, complete as indicated on the Drawings or specified herein, or both, necessary for completion of planting. Any and all work related to tree transplantation must be performed under the supervision of a New Jersey Certified Tree Expert.
 - 2. The Contractor shall provide all topsoil, and it shall be tested, and if necessary, shall be made to conform to the pH and acidity range and percentage of organic matter as specified herein.
- D. The Contractor shall be liable for any damages to property caused by planting operations and shall, at his own expense, restore all disturbed or damaged areas to their original condition.
- E. Plant materials shall be free of damage as the result of handling and transportation.
- F. Balls of trees shall be in one solid piece properly shaped and shall be at least as large as the ball size recommended by the American Association of Nurserymen.

1.2 QUALITY ASSURANCE

- A. Standards
 - 1. ANSI Z60.1 - "American Standard for Nursery Stock" as amended.
 - 2. Plant material shall have a habit of growth that is normal for the species and that equals or exceeds the measurements specified in the plant list, which are the minimum acceptable sizes. Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock". Provide healthy,

vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions or disfigurement. They shall be measured before pruning with branches in normal position. Any necessary pruning shall be done at the time of planting under direction of the Landscape Architect. Requirements for measurements, branching, grading, quality, balling and burlapping of plants in the plant list shall follow the code of standard currently recommended by the American Association of Nurserymen, Inc., the American Standard for Nursery Stock. Plants that meet the requirements specified, but do not have the normal balance of height and spread typical for the respective plant, shall not be accepted.

B. Inspection and Selection of Plant Material

1. The plant material shall be located by the Contractor from sources within the local area. At the direction of the Architect, the Contractor shall proceed as follows:
 - a. When all plant material has been selected by the Contractor, the Landscape Architect will make his inspection upon 72 hours notice during normal business hours. The Contractor shall have located sufficient alternative choices to prevent loss of time in the event that some plant fails to meet with the approval of the Landscape Architect. The Contractor or a member of his firm shall be present when the Landscape Architect inspects the plant material at the nursery.
 - b. Trees selected should be well matched as to height, spread and general conformation. All trees must be approved and tagged by the Landscape Architect in the field before digging. Trees delivered without tags will be rejected.
 - c. Label each tree and shrub with securely attached waterproof tag bearing legible designation of botanical and common name.
2. Substitution: Substitution will be permitted only upon submission of proof that any plant is not obtainable and written authorization by the Landscape Architect for the use of the nearest equivalent obtainable; size and variety of the plant having the same essential characteristics with an equitable adjustment of contract price. Should the Landscape Architect deem it appropriate and substitute plant material other than that specified, it shall be accomplished as long as the price of the substituted item does not exceed the bid item being replaced.
3. Plant material is to be delivered to the site in quantities and at dates established in consultation with the Landscape Architect in order that the Landscape Architect shall have a minimum of a full day's work in supervising placement of specimen material.

C. Delivery, Storage and Handling

1. Balled and Burlapped Plants: Plants designated "B & B" in the plant list shall be balled and burlapped. They shall be dug with firm natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Balls shall be firmly wrapped with burlap of similar materials and bound with twine, cord, or wire mesh. All collected plants shall be balled and burlapped. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches or destroy the natural shape. Provide protective covering during delivery.
2. Container Grown Plants: Plants grown in containers will be accepted as "B & B" providing that the plant has been growing in the container for one full growing season prior to delivery. Do not remove container grown stock from containers until planting time.
3. Protection After Delivery: Plants which cannot be planted immediately on delivery to the site shall be covered with moist soil, mulch, or other protection from the drying of wind and sun. All plants shall be watered as necessary until planted. Trees moved by winch or crane shall be thoroughly protected from chain marks, girdling, or bark slippage by means of burlap wood battens or other approved method.

1.3 SUBMITTALS

- A. Certified analysis of a recognized laboratory shall be submitted for topsoil; analysis shall be made to determine compliance with requirements for topsoil as hereinbefore specified under Section 02485 Finish Grading and Seeding sections. The costs of the tests shall be borne by the Contractor. Reports of the tests shall be submitted to the Engineer in writing.
- B. Furnish, in duplicate, copies of manufacturer's specifications as well as invoices for all soil amendments, including fertilizer, used on the project. Quantities of each material shall be clearly indicated on supplier's invoicing.
- C. Planting Schedule: Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

1.4 MAINTENANCE INSTRUCTIONS:

- A. Submit typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Topsoil as specified under Section 02485, Finish Grading and Seeding.
 - 1. The topsoil mixture materials shall be thoroughly mixed by hand or rotary mixer to the satisfaction of the Landscape Architect.
 - 2. Deciduous Plants: Topsoil mixture for backfilling planted areas shall consist of two parts each by volume of topsoil and native soil thoroughly mixed with 1 part of composted cow manure, or stable manure, and 5 pounds of bone meal per cubic yard.
 - 3. Evergreen Plants: Topsoil mixture for backfilling planted areas shall consist of two parts each by volume of topsoil and native soil thoroughly mixed with 1 part of peat moss or humus.

2.2 SOIL AMENDMENTS

- A. Peat Humus: FS Q-P-166 decomposed peat with no identifiable fibers and with pH range suitable for intended use.
- B. Wood Mulch: Twice Ground Hardwood, Ground or Shredded Bark, Wood Chips: Shall have no leaves, young green growth, wood shavings, sawdust, or foreign materials of any nature mixed with the bark. Size shall be 1-1/2" maximum and 3/4" minimum in greatest dimension. Samples shall be submitted to the Engineer for approval before purchase or delivery.
- C. Commercial Fertilizer: Time released packets shall be a complete fertilizer, part of the elements of which are derived from organic sources. It shall be delivered to the site in the original unopened packages each bearing the manufacturer's guaranteed analysis and installation instructions. For trees and shrubs, provide fertilizer with not less than 5% total nitrogen, 10% available phosphoric acid and 5% soluble potash.
- D. For lawns, provide fertilizer with percentage of nitrogen required to provide not less than 1 lb. of actual nitrogen per 1000 sq. ft. of lawn area and not less than 4% phosphoric acid and 2% potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth; at least 50% of nitrogen to be organic form.
- E. Anti-Desiccant Spray: Shall be an emulsion which provides a protective film over plant surfaces, permeable enough to permit transpiration. The Anti-desiccant shall be delivered in manufacturer's containers and shall be mixed according to manufacturer's directions.
- F. Water: Shall be furnished by the Contractor until the maintenance phase and will

be suitable for irrigation and free from ingredients harmful to plant life. Hose and other watering equipment shall be furnished by the Contractor. Self-watering system, where required, shall be Tree Gator 20-gallon capacity refillable watering system, by Spectrum Products, Raleigh, NC, 919-878-8911 or approved equal.

G. Guying, Staking and Wrapping Materials

1. Wire for tree guys shall be 3/16" - 1 x 7 stainless black steel leftlay strand Type 304 cable as manufactured by U.S. Steel or approved equal.
2. Turnbuckles shall be stainless steel and 4-1/2" lengthwise openings, threaded ends, 5/16" diameter, filled with screw eyes.
3. Hose shall be new black two-ply, reinforced, fiber-bearing garden hose not less than 1/2 inch inside diameter.
4. Stakes for vertical staking shall be white cedar milled 3 inches diameter, as manufactured by L. J. Taylor and Sons, Vincentown, NJ or approved equal.
5. Stakes for guying trees 3 inch caliber or less, shall be of 2" x 4" x 40", one end pointed, wolmanized wood.

2.3 PLANT MATERIALS

- A. Quality: Provide trees, shrubs, and other plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".
- B. All plants shall be freshly dug and neither heeled-in plants nor plants from cold storage will be accepted. Balled and burlapped plants shall come from soil which will hold a firm ball.
- C. Deciduous Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
- D. Deciduous Shrubs: Provide shrubs of the height shown or listed and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
- E. Coniferous and Broadleafed Evergreens: Provide evergreens of sizes shown or listed. Dimensions indicate minimum spread for spreading and semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad up-right, and columnar. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the

primary dimension shown.

- F. Ground Cover: Provide plants established and well rooted in removable containers or integral peat pots with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.
- G. Container Grown Plants: Container grown plants may be supplied in lieu of balled and burlapped plants if all other specified requirements are met. These plants shall have been grown in the container for a minimum of one full growing season and a maximum of two years and when delivered, shall have sufficient root growth to hold earth intact when removed from container. They shall not be root bound. Remove container in a way to prevent damage to plant or root system.

2.4 GROUND COVER

- A. Provide plants established and well-rooted in removable containers or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.

2.5 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Wood Headers and Edging: Of sizes shown and following wood species.
 - 1. Southern Pine, pressure treated with water borne preservatives for ground contact use complying with AWPB LP-22.
 - 2. Provide wood stakes of the same species, 2" x 2" x 24" long and galvanized nails for anchoring headers and edging.
- B. Steel Edging: Commercial steel edging of size shown on drawings fabricated in sections at 2'-6" o.c. to receive stakes. Provide tapered steel stakes 16" long. Finish edging sections and stakes with manufacturers standard green-black paint.
- C. Tree grates: Campbell pattern 9188 1484 or approved equal, measuring 48" by 48" square. To be ADA compliant, constructed of grey cast iron and free from holes, cracks, cold shuts, etc. and coated with coal tar varnish. Work includes furnishing and placing of grates, and all labor incidental to placement.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Planting Operations
 - 1. The Engineer / Landscape Architect shall be notified 72 hours in advance of the delivery of any plant material to the site. Delivery slips covering all plant

material transported to the site shall be furnished to the Engineer / Landscape Architect.

2. Following the signing of the Contract and prior to the commencement of planting, the Contractor shall contact the Engineer / Landscape Architect to work out a schedule for plant material inspection and for planting dates.
 3. Upon delivery of plant material to the site, and prior to planting, the Engineer / Landscape Architect shall inspect the delivered plant material in the presence of the Contractor or his designated representative. Any and all plant materials which fail to comply with the Contract drawings and/or American Association of Nurserymen Standards due to health, form or damage shall be rejected and replaced with conforming materials.
 4. Plant pits shall not be pre-dug. **The location of plants, as shown on the drawings is intended only as a guide.** Plants shall be delivered to the site and set on the ground in the location shown. The Engineer / Landscape Architect shall then determine the specific location of each plant in the field prior to planting.
- B. Prior to any digging, the Contractor shall ascertain the location of all utilities in the areas including tanks or other subsurface encumbrances within the contract limit line. Precaution must be taken not to disturb or damage these items. In the event of a conflict with planting, the Contractor shall notify the Engineer / Landscape Architect.
- C. Preparation of Planting Soils
1. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.
 2. Contractor shall prepare soil mixture as outlined under Section 2.1.
 3. For nursery plantings, use timed release fertilizer packets for all trees and shrubs as per planting details, making sure the packets do not come in direct contact with root ball. Apply as per manufacturer's instructions.
- D. Preparation of Planting Beds:
1. Loosen subgrade of planting bed areas to a minimum depth of 6" using a cultmulcher or similar equipment. Remove stones over 1-1/2" in any dimension, and sticks, stones, rubbish and other extraneous matter.
 2. Spread planting soil mixture to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Place approximately 1/2 of total amount of planting soil required. Work into top of loosened subgrade to create a transition layer, then place remainder of the planting soil.

3. Planters: Place not less than 4" layer of gravel in bottom of planters, install filtration/separation fabric and fill with planting soil mixture consisting of 1 part topsoil, 1 part coarse sand, 1 part peat humus, and 3 lbs. dolomitic limestone per cubic yard of mix. Place soil in lightly compacted layers to an elevation 1-1/2" below top of planter allowing for natural settlement.

E. Excavation for Trees and Shrubs:

1. Excavate pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard or compacted subsoil in bottom of excavation. This is particularly important in pits excavated by machine due to compaction and smearing of soils which can occur, which prevents proper development of root systems.
2. For bare root trees and shrubs, make excavations at least 1'-0" wider than root spread and deep enough to allow for setting of roots on a layer of compacted backfill and with collar set at same grade as in nursery, but 1" below finished grade at site.
3. For balled and burlapped (B&B) trees and shrubs, make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a layer of compacted backfill:
4. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.
5. Fill excavations for trees and shrubs with water and allow to percolate out before planting.

3.2 PLANTING

A. Planting Trees and Shrubs:

1. Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms. If wire baskets have been used, cut wire baskets at top half and fold down so as to be a minimum of 3" below final grade, prior to any mulching. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3-full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.
2. Set transplanted trees plumb and in center of pit with top of root ball flush with adjacent finish grades. Orient each tree in the pit so that marked north side of tree aligns with north direction of pit. Backfill around base and sides of ball with planting soil as specified, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately

2/3rds full, water thoroughly before placing remaining backfill. Amend top 8-10 inches of planting pit soil as specified in Section 2.2. Repeat watering until no more water is absorbed. Dish top to allow for mulching. Install according to manufacturers specification two (2) 20-gallon Tree Gators, zipped together, for trees 4-12" in caliper. Fill bags with potable water.

3. Set bare root stock on cushion of planting soil mixture. Spread roots and carefully work backfill around roots by hand and puddle with water until backfill layers are completely saturated. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers of soil mixture above roots. Set collar 1" below adjacent finish landscape grades. Spread out roots without tangling or turning up to surface. Cut injured roots clean; do not break.
 4. Set container grown stock as specified for balled burlapped stock, except cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls. Backfill soil shall comply with the Topsoil specified in Section 2.1.
- B. Dish top of backfill to allow for mulching.
- C. Mulch pits, trenches and planted areas. Provide not less than following thickness of mulch and work into top of backfill and finish level with adjacent finish grades.
1. Provide 3" thickness of shredded hardwood mulch at trees.
 2. Provide 2" thickness of shredded hardwood mulch at shrubs and ground covers.
- D. For ground cover planting, space plants as shown on schedule; dig holes large enough to allow for spreading of roots, apply fertilizer at a rate of one (1) pound per twenty (20) square feet, backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plant to hold water. Water after planting and mulch as specified.
- E. Tree and Shrub Pruning
1. Prune, thin, and shape trees and shrubs as directed by Engineer / Landscape Architect.
 2. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain height and spread. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.
- F. All trees and shrubs shall be sprayed with anti-desiccant material immediately

after pruning. After pruning, all trees and shrubs shall also be sprayed with insecticide and fungicide. Transplanted trees to be sprayed only upon approval of Landscape Architect.

- G. As indicated in the Drawings, trees shall be guyed, immediately after planting. Pieces of rubber hose or tree tie shall be used under the wires where they are attached to the trees. This work shall be performed only when necessary to stake or guy in areas subject to high winds or on slopes.
- H. Miscellaneous Landscape Work:
 - 1. Install wood headers and edgings where shown. Anchor with wood stakes spaced not more than 3' o.c., and driven at least 1" below top elevation of header or edging. Use 2 galvanized nails per stake to fasten headers and edging, and clinch point of each nail.
 - 2. Install steel edging where shown. Anchor with steel stakes spaced not more than 3' o.c., and driven at least 1" below top elevation of edging.

3.3 MAINTENANCE

- A. Begin maintenance immediately after planting. Maintain trees, shrubs and other plants until final acceptance but in no case less than one (1) year after substantial completion of planting.
- B. Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Spray as required to keep trees and shrubs free of insects and disease. All tree stakes and guys must be removed within 2 growing seasons of the initial planting.
- C. Maintenance to be performed by the Contractor shall include the following:
 - 1. Watering of plant material as required for each plant type and current weather conditions, but in no case less than once a week for the period between June 15th to September 15th.
 - 2. Also cultivation, weeding, seasonal spraying, pruning of plant material, and adjusting of stakes, guys, and wrapping, repairs of minor washouts and gullies, and other horticultural operations necessary for the proper growth of all plants.

END OF SECTION 02480

SECTION 02485 - FINISH GRADING, SEEDING AND AMENITIES

1. PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of work is shown on drawings and in schedules.
- B. The work includes, but is not limited to, the following.
 - 1. Soil erosion and sediment control.
 - 2. Fine grading of topsoil.
 - 3. Application of lime and fertilizer.
 - 4. Seeding.
 - 5. The task items specified above must be applied to all disturbed areas, whether or not indicated on the drawings. Include adjacent property wherever grass is disturbed in execution of this contract.
- C. See notes on drawings for additional requirements relating to work of this section, including the Soil Erosion and Sediment Control Plan and Notes and Details.
- D. Subgrade Elevations: Excavation, filling and grading required to establish the elevations shown on drawings are not specified in this section. Refer to Earthwork, Section 02200.
- E. Refer to Earthwork Section 02200 for as-built drawings required prior to finish grading and seeding work.
- F. Refer to Section 02514 – Sitework Concrete for concrete work.

1.3 QUALITY ASSURANCE

- A. Conform to the requirements of "Standards for Soil Erosion and Sediment Control in New Jersey", current edition, promulgated by the NJ State Soil Conservation Committee, hereinafter referred to as "standards". Compliance with the certified Soil Erosion and Sediment Control Plans and Details is mandatory.

- B. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

1.4 SUBMITTALS

- A. Certification: Submit certificates of inspection as required by governmental authorities, and manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.
- B. Submit certified analysis from a recognized laboratory shall be submitted for site topsoil stockpile for re-use as required in this specification. Certified analysis shall be made to determine compliance with requirements for topsoil stockpiled on-site as hereinafter specified under "Materials". Additional topsoil may be required to be imported from off-site in order to comply with these specifications. Certified analysis for an imported topsoil material shall also be provided to verify compliance with these Specifications. See also subsection C below. The costs of the tests shall be borne by the Contractor. Reports of the tests shall be submitted to the Architect in writing.
- C. Imported materials must include a written certification from the supplier stating that the fill is virgin material, and if it is from an agricultural, commercial or non-commercial source. The material shall also be tested and be certified free of contamination or hazardous materials. Testing parameters shall be based on the source of the material, which shall be declared to Architect/Engineer in writing. The Architect/Engineer may require supplemental testing by Contractor prior to importation at no cost to the Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Materials imported for use as topsoil, and for detention basin infiltration sand, shall be segregated and protected from contamination prior to use. Topsoil shall be stockpiled and temporarily stabilized in accordance with the Erosion Control Standards.
- B. Lawn Seed: Furnish in duplicate, signed copies of a statement from the vendor, certifying that each container of seed delivered is fully labeled in accordance with the Federal Seed Act. This certification shall appear on or with all copies of invoices for seed.
- C. Furnish in duplicate copies of invoices for all fertilizer used on the project.

1.6 JOB CONDITIONS

- A. Utilities: Determine location of underground utilities and perform work in a

manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

- B. Obtain copies of and abide by all conditions of the approvals and permits issued by the local Soil Conservation District.

1.7 PAYMENT

- A. The lump sum price bid shall include all material, equipment and labor necessary to perform final grading and stabilization and maintain the same until final acceptance.

1.8 RELATED SECTIONS

- A. Section 02200 – Earthwork
- B. Section 02485 – Finished Grading
- C. AIA A201 & Section 00800 - Submittals

2. PART 2 - PRODUCTS

2.1 TOPSOIL

- A. The existing topsoil shall be tested and, if necessary, shall be made to conform to the pH acidity range and percentage of organic matter, and other requirements as listed below. Additional topsoil may be required; it shall be furnished by the Contractor at no additional expense, and shall be tested and made to meet the requirements listed below. Tests shall be made by the Contractor at his expense.
- B. All topsoil (new and existing) shall be of uniform quality, free from hard clods, roots, sods, stiff clay, hard pan, stones larger than 1 inch, lime cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, sticks, or any undesirable material.
- C. Topsoil shall contain a minimum of 2.75% organic matter in accordance with the current method of the Local Soil Conservation District. The acidity range shall be Ph 5.0 to Ph 7.0, inclusive. Soluble salts, as determined by electrical conductivity testing, shall not exceed 0.5 milliohms per centimeter.
- D. The mechanical analysis of the soil shall be:

Quantity Percent oven dry weight	Size Fraction	Range of Particle Diameter in Inches
Less than 2%	Gravel	Larger than 1

Less than 3%	Gravel	1/4 to 1
Less than 10%	Gravel	2/25 to 1/4
40% to 65 %	Sand	1/500 to 2/25
25% to 40 %	Silt	1/12,500 to 1/500
Less than 12%	Clay	Smaller than 1/12,500

Passing	Retained On	Percent
1" Screen		100%
1" Screen	1/2" Screen (gravel not more than)	3%
1/4" Screen	#100USS Sieve (coarse, medium & fine sand)	40-60%
#100USS Sieve	(Very fine sand, silt & clay)	12-40%

- E. Sufficient native topsoil is to be retained and stockpiled on-site to adequately restore the site in accordance with these specifications. If topsoil is required to be imported to the project, obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 5 inches; do not obtain from bogs or marshes. The source of imported topsoil is to be inspected and approved by the Architect prior to approval of its use and importation.
- F. All soil materials proposed to be imported to the site shall be certified by an independent testing agency to be free from contamination, in accordance with the standards of the N.J.D.E.P., and the U.S. Environmental Protection Agency. Written certification to be received, and approval by Owner issued prior to any importation activity.

2.2 SOIL AMENDMENTS

- A. **Provide the following as recommended by the Local Soil Conservation District or, if not required by the District, provide as indicated below. In the case of conflicting standards, the standards of the Soil Conservation District govern.**
- B. Lime: Natural limestone containing not less than 85% of total carbonates, ground so that not less than 90% passes a 10-mesh sieve and not less than 50% passes a 100-mesh sieve.
 1. Agriculture Pulverized Limestone: 50% calcium availability.
 2. Commercial Fertilizer: Complete fertilizer of neutral character with some elements derived from organic sources and containing following percentages of available plant nutrients.

3. Provide fertilizer with not less than 4% phosphoric acid and not less than 2% potassium, and percentage of nitrogen required to provide not less than 1 pound of actual nitrogen per 1000 square feet of lawn area. Provide nitrogen in a form that will be available to lawn during initial period of growth.
 - a. Refer to permanent Seeding Requirements shown on drawings for fertilizer specifications.
- C. Weed Killer: Type selected by the Seeding Subcontractor and approved by the local authorities having jurisdiction. Apply to planting and ground cover areas, in strict accordance with the manufacturer's recommendations.
- D. Grass seed shall be fresh, re-cleaned seed of the latest crop mixed in the following proportions by weight and meeting the following standards of pure live seed content. The tolerance for P.L.S. (purity x germination) shall be those called official and tabulated on page 5, Department of Agriculture Bulletin No. 480.
 1. Lawn Materials: Refer to "Seed Mix" on turf seeding and application specifications on Soil Erosion and Sediment Control drawings.
 2. All seed shall be fresh and clean and shall be "new crop" seed. All seed shall be delivered in the original packages, unopened, which shall bear the manufacturer's guaranteed analysis. No packages shall be opened or seed labels removed until inspected by the Architect.
- E. Water: Water used in the work will be suitable for irrigation and free from ingredients harmful to plant life. Hoses, sprinklers and other water equipment required for the work shall be furnished by the Contractor at no additional cost or expense.

2.3 EROSION CONTROL

- A. Silt Fence: Material to conform with the requirements of the Standards for Soil Erosion and Sediment Control in New Jersey, as amended, and New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended.
- B. Erosion Control Fabric: Where required, is to conform with the requirements of a Flexible Channel Liner as outlined in the Standards for Soil Erosion and Sediment Control in New Jersey, as amended and New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended. Shall be a minimum of Type E as defined therein, as manufactured by American Excelsior, BonTerra, North American Green, or approved equal.

3. PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Perform all work to reasonably control soil erosion resulting from construction operations, including the work of other contractors on the project, and to prevent excessive flow of sediment from the construction site.
- B. The Contractor shall adhere to the requirements of the Soil Erosion and Sediment Control Plan. When no work will be performed on critical areas for more than 30 days, they shall be protected by temporary seeding, and mulching in accordance with drawings. Earth berms or diversions shall be constructed to intercept and divert runoff water away from critical areas.
 - 1. Diversion outlets shall be stable or shall be stabilized by paving or other means acceptable to Architects.
- C. Permanent restoration of vegetative cover on all areas shall be accomplished within 10 days after final grading operations have been completed. Time extensions beyond the 10 days requirement may be requested in writing and are subject to written approval by the Architect.
- D. Excavated soil materials shall not be placed adjacent to wetlands streams and bodies of water.
- E. Pollutants such as chemicals, fuels, lubricants and other harmful waste shall not be discharged into or alongside of streams, wetlands, impoundments or into natural or man-made channels leading thereto.

3.2 PROTECTION FOR CRITICAL AREAS

- A. Except as otherwise directed by the local Soil Conservation District, or as outlined and details on the Plans, the type of protection for critical areas shall be optional with the Contractor.
- B. Protection shall be by means of straw mulch, hydro seeding or matting, applied in conformance with referenced standards.
- C. Critical areas shall be those areas subject to excessive erosion due to highly erodible soils, slope length and steepness or water concentrations, including overflow spillways.

3.3 PREPARATION OF SUBGRADE AND SPREADING OF TOPSOIL

- A. The subgrade soil shall be loosened to a depth of 6 inches and graded to remove all ridges and depressions so that it will be everywhere parallel to proposed finished grade. All stones over 2 inches in any dimension, sticks, rubbish and other extraneous matter shall be removed during this operation. No heavy equipment shall be moved over lawn areas after the subgrade soil has been

prepared before topsoil is spread. This scarification must be done and approved before topsoil is spread.

- B. After the subgrade soil has been prepared, topsoil shall be spread evenly thereon and the area then rolled with a 200 lb. roller so as to produce a minimum compact depth of five (5) inches of topsoil. No topsoil shall be spread in frozen or muddy conditions. In all lawn areas, the finished surface of the topsoil shall conform and shall be free from hollows or other inequalities, stones over 1 inch every dimension, sticks, and other extraneous matter.

3.4 SEEDBED PREPARATION, FERTILIZING AND SEEDING (LAWN AREAS)

- A. Before any seed is sown, the topsoil shall be cultivated (raked) to a depth of 3"-4" to produce an even, friable surface or moderately coarse particles. Do not work soil into dusty powder. No fertilizer shall be applied or seed sown on any area which has not been so prepared.
- B. Fertilizer and limestone shall be applied to lawn areas at the rate as indicated on drawings. Fertilizer and limestone shall be spread evenly on the newly prepared soil prior to seeding and incorporated into the topsoil as stated in the Permanent Seeding Requirements shown on drawings.
- C. Ground limestone shall be evenly distributed in an amount related to the pH and worked into the top three (3) inches of soil at least 5 days before applying commercial fertilizer. Commercial fertilizer shall be worked lightly into the top 3 inches of the soil of new areas.
- D. Lawn shall be seeded with the seed mixes and rates as specified in the Permanent Seeding Requirements shown on drawings. The seed shall be sown in a uniform application by the use of an accurate spreader, properly calibrated, in the opposite direction of fertilization. The spreader shall be set at the specified rate. After the seed has been applied lightly, mix into surface by pulling a short section of chain link fence (or an alternate method if approved by the Architect) over the seeded area. Do not roll seed bed unless specifically ordered by the Architect. If rolling is deemed to be necessary by the Architect, it shall be done with 100 lb. roller or less and under his direction.

3.5 MULCHING

- A. Mulching is required on all seeding. Mulch will insure against erosion before grass is established and will promote faster and earlier establishment. (The existence of vegetation sufficient to control soil erosion shall be deemed compliance with this mulching requirement.)
 - 1. Mulch materials should be unrotted small grain straw, hay free of seeds, or salt hay to be applied at the rate of 1-1/2 to 2 tons per acre (70 to 90 pounds per 1,000 square feet), except that where a crimper is used instead of a

liquid mulch-binder (tacking or adhesive agent), the rate of application must be double the lower rate. Mulch chopper-blowers must not grind the material.

2. Spread uniformly by hand or mechanically so that approximately 85% of the soil surface will be covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square feet sections and distribute 70 to 90 pounds within each section.
3. Mulch anchoring should be accomplished immediately after placement to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area, steepness of slopes, and costs.
 - a. Peg and Twine - Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross and a square pattern. Secure twine around each peg with two or more round turns.
 - b. Mulch Nettings - Staple paper, jute, cotton, or plastic nettings to the soil surface. Use a degradable netting in areas to be mowed.
 - c. Crimper (mulch anchoring tool) - A tractor-drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inches into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate must be 3 tons per acre. No tacking or adhesive agent is required.
4. Liquid Mulch-Binders - May be used to anchor salt hay or straw mulches.
 - a. Applications should be heavier at edges where wind catches the mulch, in valleys, and at crests of banks. Remainder of area should be uniform in appearance.
 - b. Use of the following:
Synthetic or Organic binders - binders such as Curasol, DCA-70, Petro-set, and Terra-Tack may be used at rates recommended by the manufacturer to anchor mulch materials.

NOTE: All names given above are registered trade names. This does not constitute a recommendation of these products to the exclusion of other products.
5. Wood-fiber or paper-fiber mulch at the rate of 1,500 pounds per acre may be

applied by a hydro seeder. Use is limited to flatter slopes and during optimum seeding periods in spring and fall.

3.6 SEEDING PERIOD

- A. Permanent seeding shall be executed according to the following schedule: From 1 March to 15 May or 15 August to 1 October. This period may be extended or reduced according to prevailing weather conditions at the time, as directed by the Architect.

3.7 LAWN PROTECTION

- A. Adequate protection shall be provided at all times for lawn areas against trespassing by any individuals and damage of any kind during planting or other operations. Such protection shall be maintained from the completion of seeding to the completion of the Contract Work.

3.8 MAINTENANCE OF LAWNS

- A. The Contractor shall be responsible for all areas during the period when the grass is becoming established and until all work under this Contract is completed and accepted.
- B. Maintenance shall include but not be limited to reseeding, watering, mowing and reworking as follows:
 - 1. Reseeding of any bare areas.
 - 2. Proper and adequate watering.
 - a. The lawn area shall be watered daily and as may additionally be required until germination.
 - b. Upon germination, the lawn area shall be watered twice a week with an accumulation of ½ inch of water at each watering.
 - c. The above watering schedule is a minimum and shall be changed at the discretion of the Architect according to climatic conditions, etc.
 - 3. If any portion of the surface becomes eroded, washed out, gullied or otherwise damaged following seeding, the affected portion shall be repaired to re-establish the conditions and grade of the soil prior to seeding and shall then be reseeded as specified herein.
- C. Mowing: The grass shall be properly mowed to a height of 2 inches when the grass attains a height of 3 inches. It is essential that at all times the mower blades are kept sharp.

- D. Reworking and reseeding of any areas which fail to show a uniform stand of grass shall be done at the Contractor's expense with the same seed mixture applied at the rate originally used and repeated until all areas are covered with a satisfactory stand of grass.
- E. It is the Contractor's responsibility to carry out the above operations on a continuing basis until a uniform, thick stand of specified grasses is established and until acceptance by the Architect.

3.9 INSPECTION AND ACCEPTANCE

- A. Inspection of the seeding and related work to determine completion of Contract work will be made by the Architect upon notice requesting such an inspection by the Contractor several days prior to the anticipated date. The conditions of the planting and lawns will be noted and determination made by the Architect whether maintenance shall be continued in any part.
- B. After inspection, the Contractor will be notified in writing by the Architect of acceptance of the work or, if there are any deficiencies, the requirements for completion of the work. Remaining work to be done shall be subject to inspection before acceptance. Maintenance shall become the responsibility of the Owner immediately upon acceptance.

3.10 CLEAN UP

- A. The Contractor shall dispose of excess materials and debris including but not limited to branches, paper, and rubbish resulting from this work off-site and in a legal manner.
- B. All areas shall be left neat and clean; and, upon completion of the work, the site shall be left in an orderly condition satisfactory to the Architect.

END OF SECTION 02485

SECTION 02514 - SITEWORK CONCRETE

1. PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of concrete work is shown on drawings.
 - 1. Curbs, concrete walks, and slabs where shown.

1.3 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02248 – Shoring and Bracing
- C. Section 02200 - Earthwork
- D. Section 02485 – Finished Grading
- F. Section 01550 – Traffic Control
- G. AIA A201 & Section 00800 - Submittals

1.4 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - ACI 301 "Specifications for Structural Concrete for Buildings."
 - ACI 311 "Recommended Practice for Concrete Inspection."
 - ACI 318 "Building Code Requirements for Reinforced Concrete."
 - ACI 347 "Recommended Practice for Concrete Formwork."
 - ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."
 - Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
 - Non-Slip Finish for Walkways: Provide finish in accordance with BOCA Building Code, CABO/ANSI A117.1, for non-slip finish.
- B. Concrete Testing Service: Employ, at the Contractor's expense, a testing laboratory acceptable to the Architect to perform material evaluation tests and to design concrete mixes.
- C. Comply with the requirements of Section 03300 and structural drawings for concrete work, where applicable, as determined by Architect.

1.5 SUBMITTALS

- A. Submit all test reports to Architect with copy to Engineer. Submit copies of all receipt tickets to Engineer.

- B. Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems and others as requested by the Architect.
- C. Submit samples of materials as specified and as otherwise may be requested by the Architect, including names, sources and descriptions as required.

1.6 JOB CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities, for facility operation and for public use. All traffic control measures to comply with the Manual on Uniform Traffic Control Devices, as amended.
 - 1. Utilize flagmen, barricades, warning signs and warning lights as required.
- B. Mark Out: Contractor shall be responsible to do the necessary survey work required for the mark out of all proposed features and elevations.

1.7 PAYMENT

- A. The lump sum price bid shall include all survey mark outs, material, equipment and labor necessary to construction site concrete work and maintain the same.

2. PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Construct formwork for exposed concrete surfaces with plywood, metal, or other acceptable materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
- B. Provide commercial formulation form-coating compounds that will not bond with, stain or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces to be cured with water or curing compound. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

2.2 REINFORCING MATERIALS

- A. Welded Wire Fabric (WWF): ASTM A 185, welded steel wire fabric.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, unless otherwise acceptable to the Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for all exposed concrete.
 - 1. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.
 - 2. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud,

loam, or foreign matter as follows:

- a. Maximum Aggregate Size: Not larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs.
- C. Water: Clean, fresh, drinkable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Water-Reducing Admixture: ASTM C 494, Type A.
- F. Set-Control Admixtures: ASTM C 494.
- G. Anti-Spalling Compound: 50 percent (by volume) boiled linseed oil and 50 percent (by volume) commercial grade kerosene or mineral spirits.
- H. Calcium Chloride will not be permitted in concrete, unless specifically authorized in writing by the Architect.

2.4 RELATED MATERIALS

- A. Preformed Expansion Joint Fillers: Specified in Section 07900.
- B. Curing Compounds: Exterior slabs shall be cured with a compound that shall conform to Federal Specification TT-C-800A, with 30 percent solids, minimum, such as "Masterseal" as manufactured by Master Builders, or approved equal.
- C. Detectable Warning Strips for handicap ramps: Preformed polyurethane mats with raised bumps of truncated domes, of a high visibility color, including required installation materials, meeting State and local code regulations for handicap accessibility, such as those manufactured by Detectable Warning Systems of Orange, California, 714-974-3566, or approved equal.

2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes in accordance with applicable provisions of ASTM C 94. Use an independent testing facility acceptable to the Architect for preparing and reporting proposed mix designs.
- B. Submit written reports to the Architect of proposed mix at least fifteen (15) days prior to the start of the work. Do not begin concrete production until mixes have been reviewed by the Architect.
- C. Design mix to provide normal weight concrete with the following properties.
 - 1. 4500 psi 28-day compressive strength.
 - 2. 3500 psi 28-day compressive strength
 - 3. 2500 psi 28-day compressive strength
- D. Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at no additional cost to the Owner and as accepted by the Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Architect before using in the work.

E. Admixtures

1. Use air-entraining admixture in exterior exposed concrete. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content within the following limits.
 - a. Concrete exposed to freezing and thawing or subjected to hydraulic pressure:
5 percent for maximum 2-inch aggregate.
6 percent for maximum ¾-inch aggregate.
 - b. Maximum water cement ratio: 0.40.
2. Use admixtures for water-reducing and set-control in strict compliance with the manufacturer's directions.

F. Slump Limits including Ready-Mix Concrete

1. Ramps and Sloping Surfaces: Not more than 3 inches.
2. All Other Concrete: Not less than 1 inch and not more than 4 inches.

- G. Ready-Mix Concrete: Comply with the requirements of ASTM C 94 and as herein specified.

3. PART 3 - EXECUTION

3.1 FORMS

- A. Construct forms complying with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work.
- B. Form Ties: Factory-fabricated, adjustable length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal. Provide form ties that will not leave holes larger than 1 inch in diameter in concrete surface.
- C. Check completed formwork for grade and alignment to the following tolerances:
 1. Top of forms not more than 1/8 inch in 10 feet.
 2. Vertical face on longitudinal axis or radius, not more than 1/4 inch in 10 feet.
- D. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.
- E. Depressed curb shall be installed one and one-half (1-1/2) inch above the adjacent existing or proposed pavement grade. Depressed curb at handicapped ramps shall be flush with the existing or proposed finished pavement grade. Excavation for depressed curb shall be full depth in accordance with the plan details. For granite block installations, it will not be permitted to install the curb blocks in any location such that they are not properly positioned as detailed on the plans.

3.2 REINFORCEMENT

- A. Reinforce walks with welded wire mesh, as indicated.
- B. Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- C. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one (1) full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.3 JOINTS AND SCREEDS

- A. Provide expansion joints between new and existing curbs and concrete paving, between new curbs or concrete paving and vertical surfaces, and where required by the plan notes and details, but not exceeding 20 feet o.c. in all directions. Extend joint fillers full width and depth of joint, and not less than ½ inch or more than 1 inch below finished surface. Fill flush with sealer, as specified in Section 07900. Concrete shall be allowed to expand in not less than 2 directions.
- B. Weakened-Plane (Contraction) Joints: Provide weakened-plane joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
 - 1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
 - 2. Provide tooled joints on 5 foot centers each way for paving and walks or as shown on the drawings.
- C. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain the required elevations and contours in the finished slab surface. Provide and secure units sufficiently strong to support the types of screed strips by the use of strike-off templates or accepted compacting type screeds.

3.4 PREPARATION OF FORM SURFACE

- A. Coat the contact surfaces of forms with a form coating compound before reinforcement is placed.
- B. Do not allow excess form coating material to accumulate in the forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with the manufacturer's instructions.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete the formwork installation and reinforcing steel.
- B. Comply with ACI 304, and as herein specified.

- C. Deposit concrete paving in a continuous operation, as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.
- D. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping, and use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309, to suit the type of concrete and project conditions.
- E. Bring slab surfaces to the correct level with a straightedge and strikeoff. Use bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.
- F. Maintain reinforcing in the proper position during concrete placement operations.
- G. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306.
- H. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305.

3.6 FINISH

- A. Smooth Form Finish: For formed concrete surfaces exposed to view. This is the as-cast concrete surface as obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with all fins or other projections completely removed and smoothed.
- B. Float Finish: Apply float finish to monolithic slab surfaces that are to receive other finishes as hereinafter specified. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/8 inch in 10 feet when tested with a 10-foot straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.
- C. After smooth form finishing or floating and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 - 1. Walks
 - a. Broom finish by drawing a fine hair broom across concrete surfaces, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect and meet indicated code for non-slip finish. Provide a smooth border at all joints and edges.
 - b. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff bristled broom, perpendicular to line of traffic.
 - 2. Curbs and other exposed formed surfaces: Smooth rubbed finish; grout cleaned finish will not be permitted. Match sample of finish approved by Architect for entire project.

- D. ADA detectable warning surface where required and shown on the plans and details shall be installed during the finishing of concrete. Detectible warning surfaces shall be flush with the surface to prevent trip hazards. Surface applied detectable warning systems are prohibited. All detectable warning surfaces shall be cast into the fresh concrete.

3.7 CURING

- A. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 72 hours.
- B. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures.
- C. Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods as approved by Architect.

3.8 ANTI-SPALLING TREATMENT

- A. Apply compound to concrete surfaces no sooner than 28 days after placement. Apply to clean, dry concrete free of oil, dirt, and other foreign materials, in 2-sprayed applications. First application at rate of 40 square yards per gallon; second application, 60 square yards per gallon. Allow complete drying between applications. Do not apply to areas of concrete is to receive paint or other surface treatment.

3.9 REMOVAL OF FORMS

- A. Formwork may be removed after cumulatively curing at not less than 50 degrees F. for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

3.10 DETECTABLE WARNING STRIP

- A. Install detectable warning strips to handicap ramps as required by the plans during finishing. Strips are to be installed in strict accordance with manufacturer's specifications and materials.

3.11 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Sampling Fresh Concrete: ASTM C 172, except modified or slump to comply with ASTM C 94.
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 2. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
 - 3. Compression Test Specimens: ASTM C 31; provide tests as specified in Section 03300 - Concrete Work.

END OF SECTION 02514

SECTION 02515 - CONCRETE SIDEWALK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This work shall consist of the construction or reconstruction of Portland Cement Concrete Sidewalk.

1.3 SUBMITTALS

- A. An approved NJDOT concrete mix design shall be submitted for all Portland Cement Concrete used for sidewalk. The design shall be submitted to the engineer and approved prior to the placing of any concrete.
- B. Concrete delivery receipts shall be provided for all Portland Cement Concrete delivered and used on the project.

1.4 JOB CONDITIONS (Not Applicable).

1.5 PAYMENT

- A. Payment shall be a lump sum for concrete sidewalk and shall include all equipment, labor and materials necessary to install and/or remove and install concrete sidewalk.

PART 2 - PRODUCTS

- A. Portland Cement Concrete shall conform to the NJDOT Standard Specification for Road and Bridge Construction as amended or supplemented. All Portland Cement Concrete shall have a minimum strength of 4,500 PSI at 28 days. All other materials including but not limited to curing materials, reinforcing steel, preformed expansion joint filler, and foundation material shall conform to NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented. Cure and seal compound shall be Lumiseal Plus as manufactured by L&M Construction Chemicals, Inc. or equivalent.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Concrete sidewalk shall be rejected and ordered replaced by the Engineer, if any or all of the following should occur or exist:
- (1) Staining or discoloration of sidewalk;
 - (2) Sidewalk is out of alignment;
 - (3) Sidewalk is out of grade;
 - (4) Expansion joints are not perpendicular to sidewalk;
 - (5) Joints and surface are improperly finished;
 - (6) Expansion joints protrude from sidewalk;
 - (7) Cracks, chips or other damage occur in construction or maintenance period;
 - (8) Settlement of sidewalk;
 - (9) Inspection not asked for prior to pouring of sidewalk.

3.2 CONSTRUCTION

- A. The contractor shall excavate for all concrete sidewalk and shall properly compact all subgrade beneath the sidewalk. If unsuitable subgrade material is encountered, the contractor shall excavate said material until suitable material is reached and shall backfill with $\frac{3}{4}$ " clean crushed stone to the proper subgrade elevation. If existing sidewalk is present, the same shall be removed entirely and shall be disposed of by the Contractor. All excavation for sidewalk shall be unclassified.
- B. Concrete Sidewalk shall conform with the Construction Details.
- C. Forms used shall be metal forms or wood forms. Wood forms shall be used on curves or monolithically constructed sidewalk. Form-lubricating materials and methods shall be such that they will not discolor or stain the concrete. Forms shall be removed when sufficient hardness of the concrete has been attained to be self-supporting, yet in ample time for finishing.
- D. Expansion joints shall be located a maximum of twenty feet (20') on centers and/or every eighty square feet (80 S.F.) and in all areas where designated by the Engineer, including, but not limited to areas where the slab meets curb, existing pavement, or existing sidewalk. Expansion joint material shall be one-half inch ($\frac{1}{2}$ ") premolded asphalt.
- E. Dowels where required shall be installed per the construction detail.

- F. Restoration adjacent to sidewalk shall be in accordance with the site restoration section of this specification.

END OF SECTION 02515

SECTION 02516 – STORM SEWER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. The contractor shall furnish all necessary labor, equipment, tools, implements and materials required to construct storm sewer or other storm water drainage facilities and structures herein.

1.3 SUBMITTALS

- A. Upon delivery of materials, the Contractor shall require the Manufacturer or Supplier to furnish to the Engineer a Certification of Compliance that the delivered materials, components and manufactured items are acceptable. Certificates of Compliance shall contain the following information:

- (1) Project to which material is consigned.
- (2) Name of the Contractor to which the material is supplied.
- (3) Kind of material supplied.
- (4) Quantity of material represented by the Certificate.
- (5) Means of identifying and consignment.
- (6) Date and method of shipment.
- (7) That the material has been tested and found in conformity with the pertinent specification(s) stated in the Certificate.
- (8) Signature of person having legal authority to bind the supplier.
- (9) Signature attested to by a notary public.

- B. An NJDOT mix design shall be submitted and approved by the engineer prior to the placing of any Portland Cement Concrete.

- C. Shop drawings of all pre-cast manholes, inlets, bases and trench drains shall be submitted to and approved by the Engineer prior to installation.

1.4 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to install storm sewers.

0.5 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02248 – Shoring and Bracing
- E. Section 02200 – Earthwork
- F. Section 02485 – Finished Grading
- G. Section 02071 – Selective Site Demolition
- H. Section 02550 – Traffic Control
- I. Section 02514 – Site Work Concrete
- J. Section 03300 – Cast In Place Concrete
- K. AIA A201 & Section 00800 - Submittals

PART 2 – MATERIALS

2.1 PORTLAND CEMENT

- A. Cement shall be either Standard of High Early Strength Portland Cement, conforming to the requirements of Serial Designation: C150, Type I and Type III, respectively, of the Standards of the American Society for Testing Materials; unless otherwise specified, all cement shall be Type I.
- B. Only one brand of cement shall be used on the project, except when written permission is obtained from the Engineer for the use of more than one brand.
- C. Cement shall be in either cloth or paper bags containing ninety-four (94) pounds.
- D. At the site of the project, the cement shall be stored in a suitable weatherproof building, or other acceptable enclosure, with the floor raised above the ground.
- E. Bags of cement which for any reason have become partially set on the outside or which contain lumps or partly set cement, shall be rejected.

2.2 CRUSHED STONE

- A. Crushed stone shall be either trap rock or dolomite. Only one type of stone shall be used, unless otherwise approved by the Engineer.
- B. When a coating of bitumen is to be applied to the stone or when the stone is to be used in concrete, it shall be free from pieces coated with clay, caked store dust, and other foreign materials.
- C. Stone shall contain not more than five percent (5%) of weathered or decomposed rock, not more than three percent (3%) of flat pieces and pieces with a length less than half the width, not more than five percent (5%) of other types of stone, and the total of the above shall not be more than ten percent (10%).
- D. Crushed stone shall be graded in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, Section 901 as amended or supplemented.
- E. When two (2) or more sizes of stone are mixed to secure any particular size, the mixing must be so executed that the resulting product shall be uniform throughout.

2.3 FOUNDATION MATERIAL

- A. Foundation material shall be clean 3/4" stone. It shall be free of all dirt, dust, vegetation and other foreign matter. The stone shall be leveled and compacted to the required depth and graded by approved means.

2.4 FINE AGGREGATE FOR CONCRETE AND MORTAR

- A. Sand for concrete and mortar shall be particles of quartz or other hard, durable rock, moderately sharp and free from soft particles, clay, loam, cemented particles, mica, salt and organic and other foreign matter. The surfaces of the particles shall be clean, and the sand shall contain not more than four percent (4%) of elutriable materials. The sand shall further conform to the requirements of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.
- B. When the sand is mixed with cement and water, the resulting mortar shall have compressive and tensile strengths at the age of seven (7) and twenty-eight (28) days, which are not less than those of mortar similarly prepared with standard Ottawa sand.

2.5 WATER

- A. Water shall be subject to the approval of the Engineer and shall be clean, fresh and free from oil, acid, injurious alkali and vegetable matter. It may be tested in accordance with Method T-26 of the American Association of State Highway and Transportation Officials. If the test indicates that mortar made with the water being tested in unsound or slow setting, or of less strength than mortar made with water of satisfactory quality, the water shall not be used for concrete mixtures.

2.6 BRICK

- A. Brick, for use in construction of manholes and catch basins, shall be new, whole, first-quality concrete brick, of a standard brand or make. The brick shall comply with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.

2.7 CONCRETE BLOCK

- A. Concrete block, for use in construction of manholes, inlets and catch basins, shall comply with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.

2.8 PIPE

- A. Reinforced Concrete Pipe - Reinforced concrete pipe shall conform to the requirements of current A.A.S.H.T.O. Designation M170, as amended by the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction.

- B. PVC Pipe - All polyvinyl chloride (PVC) pipe shall be schedule 40 unless otherwise noted on the plans with rubber gasket joints except 3", 4", 6" and 8" diameters which shall have solvent welded joints. Pipes shall be labeled by the manufacturer on the pipe to indicate size and schedule.
- C. Ductile Iron Pipe - Ductile Iron Pipe shall be centrifugally cast in conformance with ANSI/AWWA C151/A21.51 (Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids). Ductile Iron Pipe, shall, as a minimum, be of the thickness required for laying condition Type 1 (Flat-bottom trench, loose backfill) in accordance with ANSI/AWWA C150/A21.50). In no case shall Ductile Iron Pipe be installed with a thickness class less than Class 52, regardless of laying condition, depth of cover, or surcharge loading. Push-on joints or mechanical joints shall be used for all buried piping. Gaskets for ductile iron push-on and mechanical joints shall be in conformance with ANSI/AWWA C111/A21.11 (Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings), and shall be vulcanized natural rubber or vulcanized synthetic rubber.

2.9 CASTINGS

- A. All castings shall be made of clean, even grain, tough gray cast iron. The castings shall be smooth, conform in all respects to the plans and be free from sand holes, projections, blow holes, cold shuts, cracks, warp and other defects which would interfere with the use of, or impair the serviceability of the castings.
- B. Castings shall not be repaired, plugged or welded without permission from the Engineer, and such permission will be given only for small defects.
- C. All manhole castings shall be machined, as required by the plans. After machining, it shall not be possible to rock any cover after it has been seated in any position in its associated frame.

2.10 SELECT FILL

- A. The select fill under this item shall consist of bank run sand and gravel or other permitted materials. The fill shall contain no stone larger than two inches (2") in its largest diameter and shall meet the specifications for Borrow Excavation Embankment of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.

2.11 DENSE GRADED AGGREGATE

- A. All dense graded aggregate shall conform to the NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented except that recycled concrete shall not be substituted for quarry grade dense graded aggregate.

2.12 MANHOLE BOOT

- A. A manufacturer's product data for Link-Seal or equivalent.

2.13 PORTLAND CEMENT CONCRETE

- A. All Portland Cement Concrete shall conform to the NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented.

2.14 FILTER FABRIC

- A. Filter fabric shall be Mirafi 140N or equivalent as shown on the plans and details.

PART 3 – EXECUTION

3.1 GENERAL

- A. All drainage structures and facilities shall be constructed by capable, skilled workman, according to the Construction Details in the locations shown on the Construction Plans. All grubbing, stripping and stockpiling of topsoil, unclassified excavation, stripping and stockpiling of topsoil, unclassified excavation, furnishing of all materials, labor and equipment, pumping and/or bailing, compaction and backfill of excavation and all other items incidental to completion, shall be included in the lump sum price bid for the structure, except those items specifically set forth as pay item.
- B. All backfilling operations shall be conducted, at the direction of the Engineer, in such a manner that uniform ground pressures will result. Compaction of backfill in areas adjacent to drainage structures shall be by hand tamping.

3.2 INLETS

- A. Wherever inlets are mentioned in these specifications, they shall be construed to also mean catch basins.
- B. All concrete block and brick shall be laid with broken joints, and all vertical and horizontal joints shall be filled with 1:2 cement-sand mortar. Joints shall not be more than 3/8" wide. The masonry shall be carried to such a height that a mortar joint not more than one-half inch (1/2") thick is needed for setting the head casting, without using split blocks or bricks. The outside wall shall be plastered with a one-half inch (1/2") thick coat of 1:2 cement-sand mortar, troweled to a smooth finish. The portions of inlets below a depth of eight feet (8') from the top of the inlet grate, shall be constructed with double walls.
- C. The concrete base shall be poured on a firm and level bearing. If excavation is carried too deep, it shall be brought to grade, using three-quarter inch (3/4") compacted crushed stone. The concrete for inlet bases shall be 2500 psi concrete.

- D. Steps shall be installed as the masonry work progresses. The steps shall be an aluminum ladder rung, extruded from 6061-T6 Aluminum.
- E. Channels shall be installed in all inlets in accordance with the Construction Details, using 2500 psi, concrete. The channels shall be smooth and semi-circular in shape and shall conform to the size of the adjacent storm drainage pipe. Changes in direction shall be made with as large a radius as possible. The base of the inlet shall fall to the invert channel. No drainage pipe shall extend further into the manhole than is required for proper bond.

3.3 CONNECTION TO EXISTING INLETS

- A. The connection to an existing inlet must be made by means of coring machine. The Contractor must have experience in the operation of this equipment or subcontract to a company who has experience in the operation of a coring machine.
- B. The new connection in the inlet must be sealed by means of a manhole boot. Contractor shall follow manufacturer's instructions when installing the manhole boot.

3.4 HEADWALLS

- A. All headwalls shall be constructed in accordance with size and dimensions shown on the Construction Details; 3500 psi concrete, shall be used for headwalls. Concrete may be prepared with or without air entrainment. All reinforcing steel shall be Grade 40. All reinforcing steel shall be placed in accordance with the dimensions shown on the Construction Details. All exposed concrete edges shall be finished with a 1 inch 45 degree chamfer. All exposed concrete surfaces shall be smoothly finished by workmen skilled in this work.
- B. Headwalls will not be accepted or paid for, if the following conditions exist:
 - (1) Improper placement of concrete, resulting in honeycombing or voids in the concrete.
 - (2) Exposed concrete edges and surface are not finished, as specified.
 - (3) The face of the headwall is not plumb.
 - (4) Backfill and clean-up operations are incomplete.
 - (5) Base of headwall is not carried to depth specified.
 - (6) Concrete apron or rip-rap, if required by the Engineer, is not in place.

- (7) Drainage runoff is improper, due to improper grade and/or alignment of the headwall.
- (8) Improper placement of reinforcing steel.

3.5 MANHOLES

A. Concrete and Brick Masonry - Concrete block manholes shall conform to the requirements of these specifications, except:

- (1) The top foot of masonry shall have alternate vertical joints open.
- (2) The words "Storm Sewer" shall be cast into all manhole covers.

B. Base

- (1) If precast manhole bases are allowed by the Engineer, a solid, stabilized and level sub-foundation will be furnished. The manhole shall have a minimum of six inches (6") between the low invert of the manhole and the inside base to allow ample room for the construction of the channel. All riser sections and the top cone will be placed before grouting the pipe in place.

C. Steps shall be as specified heretofore.

D. Invert channels shall be as specified heretofore.

E. Frame and cover shall be as specified heretofore.

3.6 FLARED END SECTIONS

A. Flared end sections shall be installed in accordance with the size, dimensions, grades, and cutoffs as shown on the construction details. The Contractor shall furnish all materials, labor, equipment, excavation and grading to assure drainage to or from the flared end section at the lump sum price bid for the same.

3.7 STORM DRAINAGE PIPE

A. All excavations shall be made in such a manner and to such width as will give ample room for building the required structures or laying and jointing the pipe and for such sheeting, pumping and drainage incidental thereto. Trenches of excessive width, greater than pipe I.D. + 2' measured 1 foot above the pipe crown, may require pipe of increased strength class, special bedding, or other corrective measure directed by the Engineer and such corrective work is to be completed without extra compensation.

- B. All excavation shall be unclassified and shall include the removal of all materials, including, but not limited to pavements, curbs, earth, loam, shale, clay and rock of any kind, including boulders and abandoned foundations.
- C. Stripping and Stockpiling of Topsoil - Topsoil shall be stripped from the construction area before excavating the trench and shall be stockpiled. Soil erosion protection and temporary vegetative cover shall be provided in accordance with "Standards for Soil Erosion and Sediment Control in New Jersey" prepared by New Jersey State Soil Conservation Committee, latest edition, acceptable to the Engineer.
- D. The trench in which storm sewers and appurtenances are to be constructed shall be opened in accordance with the grades designed by the Engineer. All excavation shall be by open cut from the surface, except where otherwise directed, and shall be excavated to a width not less than twelve inches (12") or more than twenty-four inches (24") greater than the outside diameter of the pipe as will give suitable room for laying and properly joining the pipes, sheeting and bracing, pumping and bailing. When rock is encountered, the trench depth shall be carried to at least four inches (4") lower than the invert of the pipe to provide a suitable bedding for the pipe. The trench width at the ground surface may vary with and depend upon its depth and the nature of the ground encountered. The maximum clear width of unsheeted or sheeted trench, measured at the top of the pipe, shall be not more than the outside of the barrel, plus two feet (2'). Greater widths may be allowed, with the written permission of the Engineer.
- E. The extent of excavation opened or the area unrestored at any one time will be controlled by existing conditions, but shall always be confined to the limits prescribed by the Engineer, with regard to expeditious construction and to the safety and convenience of the public. Without the written permission of the Engineer, not more than two hundred feet (200') of trench shall be opened in advance of the completed storm sewer. In rock, the completed excavation must be at least fifty feet (50') in advance of the pipe laying. Without the written permission of the Engineer, all excavations and trenches shall not remain open when construction activity is suspended for any reason, including but not limited to cessation of operations over weekends, nights and holidays.
- F. If the Contractor excavates below the grade given by the Engineer, the bottom of the trench shall be filled and compacted to the required grade with a material satisfactory to the Engineer at the expense of the Contractor.
- G. If, in the opinion of the Engineer, the material at or below the grade for which excavation would normally be carried is unsuitable for pipe foundation, it shall be removed to such depths and widths as he may direct and be replaced with the type of foundation material as ordered.
- H. The Contractor shall furnish sufficient pumping equipment and shall provide at his own expense satisfactory methods for pumping or bailing whenever needed in the trench and other excavations during the progress of the work and at its

completion for final inspection. The use of foundation material to provide drainage will not be an allowable pay item. No structure of sewers shall be laid in water and water shall not be allowed to flow over or rise upon any concrete, masonry, or pipe until the work has been inspected and the mortar or concrete has properly set. All water pumped or bailed from the trench or other excavation shall be conveyed in a proper manner to a suitable point of discharge by the Contractor at his own expense.

- I. The Contractor shall be responsible for properly supporting the sides of all excavations with timber, metal, or other supports.
- J. Prior to any excavation the Contractor shall locate and mark all services, mains, conduits and drains, etc., in the vicinity of, or crossing over, the storm sewers included in the project. All costs for crossing subsurface utilities, whether shown on the plans or not, shall be included under the prices bid for storm sewers.
- K. Prior to any excavation, the Contractor shall cut all pavement to a neat line, by using pneumatic hammers or mechanical pavement cutters, saws or other approved methods or devices.
- L. Drainage pipe to be abandoned shall be sealed by mortaring (bricking) the end of the pipe for a distance of 18 inches minimum, or one-half the diameter of the pipe, whichever is larger. The pipe shall be sealed with solid concrete block or brick and acceptable cement grout to form a solid waterproof plug completely bonded to the pipe, unless otherwise specified.

3.8 ALIGNMENT AND GRADE

- A. The Contractor shall lay the pipe lines in the location and exactly to the lines and grades established and as staked by the Engineer. No deviation shall be made from the required line or grade without the written consent of the Engineer. The Engineer shall have the power to order the removal or relaying of any pipe laid contrary to his instructions.
- B. Where the grade or alignment of the pipe is obstructed by existing utility structures, such as conduits, ducts, pipes, service connections to water mains, or sanitary sewers, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the Contractor in cooperation with the Owners of such utility structures. Temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, water mains and other obstructions encountered in the progress of the work, shall be furnished by the Contractor at his own expense under the direction of the Engineer.
- C. Except in rock, water bearing earth, or where excavated material is not suitable for proper foundation, mechanical excavation of trenches shall be stopped above the final invert grade elevation so that the pipe may be laid on a solid, dry foundation free from any rocks, wood block, etc., along its entire length except at

joints. This part of the work shall be done manually by men skilled in this type of work. Depressions for joints shall be made after the trench bottom has been aligned and properly graded.

3.9 HANDLING MATERIALS

- A. All pipe shall be carefully examined for dents, cracks and other defects, and no pipe known to be defective shall be laid. Those pipes not meeting the specifications shall be rejected and either destroyed or removed from the work within twenty-four (24) hours. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment. Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into the pipe after laying.
- B. Equipment - Proper implements, tools and facilities satisfactory to the Engineer shall be provided for the safe and efficient execution of the work. All pipes, fittings and accessories shall be carefully lowered into the trench by means of crane, ropes, or other suitable equipment in such manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

3.10 PIPE JOINTING

- A. All pipe ends shall be thoroughly cleaned prior to and kept clean during the jointing operations. Joints for rigid pipe shall be made with mortar, grout, 2 step solvent weld, or gaskets. Other types of joints recommended by the pipe manufacturer may be permitted. Corrugated pipe shall be joined by coupling bands. For mortar joints, the pipe ends shall be cleaned and wetted with water before the joint is made. Stiff mortar shall be placed in the lower half of the bell or groove of the pipe section already laid and on the upper half of the spigot or tongue of the section to be laid. The two pipe sections shall then be tightly joined with their inner surfaces flush and even. Any voids occurring in the outside of the joint shall be filled. Lifting holes shall be filled with stiff mortar. For pipes 36 inches and larger, the inside of the joint shall be finished smooth. For pipes smaller than 36 inches, the joint shall be cleared of protruding mortar. The completed mortar joints shall be protected against rapid drying if not immediately backfilled with earth. Gaskets, where required, shall be installed to form a flexible watertight seal. Rubber and flexible plastic gaskets shall be installed in accordance with recommendations of the manufacturer. All lift holes shall be fully mortared with a 1:2 cement sand mortar.

3.11 BACKFILLING

- A. The backfilling of trenches or other excavations shall not begin until the storm sewer or structure has been inspected and approved, except as otherwise provided in these specifications.

3.12 BACKFILL AROUND STRUCTURES

- A. As soon as practicable after the masonry has been placed and concrete has acquired a suitable degree of hardness and all installations have been made, backfilling shall begin. Select fill or dense graded aggregates as shown on the plans shall be used in backfilling within two feet (2') of the structure. Unequal distribution of soil pressures shall be avoided by carrying the fill up evenly. The Contractor shall be responsible for proper compaction to prevent settlement. If the backfill is compacted by tamping, rolling or ramming, the fill shall be deposited in suitable layers to give optimum compaction.

3.13 BACKFILLING OPEN TRENCHES

- A. One-half (1/2) the diameter of the pipe above the invert shall be placed by hand. The materials shall be free from large lumps and stones having any dimension greater than two inches (2"). If the material excavated from the trench is not suitable for backfill, select material will be ordered by the Engineer. The backfill shall be deposited in layers not to exceed six inches (6") and shall be thoroughly compacted by hand tamping or other vibratory soil compacting equipment approved by the Engineer. Tamping will proceed to a point two feet (2') above the crown of the pipe. Backfilling shall proceed evenly on both sides of the pipe and be compacted to two feet (2') above the crown of the pipe. Care will be taken not to displace the pipe from its correct grade and alignment.
- B. When the sewer is in a street or driveway area which is to be replaced as part of the work under the contract, the trench shall be compacted to grade by approved method of compaction. The backfill material shall be Dense Graded Aggregate only.

3.14 BACKFILL PROCEDURE

- A. Compaction--The backfill shall be deposited and spread in horizontal layers not exceeding thickness allowed by the Engineer. Each layer shall be thoroughly compacted before additional layers are placed.
- B. Puddling--The excavated material or select fill shall be deposited in water when this method of backfilling is employed.
- C. Water Jetting--When water jetting is employed, the Contractor shall provide a suitable length of pipe not less than 1¼" in diameter fitted with a quick-acting valve and sufficient hose to connect to a hydrant or pump having adequate pressure and capacity. The full depth of the backfill material shall then be thoroughly saturated by thrusting the pipe into the soil with the valve open at frequent intervals along the trench until all slumping ceases.
- D. All methods of compacting the backfill shall avoid stones and lumps that become nested and result in voids. No large masses of backfill or stones weighing over fifty pounds (50 lbs.) shall be dropped into the trench.

3.15 RIP-RAP OUTLET PROTECTION

- A. The Contractor shall furnish, handle, excavate for, grade and place rip-rap as shown on the plans and details.

3.16 SOIL EROSION AND SEDIMENTATION CONTROL

- A. Soil erosion and sedimentation control shall be provided and maintained in accordance with the details delineated on the construction plans and the "Standards for Soil Erosion and Sedimentation Control in New Jersey".

END OF SECTION 02516

SECTION 02517 - CONCRETE CURB

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This work shall consist of the construction or reconstruction of Portland Cement Concrete Curb parking lots and roadways.

1.3 SUBMITTALS

- A. An approved NJDOT concrete mix design shall be submitted for all Portland Cement Concrete used for curb and/or curb and gutter. The design shall be submitted to the engineer and approved prior to the placing of any concrete.
- B. Concrete delivery receipts shall be provided for all Portland Cement Concrete delivered and used on the project.

1.4 PAYMENT

- A. Payment shall be a lump sum for concrete curb and shall include all equipment, labor and materials necessary to install and/or remove and install concrete curb.

PART 2 - PRODUCTS

- A. Portland Cement Concrete shall conform to the NJDOT Standard Specification for Road and Bridge Construction as amended or supplemented. All Portland Cement Concrete shall have a minimum strength of 4,500 PSI at 28 days. All other materials including but not limited to curing materials, preformed expansion joint filler, and foundation material shall conform to NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented. Cure and seal compound shall be Lumiseal Plus as manufactured by L&M Construction Chemicals, Inc. or equivalent.

PART 3 - EXECUTION

3.1 TESTS AND INSPECTIONS

- A. Concrete curb and curb and gutter shall be rejected and ordered replaced by the Engineer, if any or all of the following should occur or exist:
 - (1) Staining or discoloration of curb;

- (2) Curb is out of alignment;
- (3) Curb is out of grade;
- (4) Expansion joints are not perpendicular;
- (5) Joints and surface are improperly finished;
- (6) Expansion joints protrude from curb;
- (7) Cracks, chips or other damage occur in construction or maintenance period;
- (8) Settlement of curb;
- (9) Inspection not asked for prior to pouring of curb.

3.2 CONSTRUCTION

- A. The contractor shall excavate for all concrete curb and shall properly compact all subgrade beneath the curb or curb and gutter. If unsuitable subgrade material is encountered, the contractor shall excavate said material until suitable material is reached and shall backfill with $\frac{3}{4}$ " clean crushed stone to the proper subgrade elevation. If existing curb is present, the same shall be removed entirely and shall be disposed of by the Contractor. All excavation of curb shall be unclassified. Where curb is proposed adjacent to existing pavement, the pavement shall be cut and removed as shown on the construction details to allow for proper forming of new curb. Cure and seal compound shall be applied to all concrete curb, except those painted, prior to backfilling in accordance with manufacturers recommendations.
- B. Concrete Curb shall conform with the Construction Details.
- C. Forms used shall be metal forms or wood forms. Wood forms shall be used on curves or monolithically constructed curb. Form-lubricating materials and methods shall be such that they will not discolor or stain the concrete. Forms shall be removed when sufficient hardness of the concrete has been attained for the curb to be self-supporting, yet in ample time for finishing.
- D. Expansion joints shall be located a maximum of twenty feet (20') on centers and in all areas where designated by the Engineer. Expansion joint material shall be one-half inch ($\frac{1}{2}$ ") premolded asphalt. All expansion joints shall not be closer than one-quarter inch ($\frac{1}{4}$ ") to the exposed area of the curb.
- E. Lawn restoration adjacent to curb shall be in accordance with the site restoration section and the distressed pavement replacement section of these specifications.

END OF SECTION 02517

SECTION 02518 – UNDERGROUND STORMWATER BASIN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This section includes stormwater underground basin.
 - 1. Provide excavation and base preparation per Civil Engineer/Geotechnical Engineer's recommendations, and/or as shown on design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with owner's and OSHA requirements.
 - 2. Provide and install ACO StormBrixx SD system or equivalent, including approved fill materials, geotextiles, pipe connections, in accordance with manufacturer's installation instructions.
 - 3. ACO StormBrixx SD system or equivalent should be protected from construction traffic during installation and until project completion.
 - 4. Contractor must have manufacturer's representative available for site review if requested by Owner.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Protect ACO StormBrixxx SD and other materials from damage during delivery
- B. If extended storage is expected, ACO StormBrixx SD units/parts should be protected from UV exposure
- C. Use lifting equipment appropriate to size and site conditions, including, but not limited to, handcarts, forklifts, extension lifts and small cranes. Use care to prevent damage to pallets and ACO StormBrixx SD units

1.4 PROJECT CONDITIONS

- A. Review installation procedures and coordinate work with preparation and adjacent work, including but not limited to grading, excavation, utilities, or erosion control. Do not permit construction traffic or loads greater than design loads over completed installation.

- B. Protect work against damage from construction traffic during installation and following completion of backfill. Protect using construction tape, fencing, or other means, until construction is complete. Protect adjacent work from damage during installation.

1.5 PRE-CONSTRUCTION MEETING

- A. Representatives from ACO StormBrixx SD installer, design team, general contractor, excavation contractor, and manufacturer representative should meet prior to installation

1.6 SUBMITTALS

- A. ACO StormBrixx SD or equivalent submittals should include typical section details, required base elevation of stone and system tanks, minimum cover requirements and system layout
- B. Product Data: Include Manufacturer data sheets to include:
 - 1. Preparation instructions
 - 2. Storage and handling requirements
 - 3. Installation methods

1.7 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to install underground stormwater basin.

1.8 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02248 – Shoring and Bracing
- D. Section 02200 – Earthwork
- E. AIA A201 & Section 00800 - Submittals

PART 2 - PRODUCTS

2.1 MATERIAL FOR UNDERGROUND BASIN

- A. ACO StormBrixx SD or equivalent: Geocellular water management units are installed in layers using a brickbonding and crossbonding design to form structural tanks that contain water:

1. Void Ratio: 97%
 2. Vertical Load Capacity uninstalled: 50.76 psi. This must be tested by an independent lab uninstalled and submitted with independent lab test report
 3. Lateral Load Capacity uninstalled: 10.00 psi. This must be tested by an independent lab uninstalled and submitted with independent lab test report
 4. System must provide for clear access to entirety of system with remote CCTV and jetting equipment
 5. System must provide for a 50 year design life in accordance with 'C680 Testing of Geocellular Attenuation (detention) Cells'. Testing must be completed by an independent lab with lab test report documentation.
- B. Geosynthetics
1. Geotextile. A geotextile envelope is required to prevent backfill material from entering ACO StormBrixx SD system or equivalent
 2. Attenuation (detention) systems shall use 8 oz per square yard, nonwoven geotextile appropriate for soil type
 3. Infiltration systems shall use woven geotextile monofilament. Winfab 2199 or equivalent.
- C. Backfill: Provide structural fill. Shall be free from lumps and debris, or sharp materials
1. Side Infill: Structural fill per civil engineering design details. Site soils can be used per Civil
 2. Top Infill: Per civil engineering design details

PART 3 EXECUTION

3.1 EXAMINATION

- A.** Prepared excavation and conditions shall be inspected for smoothness, compaction, and level. Installation should not proceed until subbase conditions are satisfactory.
- B.** Water Table Elevation: Do not install if seasonal high water table will be above invert of ACO StormBrixx SD system.
- C.** Verify installed ACO StormBrixx SD system will not interfere with new, or existing, underground structures, utility lines, and piping.

3.2 PREPARATION

- A. Base of excavation: Compact excavation base to minimum 90 percent density, or as required by Civil Engineer/Geotechnical Engineer
- B. See manufacturer installation guide for fabric installation
- C. Layout footprint of ACO StormBrixx SD system with chalk lines to ensure squareness during installation.

3.3 INSTALLATION

- A. Install per manufacturers installation guide

3.4 MAINTENANCE REQUIREMENTS

- A. System must provide clear access for a remote CCTV to inspect entire system
- B. Clean out cover must be located at each pipe connection point.
- C. Inspection ports must be placed in accordance with the construction documents
- D. Routine maintenance is required to ensure long-term performance of ACO StormBrixx SD system. Maintain as required using acceptable practices, or following manufacturer's guidelines (for proprietary systems).
- E. ACO StormBrixx SD system shall be inspected for sediment quarterly through first year of operation. Inspection should be completed yearly following first year of installation

END OF SECTION

SECTION 02532 – GRINDER PUMP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. General information on grinder pump to be used within the Pump Station. See Section 02534 for additional specific requirements.

1.3 REFERENCES

- A. CSA International (cCSAus) Listing
 - 1. CAN/CSA – c22.2 No. 108-M89, Liquid Pump

1.4 SUBMITTALS

- A. Submit shop drawings for grinder pump.
- B. The Manufacturer shall furnish a written warranty as follows for the grinder pump against any and all defects in material and factory workmanship provided product is installed, serviced, and operated under normal conditions according to Manufacturer's instruction. Defects found during the warranty period will be reported to the manufacturer by the owner. Repair or parts replacement required as a result of such defect will be made free of charge during this period upon return of defective parts or equipment to manufacturer.
- C. Pump shall be warranted for 30 months (2.5 years) from date of manufacture or 24 months (2 years) from date of installation, whichever comes first.

1.5 PROJECT RECORD DRAWINGS

- A. Accurately record location of pipe runs, connections, manholes, cleanouts and rim and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to install grinder pump.

1.7 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02248 – Shoring and Bracing
- E. Section 02550 – Traffic Control
- F. Section 02534 – Duplex Pump Station
- G. AIA A201 & Section 00800 - Submittals

PART 2 - PRODUCTS

2.1 Grinder Pump

- A. Equipment specified shall be produced by Franklin Electric FPS, or approved equal.
- B. Grinder Pump: Grinder pump shall be a centrifugal design with mechanical seal, vertical shaft, motor driven, solids handling pump.
 1. Grinder: Grinder unit shall be on suction side of pump impeller and discharge directly into impeller inlet leaving no exposed shaft to permit packing or wrapping of ground solids. Grinder shall include a stationary hardened, stainless steel, cutter ring spaced in accurate close annular alignment with the driven cutter element. The driven cutter shall carry two (2) hardened and ground type series 440 stainless steel cutters. This assembly shall operate without objectionable noise or vibration over the entire range of operating conditions. The grinder shall be designed and constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. Stationary cutter shall be reversible to provide new cutting surface without replacing with new material. Cutters shall be hardened to Rockwell 55-60C. These requirements shall be accomplished by the following, in conjunction with the pump:
 2. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.
 3. Rotating cutters shall be precision ground to optimize grinding without excessive shaft deflection.
 4. Annular space shall be no more than 0.006 of an inch to avoid the accumulation of ground slurry and minimize horsepower and torque requirements.
 5. Rotating cutters shall be directly aligned with impeller vanes to immediately sweep ground material from grinding elements and out of volute into discharge piping.
 6. The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of “foreign objects”, such as paper,

plastic, diapers, and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1¼" diameter piping.

- C. Electric Motor: The motor shall be 2 HP connected for operation on a 460 volt, 3 phase, 60 hertz electrical supply service. Pumps are intended for wet pit installation and shall be supplied with a heavy duty guide rail assembly to support the pump. Each pump unit shall be fitted with a Grablink assembly, 20 feet long for lifting the pump. Motor design shall be adequate so that the pump is non-overloading throughout the pump performance curve. Stator windings shall be insulated with moisture resistant Class F insulation rated for 311°F (155°C). The motor shall be designed for handling residential sewage of 104°F (40°C) and capable of up to thirty (30) evenly spaced starts per hour. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal and current overload protector incorporated into the motor windings. This motor protection shall have been specifically investigated and recognized by UL and certified by CSA for the application. Because air-cooled motors do not dissipate damaging heat as efficiently as oil-cooled motors, they shall not be acceptable.
- D. Performance: Two FPS model IGP-M231 Submersible Grinder wastewater pump(s). The pump(s) shall be capable of delivering 10 U.S. GPM at a total dynamic head of 120 feet. An additional point on the same curve shall be 33 U.S. GPM at a total dynamic head of 10 feet. Shut off head shall be 97 feet (minimum).
- E. Pump Cable: The power cables shall be sized according to NEC and CSA standards and shall be of sufficient length to reach the junction box without requiring splices. The outer jacket of the cable shall be oil and water resistant, and shall be capable of continuous submerged operation underwater to a depth of 65 feet
- F. The primary mechanical seal shall be protected from interference by particles in the waste water, including fibrous materials, by an active Seal Protection System integrated into the impeller and volute, and by the grinder mechanism ahead of the impeller. The back side of the impeller shall be equipped with pump out vanes to eject any fibrous material that attempts to lodge behind the impeller. The volute housing adjacent to the back side pumping vanes of the impeller shall incorporate an outward spiraling groove as described in the "Self Cleaning Wear Plate" section above, to eject solid materials from the mechanical seal area. Fibrous material which attempts to lodge behind the impeller, or wrap around the mechanical seal shall be effectively ejected by the system preventing interference with the mechanical seal. The Seal Protection System shall operate whenever the pump operates, and shall not require adjustment or maintenance in order to function. Grinder pump designs which do not incorporate an active system to protect the primary mechanical seal shall not be considered acceptable for wastewater service

G. Pump Construction: Major pump components shall be of gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B) with smooth surfaces devoid of porosity or other irregularities. All exposed fasteners shall be stainless steel, 1.4401 (AISI type 316) construction. All metal surfaces coming into contact with the pumped media (other than the stainless steel components) shall be protected by a factory applied spray coating of zinc phosphate primer followed by a high solids two part epoxy paint finish on the exterior of the pump. The pump shall be equipped with an open lifting hoop suitable for attachment of standard chain fittings, or for hooking from the wet well surface. The hoop shall be stainless steel, 1.4401 (AISI 316), and shall be rated to lift a minimum of four times the pump weight.

1. **Grinder Mechanism:**

The grinder mechanism shall consist of two circular, hardened cutter elements, one rotating and one stationary. The cutter material shall be similar to an AISI 440C stainless steel with the addition of cobalt, vanadium, and molybdenum for superior abrasion resistance and a hardness of Rockwell C 58-62. The rotating element shall be secured to the end of the pump shaft directly below the impeller by a stainless steel bolt which is mechanically prevented from loosening by a positively engaged ratcheting washer assembly. It shall be keyed to the impeller so that it rotates with the motor. The head of the securing bolt shall be effectively recessed within the cutter element bore to prevent disruption of the flow stream and catching of solid material in the wastewater.

H. The stationary element shall be secured to the Self Cleaning Wear Plate and positioned so that it is concentric to and aligned with the rotating element. Both elements shall incorporate a sinusoidal wave pattern at the grinding interface to create a shearing and cutting action between the elements as the rotating cutter spins. The rotating cutter shall incorporate an integrated solids deflector to prevent items such as plastic bags from covering the grinder assembly and starving the pump. All wastewater being pumped by the impeller shall be drawn through the grinder mechanism by the natural suction of the pump impeller and reduced to a particle size approximately 1/8 inch. The grinder mechanism shall not require routine adjustments throughout the life of the grinder assembly.

I. Sealing design for the pump/motor assembly shall incorporate machined surfaces fitted with Nitrile (Buna-N) rubber O-rings. Sealing will be the result of controlled compression of rubber O-rings in two planes of the sealing interface. Housing interfaces shall meet with metal to metal contact between machined surfaces, and sealing shall be accomplished without requiring a specific torque on the securing fasteners. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered equal. No secondary sealing compounds shall be required or used..

- J. Pump/Motor Shaft: The pump shaft and motor shaft shall be an integral, one piece unit adequately designed to meet the maximum torque required at any normal start-up condition or operating point in the system. The shaft shall have a full shutoff head design safety factor of 1.7, and the maximum shaft deflection shall not exceed .05 mm (.002 inch) at the lower seal during normal pump operation. Each shaft shall be stainless steel 1.4021 (AISI 420) material, and shall have a polished finish with accurately machined shoulders to accommodate bearings, seals and impeller. Carbon steel, chrome plated, or multi piece welded shafts shall not be considered adequate or equal.
- K. Bearings: Each pump shaft shall rotate on high quality permanently lubricated, greased bearings. The upper bearing shall be a deep grooved ball bearing and the lower bearings shall be a heavy duty double row angular contact ball bearing. Bearings shall be of sufficient size and properly spaced to transfer all radial and axial loads to the pump housing and minimize shaft deflection. L-10 bearing life shall be a minimum of 50,000 hours at flows ranging from ½ of BEP flow to 1.2 times BEP flow (BEP is best efficiency point). The bearings shall be manufactured by a major internationally known manufacturer of high quality bearings, and shall be stamped with the manufacturer's name and size designation on the race. Generic or unbranded bearings from other than major bearing manufacturers shall not be considered acceptable..
- L. Impeller: The impeller shall be a semi open multi vane design with a solids passage size sufficient to prevent clogging on the wastewater material that has passed through the integrated grinder assembly. The impeller material shall be gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B). The impeller shall have a slip fit onto the motor shaft and drive key, and shall be securely fastened to the shaft by a stainless steel bolt which also holds the rotating cutter element. The impeller shall be dynamically balanced to the ISO 10816 standard to provide smooth vibration free operation.

2.2 FIELD QUALITY CONTROL

- A. Packing, Shipping, Handling, and Unloading: Manufacturer shall provide a complete Grinder Pump Sewage System(s) on skid(s) or pallet(s) ready to install. Do not drop or impact the collection tank. If collection tank must be moved, be sure that ground traversed is smooth and free of rocks, debris, etc. When lifting the collection tank, only a pliable strap or rope should contact basin. Do not use chains or steel cables.
- B. Storage and Protection: Store Grinder Pump Sewage System(s) away from sun and weather exposure until installation.

END OF SECTION 02532

SECTION 02534 – DUPLEX PUMP STATION

PART 1 GENERAL

1.01 SUMMARY

- A. General Description of Equipment: The Manufacturer shall furnish complete factory-built and tested Residential / Commercial Grinder Pump Sewage System(s), each consisting of a quantity of two 2 HP centrifugal grinder pumps suitably mounted in a collection tank constructed of fiberglass reinforced polyester, weighted pump control float switches, junction box, shut off valve, pump quick disconnect sealing flange, check valve, discharge pipe assembly and alternating alarm panel. For ease of serviceability, all grinder pumps shall be of like type, impeller and horsepower throughout the system. To ensure single source responsibility for the equipment, the Grinder Pump Sewage System(s) shall be by the same manufacturer as supplying the pump, collection tank, level control and alarm/disconnect panel.
- B. Qualifications: The Manufacturer shall demonstrate experience in the design, manufacture, and assembly of complete grinder pump systems for specific use in low-pressure sewer systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of the grinder pump system replacement parts. The manufacturer shall provide a reference list of five (5) of its grinder pump system installations.

1.02 NATIONALLY RECOGNIZED TESTING LABORATORIES (NRTL) AND STANDARDS

- A. CSA International (cCSAus) Listing on the automatic grinder pump CAN/CSA – c22.2 No. 108-M89, Liquid Pump
- B. Underwriters Laboratories, Inc. (UL, cUL) listing on the alarm box ANSI/UL – Std. No. 508, Control Panel

1.03 SYSTEM PERFORMANCE REQUIREMENTS

- A. Grinder Pump: Each two horsepower pump shall be FPS model IGP-M231 as manufactured by Franklin Electric. Pump to be rated 460 volts, three phase, 60 Hertz, and 3450 RPM. Grinder pump shall be capable of delivering 10 gallons per minute (gpm) against a total dynamic head (TDH) of 120 feet and 33 gallons per minute (gpm) against a total dynamic head (TDH) of 0 feet without overloading. Manufacturer shall provide pump characteristics diagrammed graphically on performance curve. Performance curve shall be established by measuring total dynamic head in feet of water against discharge flow in gallons per minute and shall

contain at least 5 measured points. Each pump shall be expected to perform as its curve describes.

- B. Primary Level Control: Mechanical float switch.
- C. High Liquid Alarm Level: Mechanical float switch

1.04 SHOP DRAWINGS

- D. After receipt of notice to proceed, the manufacturer shall furnish a minimum of four (4) sets of shop drawings detailing the equipment to be furnished including dimensional data and materials of construction. The Project Engineer and/or End User will review this data and return two (2) copies as accepted shop drawings or with requested modifications. Delivery and payment terms are to be determined upon evaluation of credit application.

1.05 MANUFACTURER QUALITY ASSURANCE

- A. Qualifications: Manufacturer shall demonstrate experience in the design, manufacture, and assembly of complete grinder pump systems for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of the grinder pump system replacement parts. The manufacturer shall provide a reference list of five (5) of its grinder pump system installations

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packing, Shipping, Handling, and Unloading: Manufacturer shall provide a complete Grinder Pump Sewage System(s) on skid(s) or pallet(s) ready to install. Do not drop or impact the collection tank. If collection tank must be moved, be sure that ground traversed is smooth and free of rocks, debris, etc. When lifting the collection tank, only a pliable strap or rope should contact basin. Do not use chains or steel cables.
- B. Storage and Protection: Store Grinder Pump Sewage System(s) away from sun and weather exposure until installation.

1.07 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: per specific jobsite
- B. Existing Conditions: per specific jobsite

1.08 WARRANTY

- A. The Manufacturer shall furnish a written warranty as follows for the complete

package grinder pump sewage system against any and all defects in material and factory workmanship provided product is installed, serviced, and operated under normal conditions according to Manufacturer's instruction. Defects found during the warranty period will be reported to the manufacturer by the owner. Repair or parts replacement required as a result of such defect will be made free of charge during this period upon return of defective parts or equipment to manufacturer.

1. Basin shall be warranted for 24 months from date of start up.
2. Mechanical components and electrical panel shall be warranted for 24 months from date of start up.
3. Pump shall be warranted for 24 months from date of start up.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Equipment specified shall be produced by Franklin Electric or approved equal, as described in Article 1.05.

2.02 MATERIALS

- A. All components shall be constructed of corrosion resistant materials with proven history in residential sewage service. Painted steel or galvanized steel components exposed to effluent shall not be allowed.

2.03 MANUFACTURED UNIT

- A. Manufacturer shall provide factory built and tested Grinder Pump Sewage System(s) completely assembled with grinder pump suspended in a fiberglass collection tank with stainless steel guiderails, shut-off valve with integral extension handle, and ball check-valve within collection tank. Also to include electrical alarm/disconnect panel, and all necessary internal wiring, piping, and controls.

2.04 CORE UNIT

- A. Grinder Pump Package System(s) shall have easily removable pump assembly constructed of stainless steel. The pump assembly shall contain pump, motor, grinder, primary motor controls, ball check valve and quick disconnect sealing flange. Pump must be serviceable or repairable without special tools. Pump operating conditions shall be as described in Article 1.03.

2.05 COMPONENTS

- A. Grinder Pump: Grinder pump shall be a centrifugal design with dual mechanical seals, vertical shaft, motor driven, and have the ability to grind solids into a fine slurry.

- a. Grinder: Grinder unit shall be on suction side of pump impeller and discharge directly into impeller inlet leaving no exposed shaft to permit packing or wrapping of ground solids. Grinder shall include a stationary hardened, stainless steel, cutter ring spaced in accurate close annular alignment with the driven cutter element. The driven cutter shall carry two (2) hardened and ground type series 440 stainless steel cutters. This assembly shall operate without objectionable noise or vibration over the entire range of operating conditions. The grinder shall be designed and constructed so as to eliminate clogging and jamming under all normal operating conditions including starting and re-starting mid-grind. Stationary cutter shall be reversible to provide new cutting surface without replacing with new material. Cutters shall be hardened to Rockwell 55-60C. These requirements shall be accomplished by the following, in conjunction with the pump:
 - i. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.
 - ii. Rotating cutters shall be precision ground to optimize grinding without excessive shaft deflection.
 - iii. Annular space shall be no more than 0.003 of an inch to avoid the accumulation of ground slurry and minimize horsepower and torque requirements.
 - iv. Rotating cutters shall be directly aligned with impeller vanes to immediately sweep ground material from grinding elements and out of volute into discharge piping.
 - v. Stationary cutter must be able to be changed without volute removal to expedite field service.
 - vi. The impeller and grinding mechanism must rotate at a nominal speed of at least 3400 RPM.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects", such as paper, plastic, diapers, flushable wipes and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1¼" diameter piping.

- b. Electric Motor: Motor shall be a 2 HP, 3450 RPM, 460V, 60 Hertz, three phase, ball bearing, with Class F windings. Motor shall be mounted in a sealed, dielectric oil filled, submersible housing to provide permanent lubrication and efficient cooling. Motor design shall be adequate so that the pump is non-overloading throughout the pump performance curve. Stator windings shall be insulated with moisture resistant Class F insulation rated for 311°F (155°C). The motor shall be designed for handling sewage of 104°F (40°C) and capable of up to thirty (30) evenly spaced starts per hour. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal and current overload protector incorporated into the motor windings. This motor protection shall have been specifically investigated and recognized by UL and certified by CSA for the application. Because air-cooled motors do not dissipate damaging heat as efficiently as oil-cooled

motors, they shall not be acceptable.

- c. Pump Cable: The power cable shall be 14 AWG 4-conductor and shall be sealed at the motor end as it enters the motor casing by a two-part barrier to moisture intrusion. The barrier shall be the compression of the oil and chemical resistant grommet, which shall seal the outer jacket of the power cord. In the event that the outer jacket of the power cord should become damaged, then the second line of defense shall be the epoxy poured isolated conductors within the jacketed cable itself. The insulation shall be removed from the individual conductors and the epoxy shall be allowed to form a leak-proof seal against wicking of the power cable between the outer jacket and the insulation of the individual conductors. The outer jacket of the power cord shall be oil resistant and water-resistant. The power cable shall be rated for NEC type "SOW" or "SOOW".
- d. Mechanical Seal: Grinder pump shall be provided with mechanical shaft seals to prevent leakage between the pump and motor. Seal shall have a stationary ceramic seat and a carbon rotating surface with faces precision lapped. Seal interface shall be held in contact by stainless steel spring and hardware. Seal system shall be cooled and lubricated with dielectric oil from the motor housing. Seal system shall not rely upon the pumped media for lubrication. Seal system shall be protected from solids in pumped media by pump-out vanes on pump impeller back shroud.
- e. Pump Construction: Motor housing, bearing housing and volute shall be of ASTM A-48 gray cast iron, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be Type 304 stainless steel or brass construction. All metal surfaces coming into contact with the residential sewage other than stainless steel or brass, shall be protected by an electrocoat paint finish on the interior and exterior of the pump. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with BUNA-N O-rings. Fittings will be the result of controlled compression of O-rings in two planes without the requirement of a specific torque limit. Rectangular cross-sectioned gaskets shall not be considered adequate or equal. No secondary sealing compounds, grease or other devices shall be used.
- f. Seal Failure Sensor: Between the mechanical seals must be an oil chamber which houses a lower seal failure probe which detects moisture intrusion past the lower mechanical seal and sends a signal to the control panel indicating that the lower mechanical seal must be replaced. This early detection allows seal replacement instead of pump replacement. Systems that contain dual-seal pumps which do not send signals to the control panel shall not be considered equal.
- g. Pump/Motor Shaft: Shaft shall be constructed of solid 300 series stainless

steel. Shaft length measured from lower ball bearing to end of shaft shall not exceed 2-3/4 inches and must be a minimum of 1-1/8" in diameter to minimize deflection and prolong bearing and mechanical seal life.

- h. Bearings: Pump/motor shaft shall rotate on two single row ball bearings. Motor bearings shall be permanently lubricated by complete submergence in dielectric oil. Bearings shall be designed to compensate for axial thrust and radial forces developed by pump operation at all points on the pump performance curve and a twenty (20) percent grinder duty cycle. Calculations shall be provided by the pump manufacturer upon request. Sleeve or grease packed bearings shall not be acceptable. Bearings which require lubrication according to a prescribed schedule shall not be acceptable.
 - i. Impeller: Impeller shall be of cast silicon bronze, ASTM C87500, seven vane design. Impeller shall be aligned with rotating cutter to ensure fine slurry from the cutters is swept from the volute into the discharge piping. Back shroud of impeller shall have pump out vanes to protect mechanical seal from grit and other solids in ground residential sewage. Cast iron or plastic impellers shall not be considered acceptable because of inferior abrasion, corrosion and heat dissipation characteristics.
- B. Collection Tank: The resins used shall be commercial grade polyester and shall be evaluated as a laminate test or determined by previous service to be acceptable for the intended environment.

The reinforcing material shall be a commercial grade of glass fiber (continuous strand, chopped-strand, continuous mat and/or non-continuous mat) having a coupling agent, which will provide a suitable bond between the glass reinforcement material and resin.

The fiberglass reinforced polyester laminate wall thickness shall vary with the wet well height to provide the aggregate strength necessary to meet the tensile and flexural physical properties requirements. The wet well fiberglass reinforced polyester wall laminate must be designed to withstand wall collapse or buckling based on:

- Hydrostatic pressure of 62.4 pounds per square foot
- Saturated soil weight of 120 pounds per cubic foot
- Soil modulus of 700 pounds per square foot
- Pipe stiffness values as specified in ASTM D3753

The wet well fiberglass reinforced polyester laminate must be constructed to withstand or exceed two times the assumed loading on any depth of the wet well.

The finished fiberglass reinforced polyester laminate will have a Barcol hardness of at least 90% of the resin manufacturer's specified hardness for the fully cured resin.

The Barcol hardness shall be the same for both the interior and exterior surfaces.

The wet well top flange (cover flange) shall have an outside diameter 2 inches (min) greater than the inside diameter of the wet well. A four or six bolt-hole pattern shall accommodate the mounting of a cover with at least ¼" diameter 300 series stainless steel fasteners.

The following non-corroding threaded inserts are acceptable for use:

- Non-corroding stainless steel threaded inserts shall be fully encapsulated with non-continuous mat or chopped-strand glass strand reinforcement. The inserts shall have an offset tab to prevent stripping or spinning out when removing and reinserting cover fasteners.

C. Piping and Valves:

- a. Internal Discharge Piping: Collection tank shall be equipped with SCH 80 PVC piping
- b. Integral Ball Check Valve: Pump discharge shall be equipped with a factory installed check valve to prevent drainage back into the collection tank. Isolation valve with integral stainless steel extension handle is also required.
- c. Shut-Off Valve: Integral means to shut-off discharge to be brass gate valve

D. PUMP CONTROL SYSTEM: It is the intention that this specification shall cover a complete Electrical Pump Control System as hereinafter described and all necessary appurtenances, which might normally be considered a part of the complete electrical system of this installation. All of the automatic control equipment is to be supplied by one manufacturer. It shall be factory assembled, wired, tested and covered by complete electrical drawings and instructions.

- a. The RPS relay logic control system described hereinafter is a system as manufactured by USEMCO, Inc., Tomah, Wisconsin, and represented by Reiner Pump Systems, Inc., Stanhope, NJ, 973-347-9000. The naming of a manufacturer of equipment in this specification is not intended to eliminate competition or prohibit qualified manufacturers from offering equipment but is to establish a standard of excellence for the material used, and to indicate a principle of operation desired.
- b. The control system shall utilize standard "off the shelf" in stock equipment. Job specific, "one-of-a-kind" custom control panels will not be accepted. A standard system is defined, as one, which has published literature, is available at time of bid, with fully tested hardware, such that no development must be done beyond system configuration and is available for immediate delivery.
- c. ALTERNATES - The contractor may, if he so chooses, provide an alternate quotation to his base bid. The amount to be added or deducted from the base bid, for a system provided by other system manufacturers, must be indicated with the alternate quotation. This amount shall include all costs or savings, which will result from the proposed alternate and will include any special expenses incurred by anyone affected by the offered alternate. This

shall include, but is not limited to, greater energy cost due to less efficient equipment, required greater installation space, or any other item with which this system is to be interfaced. In order for an alternate to be considered, it will be necessary for the contractor to provide one set of written information completely describing the alternate five (5) days prior to the bid date. Should the alternate or the information describing it fail to describe its capability in meeting the job requirements or if the contractor fails to furnish complete information, the engineer shall regard the proposal as an inferior alternate and disregard the alternate bid. The RPS float control panel is a non-proprietary, relay logic control panel. Control panels utilizing proprietary circuit boards, PLC's, or hardware shall not be considered and rejected.

FIELD SUPERVISION

The services of a factory trained, qualified representative shall be provided to inspect the completed installation, make all adjustments necessary to place the system in trouble free operation and instruct the operating personnel in the proper care and operation of the equipment.

GUARANTEE

All equipment shall be guaranteed against defects in material and workmanship for a period of one year from date of owner's final inspection and acceptance to the effect that any defective equipment shall be repaired or replaced without cost or obligation to the owner.

WIRING

All wiring shall be minimum 600 volt (UL) type MTW or AWM and have a current carrying capacity of not less than 125% of the full load current.

The conductors shall be in complete conformity with the National Electric Code, state, local and NEMA electrical standards.

To ensure the safety of all personnel working with this equipment, as well as providing a simple means of tracing wires when troubleshooting, all wiring shall be color coded in strict accordance with the wiring diagrams furnished by the equipment supplier.

All job connections required for conveniently replacing control components shall be made at approved type terminal blocks with engraved Bakelite marker strips or similar approved means.

ENCLOSURE

The described equipment shall be housed in a NEMA 4X stainless steel enclosure arranged for wall mounting, where shown on the drawings.

This weather proof, tamper proof, rain-tight enclosure shall be designed specifically for mounting in an unprotected outdoor location. The enclosure shall be gasketed. It shall have a hinged front weather door with 2 point padlocking capability and an internally mounted hinged inner panel so that all the components normally actuated by operating personnel are accessible without opening the dead front and yet are not exposed to the elements or to unauthorized personnel.

- All seams shall be continuously welded and ground smooth.
- Door and body stiffeners shall be provided for extra rigidity.
- Oil resistant gasket and adhesive.

All field installed conduits, fittings or connections shall enter the enclosure through the bottom only for any outdoor enclosure.

All major components and sub-assemblies shall be identified as to function with laminated, engraved Bakelite nameplates or similar approved means.

POWER SUPPLY AND METERING

The incoming service shall be 460 volts, 3 phase, 60 cycle. All metering shall be done ahead of the main disconnect and control panel. The contractor in accordance with local power company requirements shall install the meter.

LIGHTNING ARRESTOR

A lightning arrestor shall be supplied in the control and connected to each line of the main power input terminals. The arrestor shall protect the control against damage due to lightning strikes on the incoming power line.

PHASE MONITOR

A solid state, phase sequence/failure and under voltage release relay shall be provided to ensure additional running protection for the pump motors. The relay shall be complete with an LED to indicate proper phase sequence, all phases in operation and voltage within limits. The relay shall also include an adjustable voltage monitor, be UL and CSA certified and be complete with automatic reset feature.

PUMP CIRCUIT BREAKER

A thermal magnetic circuit breaker shall be supplied as branch circuit protection for each pump motor. The circuit breaker must have a minimum ampere interrupting capacity of (25,000-240 volt - 18,000-480 volt) symmetrical RMS amps.

The circuit breaker shall be properly sized to protect the control circuit conductors, motor starter and the motor against overcurrent due to short circuit or grounds.

MOTOR STARTERS

IEC rated full voltage non-reversing motor starters with manual reset, ambient compensated, 3 phase thermal overload relay shall be provided for each of the pumps listed below.

TRANSFORMER

The panel shall include a dry type transformer with a sufficient KVA rating to operate all 120-volt loads. Properly sized primary and secondary fuse protection shall be provided.

CONTROL BREAKER

The panel shall be supplied with a properly sized control power circuit breaker. The breaker shall supply power to all control wiring within the enclosure.

CONDENSATION PROTECTIVE HEATER

A 25-watt, 120 VAC condensation protective heater and high temperature cutout thermostwitch shall be supplied in the control panel.

WETWELL LEVEL-RESPONSE AUTOMATIC PUMP AND ALARM CONTROL SYSTEM

A wetwell level-responsive automatic pump circuit/alternator and abnormal level alarm shall be furnished to control two pumps in response to direct-acting liquid level sensors in the wetwell. The control circuit shall provide independent on, common off operation of 2 pumps with high level alarm. A solid-state alternator with lead selector switch shall change the pump sequence after each cycle of operation.

Three floats will be provided to control the operation of the duplex pumps. As the liquid level rises in the wetwell the pumps stop float energizes first. As the level increases the lead start float energizes and starts the lead pump. With the lead pump running, the level decreases to the pumps stop float, and turns the pump off. When the pump stops, the alternator shall index so that the other pump starts on the next rise in level. If the level continues to rise with the lead pump running, the lag start float will energize and start the lag pump. Both lead and lag pumps shall operate together until the stop float is deenergized.

A fourth float shall be provided to signal the High Level alarm if the level continues to rise with both pumps running.

A power fail lag delay timer shall prevent simultaneous starting of the pumps after a power fail.

AUTODIALER

Contractor shall provide a Insta-Alarm or equivalent. A cellular autodialer alarm system that transmits text message and email alarm alerts to a minimum of three phone numbers.

RUNNING TIME METER

A non-resettable "Running Time Meter" measuring hours and tenths of hours of operation up to 99999.9 hours shall be flush-mounted on the operator's door of the control panel for each pump motor indicated. This shall be a 120 VAC device operating from the control voltage by an auxiliary contact of the motor starter or other run contact.

SELECTOR SWITCHES

A 22 mm oil tight three-position, "Hand-Off-Automatic" selector switch shall be flush-mounted on the operator's door of the control panel for the operation of each magnetic motor starter. This selector switch shall operate the starter when it is in either the "Hand" position or the "Automatic" position, and the automatic control system is calling for the operation of the equipment in the manner as herein described.

STATUS INDICATORS

A 22 mm oil tight green "Pump Running" pilot light shall be flush-mounted on the operator's door of the control panel. This pilot light shall be operated from a respective starter auxiliary contact.

OVER TEMPERATURE PUMP PROTECTION

Over temperature protection shall be provided in the control panel to operate in conjunction with the over temperature switch in each pump motor. The control shall provide pump lockout of operation upon occurrence of high temperature.

PUMP SEAL FAILURE ALARM LIGHT

A 22 mm oil tight red "Seal Fail" pilot light shall be flush-mounted on the operator's door of the control panel, to indicate a pump seal failure alarm condition of each sewage pump. This light shall be operated by a solid-state resistance control relay designed for connection to the moisture probe in each pump motor.

WEATHERPROOF ALARM LIGHT

A weatherproof 40-watt alarm light assembly including a high impact resistant lexan red lens shall be included. The alarm light bulb shall be replaceable from inside the control panel without having to remove the weatherproof red lens from the panel.

WEATHERPROOF ALARM BUZZER

A weatherproof audible U.L. Listed alarm buzzer shall be provided. The buzzer will be side mounted to the control panel, and shall operate on 115 VAC. An alarm silence push button shall be included and mounted on the operator's door.

WETWELL LEVEL SENSING FLOAT SWITCHES

Each float shall be non-mercury and have a molded polypropylene body, internal redundant polyurethane foam floatation, potted switch/cable connections and fine stranded AWG #18 cable with heavy-duty synthetic rubber jacket in lengths as required to run unspliced to the control panel.

The contractor shall install and wire the float switches as shown on the drawings. The float switches shall be individually suspended in the wetwell with weight kits. The float switch cables shall be suspended from a cable rack (by others) mounted to the top of the wetwell.

SHOP DRAWINGS

A complete set of drawings shall be supplied to insure successful installation and operation of the control system. The shop drawings shall consist of all of the following:

- Sufficient detail to evaluate compliance with these specifications.
- A detailed component list including manufacturer and catalog number.
- A custom-wiring diagram for this specific application to facilitate and insure accurate field connections to the control panel by electrical installation personnel.
- A description of operation for the control system.
- An enclosure dimension print.

2.06 SAFETY

- A. Biological Hazards: All preventive maintenance tasks shall be performable with minimum contact with residential sewage.
- B. Electrical Equipment: Grinder pumps, level sensor and controls shall meet accepted standards for equipment for use in or near residences, and shall have been tested by a nationally recognized testing laboratory (NRTL) to certify their capability to perform in the system as specified. Reference Article 1.02.
- C. NEC requires that the power disconnect switch be within line of sight of the unit.

2.07 GROUNDING THE SYSTEM

Grounding the system will help protect against lightning damage. Each system must be grounded to the building's electrical system ground. It is recommended that an additional grounding point be added as close to the control panel as possible. Grounding methods must comply with any local codes and the National Electrical Code (NEC). If you are not familiar with these codes then you should contact a qualified electrician.

2.08 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to install duplex pump station.

END SECTION 02534

SECTION 02550 – TRAFFIC CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This work shall consist of the installation, maintenance and removal of traffic control devices and flagmen to assure the safety of all public traffic on and about the construction site.

1.3 SUBMITTALS

- A. Not applicable this section unless substitutions in specified materials or methods are proposed. The degree of applicability of this item shall be determined by the Engineer upon receipt of the specified alternate or substitution proposed by the Contractor.

1.4 PAYMENT

- A. The lump sum price bid shall include all labor, material and equipment necessary to erect and maintain traffic control in accordance with the drawings and as may be required to safely complete the project.

PART 2 - PRODUCTS

- A. All signs, barricades, lights, cones, drums and incidentals thereto shall be in conformance with the drawings, the Manual on Uniform Traffic Control Devices and the NJDOT Standard Specification for Road and Bridge Construction as amended or supplemented. All materials shall be of good quality, shall be legible, reflective, self supporting and functional for the duration of the project.

PART 3 – EXECUTION

- A. All signs, barricades, drums, cones and lights shall be installed and located as shown on the drawings and accordance with the Manual on Uniform Traffic Control Devices..
- B. The contractor shall inspect all traffic control devices as needed and shall maintain all devices for the duration of the project.

END OF SECTION 02550

SECTION 02600 – SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Soil Erosion and Sediment Control measures shall be constructed and installed in accordance with the Soil Erosion and Sediment Control notes, details and plans. The contractor shall be responsible for excavating for, placing and maintaining Soil Erosion and Sediment Control measures until final acceptance of the project. Soil Erosion and Sediment Control measures include but are not limited to, silt fence installation, tracking pad installation, tree protection, inlet protection, hay bale sediment barrier construction, pavement sweeping, dust control, topsoil stockpiling and temporary seeding and mulching.

1.3 SUBMITTALS

- A. Not applicable this section unless substitutions in specified materials or methods are proposed. The degree of applicability of this item shall be determined by the Engineer upon receipt of the specified alternate or substitution proposed by the Contractor.

1.4 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to install and maintain soil erosion and sediment control devices.

1.5 RELATED SECTIONS

- A. Section 02485 – Finished Grading

PART 2 – PRODUCTS

- A. All materials used for soil erosion control measures shall conform to the standards for Soil Erosion and Sediment Control in New Jersey latest revision. Temporary seed shall conform to the seed mixture shown on the drawings.

PART 3 - EXECUTION

- A. Notify local NJSCD of tentative start date for qualifying projects in accordance with their requirements

3.1 STABILIZED CONSTRUCTION ENTRANCE

- A. Install Work in accordance with Contract Drawings and Certified Plan when applicable.
- B. Maintain construction driveway entrance for duration of project or until base course paving work has been completed. Regrade or add stone to construction entrance as necessary and as required by NJSCD. Any material tracked onto a public roadway shall be removed immediately.

3.2 SEDIMENT BARRIERS

- A. Install Work in accordance with the Contract Drawings and Certified Plan when applicable.
- B. The silt fence material shall be new and undamaged. Install at locations indicated on Contract Drawings or Certified Plan, top of installed fence to be 2 feet above ground, bury bottom 12 inches of fence in soil as per Certified Plan, overlap ends of adjacent fence a minimum 1-1/2 feet.
- C. The silt fence shall be maintained for the duration of the project, replace damaged fence and remove accumulated sediment as necessary and as required by the NJSCD.
- D. Remove silt fence when all disturbed areas have been permanently stabilized, restore remaining disturbed area.

3.3 INLET PROTECTION

- A. Install Work in accordance with the Contract Drawings or Certified Plan.
- B. Install proper protection for inlet type and site conditions.
- C. Inspect and clean protection after each rain event and as required by the NJSCD.
- D. Maintain protection until all disturbed areas have been properly stabilized or just prior to top course paving. Replace protection if disturbed areas not stabilized.
- E. SEDIMENT TRAP
 - a. The Contractor shall take appropriate measures to prevent erosion and discharge of silt when dewatering excavations or trenches. Devices to trap silt and mitigate erosion shall be utilized for all dewatering operations, as indicated by the certified plan or approved by the Engineer. Sediment laden water may not be discharged into storm sewers or existing waterways without proper protection.
 - b. The type and size of device will be dictated by the nature and volume of water being discharged, as approved by the Engineer.

3.4 PAVEMENT CLEANING

- A. The Contractor shall be responsible for maintaining roadways, sidewalks and driveways within the project limits free of dirt, debris or other material resulting from his work operations.

- B. The project areas are to be inspected on a regular basis and cleaned as necessary. At no time shall any material be washed or swept into a storm drain inlet or natural waterway. The cleaning operation shall be conducted so as to minimize creating dust.
- C. The Contractor shall employ the services of a street sweeper service on a routine basis as required to meet the intent of this section.

3.5 DUST CONTROL

- A. The Contractor shall conduct his work operations to minimize the creation and dispersion of dust. If dust becomes a problem within the project or adjacent areas the Contractor shall provide for the application of water to those areas, or other approved measures as outlined on the Certified Plan, as necessary during and after the work hours to control the problem. The use of calcium chloride or other chemicals will not be permitted.

3.6 SITE STABILIZATION

- A. Incorporate erosion control devices indicated on the Contact Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within the tributary (“drainage”) areas of those controls.
- C. Stockpile heights for topsoil shall be reasonable and subject to approval of Engineer. Slope stockpile sides at 3:1 or flatter. Provide erosion control at lower end and sides of pile, stabilize surface as necessary with temporary vegetative cover.
- D. Stabilize any disturbed area on which activity has ceased and which will remain with soils exposed for more than fourteen (14) days which are not being graded, or under active construction.
- E. During non-germinating periods, apply mulch at recommended rates.
- F. Temporary Stabilization: Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Contract Drawings, use proper temporary seed mixture with no topsoil.
- G. Stabilize disturbed areas which are not at finished grade and will not be disturbed within one year in accordance with Contract Drawings permanent seeding specifications.
- H. Stabilize disturbed lawn and turf areas at finished grade in accordance with Section 02485 Finish Grade.
- I. Stabilize diversion channels, sediment traps and sediment basins, and stockpiles immediately.
- J. Stabilize steep slopes where required by the Contract Drawings, and where greater than 3:1, with an erosion control blanket. Use “Curlex 111” or equivalent. Installation shall include all required trenching, overlap, staples or pins as required by manufacturer’s specifications.

3.7 FIELD QUALITY CONTROL

- A. Quality Requirements, Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing in accordance with Contract Documents.

- B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

3.8 CLEANING

- A. Requirements for cleaning in accordance with the Contract Documents as directed by the Engineer.
- B. When sediment accumulation in sedimentation structures or devices has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
- C. Do not damage structure or device during cleaning operations.
- D. Do not permit sediment to erode into construction or site areas or natural waterways.
- E. Clean channels when depth of sediment reaches approximately one half channel depth.
- F. Properly dispose of sediment bags after use.

3.9 PROTECTION

- A. Execution and Closeout Requirements: Requirements for protecting finished Work in accordance with the Contract Documents.

END OF SECTION 02600

SECTION 02730 - SANITARY SEWERS AND MANHOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Sanitary sewer piping, fittings and accessories.
- B. Sanitary sewer manholes and cleanouts.

1.3 REFERENCES

- A. ANSI/ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
- B. ANSI/ASTM D2729 - Poly Vinyl Chloride (PVC) sewer pipe and fittings.
- C. ASTM A377 - Cement lined ductile iron pipe.
- D. ASTM C479 - Precast reinforced concrete manhole sections.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for the work of this section.

1.5 SUBMITTALS

- A. Submit shop drawings for precast reinforced concrete manholes.
- B. Submit product data for pipe and pipe accessories.
- C. Submit product data for manhole frames and covers.

1.6 PROJECT RECORD DRAWINGS

- A. Accurately record location of pipe runs, connections, manholes, cleanouts and rim and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.7 PAYMENT

- A. The lump sum price bid shall include the costs of all labor, equipment and materials necessary to install gravity and forcemain sanitary sewer systems.

1.8 RELATED SECTIONS

- A. Section 02232 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02248 – Shoring and Bracing
- D. Section 02100 – Traffic Control
- E. Section 02514 – Site Work Concrete
- F. AIA A201 & Section 00800 - Submittals

PART 2 - PRODUCTS

2.1 PVC GRAVITY SEWER PIPE

- A. PVC gravity sewer pipe shall conform to A.S.T.M. D-3034 (SDR35) A.S.T.M. D2241 (SDR26), Type P.S.M. Polyvinyl Chloride (PVC) sewer pipe and fittings. The maximum laying length of twenty feet (20 ft.) shall be permitted.
- B. All pipe and fittings shall be made from PVC compounds as defined and described in A.S.T.M. D-1784 for rigid polyvinyl chloride compounds (chlorinated polyvinyl chloride compounds).
- C. Joints shall be rubber gasketed of the bell and spigot type. Gaskets shall meet the requirements of A.S.T.M. F-477. All joints shall comply to A.S.T.M. D-3212.
- D. Pipe and fittings shall be installed in accordance with A.S.T.M. D-2321. Pipe performance is directly related to the haunching material and its placement. The material should be placed and consolidated under the pipe, haunch to provide adequate side support to the pipe, while avoiding both vertical and lateral movement of the pipe from proper alignment. Haunching is placed up to the pipe spring line.

2.2 HDPE FORCEMAIN

Force main piping shall be HDPE DR 11 pipe. HDPE pipe shall be manufactured from a PE 3408 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350-02 with a minimum cell classification of PE345464C.

HDPE pipe shall be heat fused. Elbows, fittings & valves shall be friction joined.

Buried pipe to be traced with metallic or other magnetic locating material. Tracer tape laid in the trench as shown on the drawings.

2.3 DUCTILE IRON SEWER MAIN PIPE

A. Pipe

Ductile Iron Pipe shall be centrifugally cast in conformance with ANSI/AWWA C151/A21.51 (Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids). Ductile Iron Pipe, shall, as a minimum, be of the thickness required for laying condition Type 1 (Flat-bottom trench, loose backfill) in accordance with ANSI/AWWA C150/A21.50). In no case shall Ductile Iron Pipe be installed with a thickness class less than Class 52, regardless of laying condition, depth of cover, or surcharge loading.

B. Joints

Push-on joints or mechanical joints shall be used for all buried piping. Gaskets for ductile iron push-on and mechanical joints shall be in conformance with ANSI/AWWA C111/A21.11 (Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings), and shall be vulcanized natural rubber or vulcanized synthetic rubber. Natural rubber gaskets shall be considered unsuitable for wastewater pipelines.

C. Fittings

Push-on and mechanical joint fittings shall be in conformance with ANSI/AWWA C110/A21.10 (Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In. for Water and Other Liquids). All joints shall be assembled in accordance with the manufacturer's recommendations. Pressure rating of fittings shall be as follows: 4" - 12" fittings - 350 psi; 14" - 24" fittings - 350 psi; 30" - 36" fittings - 250 psi.

D. Linings and Coatings

The interior of all Ductile Iron Pipe and Fittings shall be cement-lined in conformance with ANSI/AWWA C104/A21.4 (Cement-Mortar Lining for Ductile Iron and Gray-Iron Pipe and Fittings for Water).

The outside of all buried Ductile Iron Pipe and Fittings shall be coated with a bituminous coating approximately one (1) mil thick, in conformance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.

2.4 PRECAST MANHOLES

A. General

Precast reinforced concrete manhole sections shall be manufactured in accordance with A.S.T.M. Specification C-478-68, or the latest revision thereof. The minimum compressive strength of the concrete for all sections shall be 4,000 psi. The circumferential steel reinforcement for riser pipe, cone sections and base walls shall be a minimum of 0.12 square inches per linear foot in forty-eight (48) inch diameter sections and 0.17 square inches per linear foot for sixty (60) inch diameter sections. The reinforcing in both layers of steel in the flat slat top sections shall be 0.12 square inches per linear foot in both directions.

Joints of the manhole sections shall be formed entirely of concrete employing a round rubber gasket and when assembled, shall be self-centering and make a uniform watertight joint. Except for those surfaces within the gasket groove, all inside surfaces of the bell or outside surfaces of the spigot, or both, on which the rubber gasket may bear during the closure of the joint at any degree of partial closure shall be parallel within 1 degree and have an angle of not more than 2 degrees with the longitudinal axis of the pipe. In joints formed entirely of concrete, the distance from either side of the gasket to the end of the bell or spigot shall be not less than $\frac{3}{4}$ inch. The gasket spaces between the bell and spigot shall be so shaped as to provide grooves that will prevent the gasket from disengaging from its compression surface its own compression surface or being blown out by hydrostatic pressures.

The manhole shall be designed for an H-20 loading. A minimum period of ten (10) days shall have elapsed from manufacture of the manhole to shipping. The precast sections shall be steam cured for at least thirty-six (36) hours. The date of manufacture shall be stamped upon each manhole section when removed from the forms.

B. Base

Precast manhole bases will be furnished with a solid stabilized, and level sub-foundation. A minimum of six (6) inches of foundation material is to be placed under the base of each manhole. If The Engineer deems it necessary, six (6") inches of concrete shall be placed to insure adequate bearing. The manhole shall have a minimum of five (5) inches between the low invert of the manhole and the inside base to allow ample room for the construction of the channel. All riser sections and cone top will be placed before grouting the pipe in place.

C. Manhole Steps

Shall be of the design known as safety step as shown on the plans. They shall be 16" wide and the legs at least 12" long. Steps to be of extruded aluminum Alcoa 6061-16 drop front design, steel reinforced polypropylene step #PS4B by MA Industries, or approved equal.

D. Invert Channel

1. The channels shall be smooth and semicircular in shape and form to the size of the adjacent sewer section as shown on the detail sheet of the plans. Changes in directions shall be made with as large a radius as possible. The height of the channel will be three-fourths ($\frac{3}{4}$) the size of the adjacent pipe. The base of the manhole shall slope toward the invert channel. Adjacent sewer pipes will extend to the manhole only as far as necessary to make a proper watertight bond between the pipe and the manhole. The pipe shall be cut evenly in a workmanlike manner and mortared smoothly.
2. The vitrified brick for the channel and invert construction shall be Red Brick Paver, nominal size 2"x 4"x 8", as manufactured by Anchor Concrete or approved equal.
3. The mortar used in the channel and benching construction shall be Type 3 cement, with a 1:2 cement/sand ratio and no lime is to be used in this application.

E. Joints

Joints shall be mortared on the exterior and interior surface of the manhole. Lifting holes shall be plugged with rubber stoppers or mortar after installation. Prior to parging, the area to be parged shall be coated with a latex binder (blue) or approved equal.

F. Coatings

1. Exterior Coating

All precast sections shall receive two (2) coats of bituminous waterproofing material, Koppers 300M Epoxy, Pennsbury 32-B-4 Epoxy, or approved equal. The first coat of waterproofing material may be pre-applied leaving three (3) inches uncovered adjacent to each joint. Upon the completion of

grouting the joints and lifting holes and allowing a proper drying time, the second coat of waterproofing shall be applied. The second coat must cover all sections of the manhole prior to backfilling.

2. Interior Coating

The interior of the manhole shall receive two coats of a factory applied 2 part epoxy coating 10 mil. DFT each coat.

G. Rubber Gasket

Pipe to manhole seal shall be an A-Lok Gasket or approved equal - A.S.T.M. C923 and shall be cast integrally in manhole wall and located as required.

H. Manholes shall be manufactured by Atlantic Precast Concrete, Inc. or approved equal.

I. Frames and Covers

The frame and cover shall be as manufactured by Campbell Foundry, Pattern as indicated on the plan and detail, or approved equal, and the covers permanently cast with the words "Sanitary Sewer". Covers shall be of grey cast iron and shall be free from holes, cracks, cold shuts, etc. All castings shall be coated with coal tar varnish. All manhole covers shall have the plan manhole number painted on the underside. The work shall include furnishing and placing, and all other labor incidental to placement.

2.5 Air/Vacuum Release Valves

Redundant Combination Air/Vacuum and Air Release Valves as manufactured by Val-Matic Valve and Manufacturing Corp. Elmhurst IL, ph (708) 941-7600 or equivalent.

2.6 FOUNDATION MATERIAL

- A. The foundation material shall be $\frac{3}{4}$ " clean crushed stone or gravel. It shall be free of all dirt, dust, vegetation and other foreign matter. The stone shall be leveled and compacted to the required depth and graded by approved means.

PART 3 - EXECUTION

3.1 EXAMINATION AND COORDINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions and elevations are as indicated on the Contract Drawings.
- B. Beginning of installation means acceptance of existing conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the owner.
- C. All work related to connection into the existing system shall be coordinated with utility owner. Do not proceed with work until utility owner has been contacted and connection work has been coordinated.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material.
- B. Remove large stones or other hard matter which could damage drainage pipe or impede consistent backfilling or compaction.
- C. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Contractor to provide all necessary material and labor to dewater construction excavations.
 - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations. Where necessary, the Contractor shall employ the services of an independent Soils Engineer to design and implement an effective dewatering system, at no additional cost to the Owner, should the Contractor's standard dewatering practices prove ineffective.
 - 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
- D. Contractor to maintain flow of sewage at all times. Bypass pumps may be used, providing that they shall be operable prior to temporary disconnection of gravity flow system. Contractor to provide pump capacity data and test same prior to start of work.

3.3 INSTALLATION - PIPE

- A. Install pipe, fittings and accessories in accordance with ANSI/ASTM D2321 and manufacturer's instructions. Seal joints watertight.
- B. Place pipe on minimum 6 inch deep bed of quarry pressed stone.
- C. Lay pipe to slope gradient noted on Contract Drawings.
- D. Install quarry processed stone next to the top of pipe as specified in Section 02200 - Earthwork.
- E. Place approved backfill material in maximum 8 inch lifts, compacting each lift.
- F. Increase compaction of each successive lift. Refer to Section 02200 for compaction requirements. Do not displace or damage pipe when compacting.
- G. Connect to existing building sewer outlet as necessary to maintain adequate flow conditions. Provide new connections as required by the Engineer.

3.4 INSTALLATION - MANHOLES AND CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Place precast concrete base pad on depth and type of stone as indicated in the details with provision for sanitary sewer pipe and sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated on the Contract Drawings.
- D. Mount lid and frame level in grout, secure to top cone section to elevation indicated on the Contract Drawings.

3.5 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction. The entire sewer system, including piping and appurtenances shall be tested for leakage. System may be tested by the use of either water or low pressure air.
- B. General Test Requirements
 - 1. Piping shall be adequately restrained against movement before testing.
 - 2. Piping system shall be flushed clean and sediment, scale, dirt and debris

removed before piping is tested.

3. Adequate provisions shall be made for carrying off flushing water without causing erosion or other damage.
 4. Structures and piping shall be tested before joints are concealed or made inaccessible.
 5. Tests shall be made in the presence of an inspector of the authority having jurisdiction and the design engineer.
- C. Notice of tests shall be made in writing to the Architect and Owner and received by them not less than five days before the date of the test.
- D. Gravity Flow System Test
1. When the groundwater is more than one foot above the crown of the pipe at the upper end of the section to be tested, an infiltration test shall be made. The upper end of the section to be tested shall be plugged, and a V-notch weir of appropriate size shall be fitted into the lower end. There shall be no leakage around the weir plate. Commercially manufactured weirs made and calibrated for the purpose may be used.
 2. When the groundwater is less than one foot above the crown of the pipe at the upper end of the section to be tested, an exfiltration test shall be made. The sewer shall be plugged at the inlet pipes of both upper and lower structures. The line shall then be filled with water to a level two feet above the crown of the pipe in the upper manhole. Before any measurements are made, a period of two hours shall be permitted to allow for absorption and escape of trapped air. Following this period, a test period of at least four hours shall begin. At the end of the test period, loss of water shall be measured and leakage computed.
 3. Air testing shall be performed in accordance with the procedures described in ASTM C828, except as otherwise noted. For making the low pressure air test, the Contractor shall use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low pressure air. The equipment shall be provided with an air regulator valve or air safety valve set so that the internal air pressure in the pipe cannot exceed 8 psi.
 - a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
 - b. All air used for testing shall pass through a single control panel.

- c. Low pressure air shall be introduced in the sealed line until the internal air pressure reaches a value 4 psig greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe at the time of the test. However, the internal air pressure in the sealed line shall not be allowed to exceed 8 psig. When the maximum pressure exerted by the groundwater is greater than 4 psig, the Contractor shall conduct only a infiltration test.
- d. At least two minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5 to 2.5 psig (greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe) shall not be less than that shown in the following table:

MINIMUM HOLDING TIME REQUIRED FOR PRESSURE TO DROP FROM 3½ TO 2½ PSI

Pipe Diameter (inches)	Minimum Time (min:sec)	Length for Minimum Time (feet)	Time for Long Length (sec)	Minimum Time for Length Shown (min:sec)		
				100 ft.	150 ft.	200 ft.
4	3:46	597	0.380 L	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40
8	7:34	298	1.520 L	7:34	7:34	7:34
10	9:26	239	2.374 L	9:26	9:26	9:53
12	11:20	199	3.418 L	11:20	11:20	11:24

- 4. Rate of infiltration and exfiltration shall not exceed 100 gallons/inch of pipe diameter per mile of pipe per 24 hours. Each section of pipe tested shall meet the above criteria.
- E. Following completion of the backfill over the PVC pipe installation, the pipe shall be tested for deflection using a "go-no-go" deflection mandrel. The mandrel shall be passed through all sections of the pipe. The test may not be performed prior to 7 days after installation, and in the presence of the Township Engineer.
- 1. Pipe deflections shall be measured and converted to a percent deflection. Deflections shall be recorded with a copy of the results submitted to the Engineer. Test results shall be mailed or delivered to the Engineer not later than the day following the day on which the test was made.
 - 2. Sections of pipe deflection greater than 7.5% shall be replaced.

F. Video Record

A closed circuit television inspection shall be made of the newly installed line. A permanent video tape record, and one copy, of a color VHS format shall be supplied to the Engineer upon completion of the TV inspection.

1. The TV camera shall be specifically designed for sewer inspection, with its own light source suitable to provide a clear picture of the entire periphery of the pipe. The camera shall not be pulled by means of a water jetting nozzle.
2. Copies of video recordings shall be submitted to the Engineer in duplicate at no cost, and shall be accompanied by a typewritten log. The videotapes and case shall be labeled clearly, indicating the project name, date and sewers inspected. The label shall correspond to the log sheet.
3. The audio log and written log shall contain the following information (as a minimum): Firm and crew chief's name; date; manhole to manhole designations or station or station; direction of camera; type of pipe; type of joints; joint spacing; cleanliness; manhole conditions; pipe conditions; section length; pipe size; depth of pipe; clarity of flow; continuous distance measurement; and location of all connections to the sewer main.
4. All TV inspection work shall be witnessed by a representative of the Engineer. Photographs of the television picture shall be provided, at no expense, of any portion of the inspection where requested by the Engineer.
5. TV inspection work shall follow sewer cleaning operations, such that the highest quality inspection can be made.

G. Manholes

Manholes shall be tested in accordance with methods approved by the Engineer for both exfiltration and infiltration.

END OF SECTION 02730

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SUMMARY

- A. Extent of concrete work is shown on drawings.
- B. Concrete paving and walks are specified in Division 2.

1.03 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds and others as required by Architect.
- B. Samples: Submit samples of materials as requested by Architect, including names, sources and descriptions.
- C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.
- D. Materials Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- E. Shop Drawings: Reinforcement: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing diagrams of bent bars, arrangement of concrete reinforcement.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings".
 - 2. ACI 318 "Building Code Requirements for Reinforced Concrete".
 - 3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
- B. Concrete Testing Service: Engage a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

2.03 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II.
 - 1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
- C. Light Weight Aggregates: ASTM C 330 and as herein specified, coarse shale, slate or slag aggregate, free from expanded clay
- D. Water: Drinkable.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Air-Mix"; Euclid Chemical Co.

- b. "Sika Aer"; Sika Corp.
 - c. "MB-VR or MB-AE"; Master Builders.
 - d. "Darex AEA" or "Daravair"; W.R. Grace.

- F. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.05 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "WRDA" Hycol"; W.R.Grace.
 - b. "Eucon WR-75" or "Eucon WR-89"; Euclid Chemical Co.
 - c. "Pozzolith 322N"; Master Builders.

- G. High-Range Water-Reducing Admixture (Super Plasticizer) ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Daracem 100" or "WRDA-19"; W.R. Grace.
 - b. "Eucon 37"; Euclid Chemical Co.
 - c. "Rheobuild 1000"; Master Builders.
 - d. "Sika 86"; Sika Corporation.

- H. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.024 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Accelguard 80"; Euclid Chemical Co.
 - b. "Daraset"; W.R. Grace
 - c. "Plastocrete 161FL" or "SikeSet NC"; Sika Corporation

- I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D and containing not more than 0.05 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Pozzolith Retarder"; Master Builders.
 - b. "Eucon Retarder 75"; Euclid Chemical Co.
 - c. "Daratard 17"; W.R. Grace.
 - d. "Plastocrete 161R"; Sika Corporation.

- J. Prohibited Admixtures: Calcium chloride thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

2.04 RELATED MATERIALS

- A. Extruded Polystyrene Board Insulation: Rigid closed-cell extruded, expanded polystyrene insulation board with integral high-density skin, complying with ASTM C-

578 Type IV: min. 25 psi compressive strength ASTM D 1621: k value of 0.20 ASTM C 518: 0.30% maximum water absorption ASTM C272: 1.1 perm/inch max water vapor transmission: manufacturer's standard length and widths.

1. Manufacturer: Subject to compliance with requirements, provide products of one of the following or an approved equal:
 - a. Dow Chemical Co: Midland MI
 - b. VC Industries/V.5 Gypsum: Chicago, IL.
 - c. GreenGuard XPS: Pactive LLC: Austin, TX
- B. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements provide one of the following:
 3. Non-metallic
 - a. "Euco-NS"; Euclid Chemical Co.
 - b. "Duragrout"; L&M Construction Chemicals, Inc.
 - c. "Masterflow 713"; Master Builders
 - d. "Five Star Grout"; U.S. Grout Corporation.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- E. Clear curing and sealing compound (VOC Compliant): The compound shall have 30% solids content minimum, and will not yellow under ultraviolet light after 500 hours of test in accordance with ASTM C-1315 and will have test data from an independent testing laboratory indicating a maximum moisture loss of 0.039 grams per sq. cm. when applied at a rate of 300 sq. ft. per gallon. Sodium silicate compounds are not permitted.
 1. Product: "Super Aqua-Cure VOX" by Euclid Chemical Co.
 2. Product: "Dress & Seal WB30" by L&M Construction Chemicals, Inc
 3. Product: "Kure-n-Seal 30 VOC" by Sonneborne
 4. Or approved equal.
- F. Vapor Barrier: Provide vapor barrier which conforms to ASTM E1745, Class A. The membrane shall have a water-vapor transmission rate no greater than 0.01 gr./ft²/hr/inch Hg when tested in accordance with ASTM E96. The vapor barrier shall be placed over prepared base material where indicated below slabs on grade. Vapor barrier shall be no less than 15 mil thick. Installation of vapor barrier to comply with ASTM E1643.

1. Product: Stego Wrap (15 mil) Vapor Barrier by Stego Industries LLC
2. Product: VaporBlock (15 mil) by Raven Industries
3. Product: Zero Perm by Alumiseal
4. Product: Premoulded Membrane with PLASMATIC CORE by W.R. Meadows.

2.05 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
- B. Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
- D. For normal weight aggregate mixes: 3000 psi 28-day compressive strength; W/C ratio, 0.51 maximum, 3500 psi 28-day compressive strength W/C ratio, 0.47 maximum.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be admitted to and accepted by Architect before using in work.
- F. Admixtures:
 1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
 2. Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight and concrete with water/cement ratios below 0.50.
 3. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
 4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits.
 - a. 5% for maximum 2" aggregate
 - b. 6% for maximum 3/4" aggregate
 - c. 7% for maximum 1/2" aggregate
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 1. Ramps, slabs and sloping surfaces: Not more than 3".

2. Reinforced foundation systems: Not less than 1" and not more than 3".
3. Concrete containing HRWR admixture (super-plasticizer): Not more than 8" after addition of HRWR to site-verified 2"-3" slump concrete.
4. Other concrete: Not less than 1" nor more than 4"

2.06 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified.
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

PART 3 - EXECUTION

3.01 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structure are of correct size, shape, alignment, elevations and position.
- B. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keywarp, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features, required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

3.02 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate at a maximum spacing of 90 feet, so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Control Joints: Locate and install control joints as indicated or at a maximum spacing of 30 feet. Locate at a spacing which does not impair appearance of the structure as acceptable to Architect. Use "SOFFCUT" saw to cut joints in slab. Joint to be cut the same day as the pour.
- C. Joint filler and sealant materials are specified in Division-7 sections of these specifications.

3.04 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms, or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.05 CONCRETE PLACEMENT

- A. Preplacement inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.
- B. General: Comply with ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

- E. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- F. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- G. Maintain reinforcing in proper position during concrete placement operations.
- H. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which would be caused by frost, freezing actions or low temperatures, in compliance with ACI 306R.
- I. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- J. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305R.

3.06 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
- B. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of Ff18 - Ff15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
- D. After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff20 - Ff17. Grind smooth surface defects which would telegraph through supplied floor covering system.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.

3.07 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing and by combinations thereof, as herein specified.
- E. Provide moisture curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- F. Provide moisture-cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, place in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- G. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting and other coatings and finish materials, unless otherwise acceptable to Architect.
- H. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
- I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover, unless otherwise directed.

3.08 MISCELLANEOUS CONCRETE ITEMS

- A. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- B. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

3.09 CONCRETE SURFACE REPAIRS

- A. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- B. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions.
- C. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- D. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
- E. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material.

3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The owner will employ a testing laboratory to perform the following tests, inspect formwork and reinforcement placement and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- D. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- E. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

- F. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
- G. Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- H. Nondestructive Testing: Impact hammer, sonoscope or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- I. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03300

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of each type of masonry work is indicated on drawings and schedule.
- B. Type of masonry work required includes:
 - 1. Concrete unit masonry.
 - 2. Brick masonry.
 - 3. Datestone.
 - 4. Masonry bond beams.
 - 5. Mortar and grout.
 - 6. Reinforcement, anchorage, and accessories.
 - 7. Concealed Flashing
 - 8. Installation of miscellaneous loose steel lintels, plates and other steel fabrications.
- C. Related Work:
 - 1. Section 05120 - Structural Steel.
 - 2. Section 05400 - Miscellaneous Structural Steel.
 - 3. Section 05500 - Metal Fabrications.
 - 4. Section 07200 - Building Insulation.
 - 5. Section 07270 - Fluid Applied (Impermeable)Air/Vapor Barriers.
 - 6. Section 07600 - Flashing.
 - 7. Section 07900 - Joint Sealer Assemblies.
 - 8. Section 08110 - Hollow Metalwork.
 - 9. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems.
 - 10. Section 08415 - Aluminum Storefront.
 - 11. Section 08520 - Aluminum Windows.
 - 12. Section 08900 - Glazed Curtain Wall.
 - 13. Section 09900 - Painting of exposed to view CMU surfaces.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
- B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

- C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made for color and textural characteristics, under sample submittals of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials and construction.
- E. Build mock-ups for the following types of masonry in sizes of approximately 4 feet long by 6 feet high by full thickness, including provisions for 16" wide by 24" high opening with appropriate steel or masonry lintels, face and back-up wythes, cavity, insulation, horizontal reinforcement, ties, through wall flashing, weep holes, air/vapor barrier, mortar net and spandrel steel beam / lintel flashing as well as any other wall components and accessories in accordance with attached sketch and as directed by the Architect in Field. **See sketch of sample Mock-Up Panel at the end of this Section.**
 - 1. Each type of exposed unit masonry work.
 - 2. Typical exterior face brick wall.
 - 3. Typical interior brick wall.
 - 4. Where masonry is to match existing, erect panels parallel to existing surface.
- E. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
- F. Masonry Pre-Installation Meeting: Prior to installation of any above-grade masonry work, there shall be a Masonry Pre-Installation Meeting between the General Construction Work Contractor, all masonry Subcontractors (if any), and the Architect. At this meeting, all masonry construction products and procedures shall be reviewed.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Samples for Verification Purposes: Submit the following samples:
 - 1. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.
 - 2. For selection of brick, submit products of all local manufacturers that the manufacturers consider to be their closest match. Resubmit until match meets approval of Architect.
 - 3. Colored masonry mortar samples for each color required showing the full range of color which can be expected in the finished work. Label samples to indicate type and amount of colorant used.

- C. Shop Drawings: Submit shop drawings for the following:
 - 1. All locations of Vertical Control Joints for interior concrete masonry unit walls including control joints shown.
 - 2. Datestone.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.
- C. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.
- D. Store cementitious materials off the ground, under cover and in dry location.
- E. Store aggregates where grading and other required characteristics can be maintained.
- F. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.
- G. Coordinate delivery and application of air/vapor barrier with the delivery and application of the cavity insulation to ensure the installation of these products are completed within the same construction phase.
- H. Deliver air/vapor barrier membranes, adhesives and primers to the jobsite in undamaged and original packaging indicating the name of the manufacturer and product. Store roll materials on end in original packaging. Protect rolls from direct sunlight until ready for use. Store air barrier membranes, adhesives and primers at temperature of 40°F and rising. Keep solvent away from open flame and excessive heat.

1.6 REFERENCE STANDARDS

- A. Comply with the current applicable provisions of all codes, regulations, industry standards and specifications referenced in this section, unless otherwise modified by the requirements of the Contract Documents, including but not limited to the following:
 - 1. ACI 531 Building Code Requirements for Masonry Structures.
 - 2. ACI 531 Commentary on Building Code Requirements for Masonry Structures.
 - 3. ACI 530.1 Specification for Masonry Construction.
 - 4. ASTM C-90 Load Bearing Masonry Units.
 - 5. ASTM C-129 Non-Load Bearing Masonry Units.
 - 6. ASTM C 140 Testing Concrete Masonry Units.
 - 7. ASTM C 216 Testing Facing Brick (Solid Masonry Units Made from Clay or Shale).
 - 8. ASTM C 270 Standard Specification for Mortar for Unit Masonry

9. ASTM C 780 Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
10. ASTM C 1586 Standard Guide for Quality Assurance of Mortars.
11. ASTM E - 119 Fire Tests with Building Construction and Materials.
12. BIA Technical Notes on Brick Construction.
13. BIA Technical Notes on Brick Construction: Technical Note #46 "Maintenance of Brick Masonry.
14. NCMA TEK Bulletins.
15. ASTM 1364 Cast Stone Masonry

16. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
17. ASTM E2357 Standard Test Method for Determining the Air Leakage of Air Barrier Assemblies.
18. ASTM E96 Water Vapor Transmission of Materials.
19. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.7 PROJECT CONDITIONS

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.
- C. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.
- D. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
- E. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
- F. Protect sills, ledges and projections from droppings of mortar.
- G. Cold Weather Protection:
 1. Do not lay masonry units which are wet or frozen.
 2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
 3. Remove masonry damaged by freezing conditions.
 4. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:

- a. For units with surface temperatures above 32°F (0°C), wet with water heated to above 70°F.
 - b. For units with surface temperature below 32°F (0°C), wet with water heated to above 130°F.
- H. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout.
- I. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F.
1. 40 degrees F to 32 degrees F:
 - a. Mortar: Heat mixing water to produce mortar temperature between 40°F and 120°F. Setting time will be limited to 60 minutes from initial mixing.
 - b. Grout: Follow normal masonry procedures.
 2. 32 degrees F to 25 degrees F:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
 3. 25 degrees F to 20 degrees F:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
 - c. Heat both sides of walls under construction using salamanders or other heat sources.
 - d. Use windbreaks or enclosures when wind is in excess of 15 mph.
 4. 20 degrees F and below:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F.
 - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
 - c. Masonry Units: Heat masonry units so that they are above 20°F at time of laying.

- d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F for 24 hours after laying units.
 - e. Do not heat water for mortar and grout to above 160°F.
- J. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.
- 1. 40 degrees F to 32 degrees F:
 - a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
 - 2. 32 degrees F to 25 degrees F:
 - a. Completely cover masonry with weather-resistive membrane for at least 24 hours.
 - 3. 25 degrees F to 20 degrees F:
 - a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.
 - 4. 20 degrees F and below:
 - a. Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.

1.8 WARRANTY

- A. The Contractor shall warrant the exterior walls to be free from leakage due to any natural cause for a period of **five (5) years** from date of final acceptance of the building and he shall, within such period at his own expense, upon written notification from the Owner, pursue such remedial measures as may be necessary to correct any condition of leakage and damage incidental thereto that may develop. The Contractor in signing this Contract accepts the above conditions. In so doing, he also agrees either that the materials and methods specified herein are such as to insure the results required or that he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the Contract.
- B. Flexible Copper Flashing:
- 1. Special warranty:
 - a. Manufacturer shall warrant flexible flashing material for **life of the wall**.
 - b. Begin warranty from the Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
 - 1. Brick: Subject to compliance with requirements, manufacturers of brick units which may be incorporated in the work include, but are not limited to, the following:
 - a. Church Brick Company.
 - b. Consolidated Brick.
 - c. Diener Brick Company.
 - d. Tri-State Brick & Building Materials, Inc.
 - e. The Belden Brick Company.
 - f. Or approved equal.
 - 2. Concrete Masonry Units: Subject to compliance with requirements, manufacturers of concrete masonry units which may be incorporated in the work include, but are not limited to, the following:
 - a. Anchor Concrete Products Inc.
 - b. Clayton Block Co., Inc.
 - c. EP Henry Corporation.
 - d. Or approved equal.
 - 3. Masonry Anchors, Joint Reinforcing, Accessories, etc.: Subject to compliance with requirements, manufacturers of masonry anchors, joint reinforcing, accessories which may be incorporated in the work include, but are not limited to, the following:
 - a. Heckman Building Products, Inc.
 - b. Hohmann & Barnard, Inc.
 - c. Or approved equal.

2.2 BRICK MADE FROM CLAY OR SHALE

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.
- B. Size: Provide bricks manufactured to the following actual dimensions:
 - 1. Utility: 3-5/8 inch x 3-5/8 inch x 11-5/8 inch.
- C. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.
- D. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncured or unfroged units with all exposed surfaces finished.

- E. Facing Brick: ASTM C 216, and as follows.
 - 1. Grade SW.
 - 2. Type: FBS.
 - 3. Compressive Strength: 8,000 psi, average, per ASTM C 67.
 - 4. Application: Use where brick is exposed, unless otherwise indicated.
 - 5. Texture and Color: Match existing.
 - 6. Wherever shown to "match existing", provide face brick of matching color, texture and size as existing adjacent brickwork.
- F. Efflorescence: Provide brick tested and rated in compliance with ASTM C67.

2.3 CONCRETE MASONRY UNITS

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
 - 1. Provide bullnose units for outside corners unless otherwise indicated.
- C. Concrete Block: Provide units complying with characteristics indicated below for face size, exposed face and under each form of block included, for weight classification.
- D. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thicknesses indicated.
- E. Where special patterns are indicated, provide units with exposed faces matching color, texture and pattern of Architect's sample.
- F. Hollow Loadbearing Block: ASTM C 90 and as follows:
 - 1. Weight Classification: Lightweight.
- G. Solid Loadbearing Block: ASTM C 90 and as follows: (Below grade and wherever else solid CMU is indicated).
 - 1. Weight Classification: Lightweight.
- H. Solid 4" and 6" CMU (2 and 3 Hour Fire Resistance Rated) Loadbearing Block: Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies - ANSI/ACI 216.1-97, TMS-0216-97 and as follows:
 - 1. Construction and material requirements of concrete masonry including units, mortar, grout, control joint materials and reinforcement shall comply with ACI 530/ASCE 5/TMS 402.
 - 2. Concrete masonry units shall comply with ASTM C 55, C 73, C 90 or C 129.
 - 3. Weight Classification: Lightweight.

4. Aggregate Type: Expanded clay, expanded shale or expanded slate with a minimum required equivalent thickness of 3.6 inches for 4" CMU.

2.4 DATESTONE

- A. Basis of Design: Provide cast stone as manufactured by Continental Cast Stone East, by Russell Inc.; or approved equal.
 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - a. Custom Cast Stone.
 - b. Reading Rock, Inc.
 - c. Or approved equal
 2. Other acceptable manufacturers shall have a minimum of ten (10) years of continuous operation and adequate facilities for producing and curing machine-made Cast Stone units as described herein.
 3. Manufacturer shall be a member of the Cast Stone Institute.
- B. Provide cast stone of size, shape and thickness indicated.
- C. Provide datestone, as shown, with incised inscription and complete with copper document box.
 1. Include in the cost the labor costs for sealing the document box and setting the cornerstone at a public ceremony to be scheduled by the Owner.
- D. Physical Properties:
 1. Compressive Strength: ASTM C 1364.
 2. Absorption, Cold Water: ASTM C 1364.
 3. Linear Shrinkage: ASTM C 1364.
 4. Surface Texture: ASTM C 1364.
 5. Cast Stone Materials:
 - a. Portland Cement: ASTM C 150, Type I, white/or gray as required to match specified color,
 - b. Coarse Aggregate: ASTM C 1364, Granite, quartz, or limestone,
 - c. Fine Aggregate: ASTM C 1364, Natural or manufactured sands,
 - d. Coloring Pigments: ASTM C 1364, Inorganic iron oxides,
 - e. Chemical Admixtures: ASTM C 1364.
 - f. Water: Potable.
- E. Color and finish: To be selected by the Architect from manufacturer's available full range of standard colors and finishes.
 1. Exposed surfaces shall exhibit a fine grained texture similar to natural stone. No bugholes or air voids will be permitted.
 2. Variation:

- a. Must match color and finish of approved sample when viewed in direct light at a 10 foot distance.
- b. Permissible Variation in Color:
 - 1) Hue Difference - ASTM C 1364, 2 units.
 - 2) Total Color Difference - ASTM C 1364, 6 units..
- F. Anchors: Non-corrosive type, sized for conditions:
 - 1. Provide Stainless steel type 304 anchors, pins, dowels and clip angles as indicated or if not indicated as required for each cast stone units and panels.
 - 2. Shelf angles and other similar structural items shall be galvanized steel.
- G. Reinforcement: Where required by ASTM C 1364, Epoxy coated or galvanized.
- H. Fiber Reinforcement: ASTM C 1116, fibrous nylon
- I. Mortar: Cast Stone Institute Standard Specification.
- J. Curing, Finishing and Cleaning: Provide methods and products which had been approved or recommended by manufacturer of the cast stone units.
- K. Cleaner:
 - 1. Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces.
 - 2. Approved for intended use by cast stone manufacturer and approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.5 MASONRY LINTELS

- A. General: Provide the following:
 - 1. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

- A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
- B. Limit cementitious materials in mortar to portland cement-lime.

- C. Portland Cement: ASTM C 150, Type 1, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.
- D. For colored aggregate mortars use masonry cement, ASTM C 91, of natural color or white as required to produce mortar colors required.
- E. Hydrated Lime: ASTM C 207, Type S.
- F. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100% passing the No. 16 sieve.
 - 1. White Mortar Aggregates: Natural white sand or ground white stone.
 - 2. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.
- G. Mortar: ASTM C387, Type N. Provide mortar for face brick and accessories to match original mortar in color, texture, strength and hardness (density and porosity). Determine existing mortar mix constituents and ratios by analysis. Review laboratory evaluations with Architect before proceeding with the work. Match color of existing mortar by use of aggregates matching original aggregate color where possible. Use inorganic coloring pigments if satisfactory color match cannot be attained with natural materials.
 - 1. Use Type M mortar for masonry below grade and in contact with earth, and where indicated.
 - 2. Use Type S mortar for exterior, above-grade loadbearing and non-loadbearing CMU walls; for interior loadbearing CMU walls; and for other applications where another type is not indicated.
- H. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.
- I. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.
- J. The proper use of ASTM C 270 and Test Method ASTM C 780 for evaluating masonry mortars produced in the laboratory and the construction site is in accordance with ASTM C 1586.
- K. Aggregate for Grout: ASTM C 404.
- L. Water: Clean and potable.
- M. Colored Aggregate Mortar: Produce mortar of color required by use of colored aggregates in combination with selected cementitious materials.
 - 1. Colors as selected by the Architect from manufacturer's available full range of colors.

2.7 JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES

- A. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:
1. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.
- B. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
1. Width: Fabricate joint reinforcement in units with widths of approximately 2 inch less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8 inch on joint faces exposed to exterior and 1/2 inch elsewhere.
 - a. Wire Size for Side Rods: 9 gauge.
 - b. Wire Size for Cross Rods: 9 gauge.
 2. Truss design with continuous diagonal cross rods spaced not more than 16 inch o.c.
 3. Number of Side Rods: One side rod for each face shell of concrete masonry back-up and one rod for brick wythe.
 4. Configuration:
 - a. Applications of Single Wythe Wall width: Truss design, diagonal cross rods at not more than 16 inches on center.
 - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 120, Truss-Mesh; or approved equal.
 - b. Applications of more than one unit width (Composite Wall): Truss design, diagonal cross rods at not more than 16 inches on center:
 - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 140, Truss-Twin-Mesh; or approved equal.
 - c. Applications of more than one unit width, exterior cavity walls (Masonry back-up), Seismic design:
 - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 170-ML (Mighty-LOK®); or approved equal.
- C. Flexible Anchors: Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.

1. For anchorage to steel framework provide manufacturer's standard anchors with triangular-shaped wire tie section sized to extend within 1inch of masonry face. Coordinate with Steel Contractor for type and size required. Provide 3/16 inch diameter, hot-dip galvanized steel.
- D. Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hot-dip galvanized to comply with ASTM C 153, Class C, in sizes and configurations indicated.
- E. Pencil rods at construction joints as shown: Dowels dipped in tar for ½ of length.
- F. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

2.8 CONCEALED FLASHING MATERIALS

- A. **Type 2:** Thru-Wall Copper Fabric Flashing (Asphalt-Free): (At the head of window, door and unit ventilator masonry openings, existing columns in masonry cavity wall or where indicated). Provide end dams where shown, or as required.
 1. Basis of Design: "Multi Flash 500 Series", as manufactured by York Manufacturing, Inc., Sanford, ME, Tel.# 800.551.2828 / www.yorkmfg.com; or approved equal.
 - a. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
 - 1) "Copper Sealtite 2000®", as manufactured by Advanced Building Products Inc., Tel.# 800.252.2306.
 - 2) "Copper-Fabric™ NA Copper Fabric Flashing", as manufactured by Sandell Manufacturing Company, Inc., (a Hohmann & Barnard, Inc. Co.) , Tel.# 800.283.3888 or 518.357.9757.
 - 3) "Gorilla Flash GF-500, as manufactured by STS Coatings, Inc., Tel.# 830.995.5177.
 - 4) "Copper Seal", as manufactured by Wire-Bond, Inc., Tel.# 800.849.6722.
 - 5) Or approved equal.
 2. Type: Copper sheet bonded with rubber based adhesive, between two layers of fiberglass fabric weighing not less than 0.3 oz/layer with a minimum of 10 x 20 threads per inch.
 - a. Copper Type: CDA Alloy 110, 060 temper in accordance with ASTM B370.
 - b. Copper Weight: 5 oz. per square foot.
 3. Fabric: Fiberglass fabric; laminated to each face of copper core with core weight manufacturer identified on product with color coded laminate.
 4. Adhesive: Non-asphalt for laminating adhesive.

5. Size: Manufacturer's standard roll width and length.
 6. Mastic/Sealant: Manufacturer's standard for specified flashing.
 - a. Type: One part 100% solids, solvent-free formulated silyl-terminated polyester (STPE), ASTM C920-11, Type S, Grade NS, Class 50.
 7. Provide "FTSA" stainless steel drip plate as manufactured by Hohmann & Barnard, Inc., Polyguard Products Inc., Masonpro Inc., Mortar Net USA Ltd., or approved equal, adhered to the Perm-A-Barrier Wall Flashing, between the steel lintel and the exterior finish masonry.
 - a. Provide factory fabricated stainless-steel drip plate from ASTM A240, Type 304, 26 gauge continuous, Type FTS with 1/8" thick compressible filler adhered to bottom of drip plate.
 - 1) Extend horizontal leg flashing not less than 3-inches into masonry wall and bend down from outer edge of wall or steel lintel for 1/2" at 30 degree from horizontal, and hem.
 - 2) Fabricate in 8 to 12 feet lengths and provide stainless-steel splice plates at joints between lengths.
 - 3) Provide factory fabricated outside and inside corner pieces.
 8. Termination Bar: Where indicated, or required, provide manufacturer's standard 1" wide, minimum by 1/8" thick, minimum by continuous length pre-punched stainless-steel bar or composite material bar complete with stainless-steel fasteners.
 - a. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
 - 1) Heckmann Building Products, Inc., Melrose Park, IL, Tel.# 800.621.4140 / www.heckmannbuildingprods.com
 - 2) Hohmann & Barnard, Inc., Hauppauge, NY, Tel.# 800.645.0616 or 631.234.0600 / www.h-b.com
 - 3) Or approved equal.
 9. Provide specially fabricated units and interior corner conditions. Lap flashing a minimum of 6-inches and seal laps with mastic, or as recommended by manufacturer.
- B. **Type 3:** Thru-Wall Spandrel Steel Beam / Lintel Flashing: (At spandrel steel beams, steel lintels above doors and windows, at steel columns and/or where indicated).
1. Basis of Design: "Perm-A-Barrier Wall Flashing", as manufactured by GCP Applied Technologies Inc., Cambridge, MA, Tel.# 877.423.6491 / 617.876.1400; or approved equal.

- a. 40 mil (1 mm) total thickness self-adhesive, cold applied tape consisting of 32 mils (0.8 MM) of rubberized asphalt integrally bonded to a 8 mil (0.2 mm) high density, cross laminated polyethylene film. Rolls are interwound with disposable silicone-coated release sheet.
 - b. Provide specially premolded units at exterior and interior corner conditions. Lap flashing a minimum of 4-inches and seal laps with Bituthene mastic or as recommended by manufacturer.
 - c. Conditioning and Priming: Use "Perma-A-Barrier WB Primer" to enhance adhesion on dusty cementitious substrates.
 - 1) Use "Bituthene Primer B2" to prime green concrete or damp substrates.
2. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
- a. W.R. Meadows.
 - b. Hohmann & Barnard, Inc., Hauppauge, NY, Tel.# 800.645.0616 / 631.234.0600, www.h-b.com.
 - c. Or approved equal.
3. Provide "FTSA" stainless steel drip plate as manufactured by Hohmann & Barnard, Inc., Polyguard Products Inc., Masonpro Inc., Mortar Net USA Ltd., or approved equal, adhered to the Perm-A-Barrier Wall Flashing, between the steel lintel and the exterior finish masonry.
- a. Provide factory fabricated stainless-steel drip plate from ASTM A240, Type 304, 26 gauge continuous, Type FTS with 1/8" thick compressible filler adhered to bottom of drip plate.
 - 1) Extend horizontal leg flashing not less than 3-inches into masonry wall and bend down from outer edge of wall or steel lintel for 1/2" at 30 degree from horizontal, and hem.
 - 2) Fabricate in 8 to 12 feet lengths and provide stainless-steel splice plates at joints between lengths.
 - 3) Provide factory fabricated outside and inside corner pieces.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Non-Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade 2A1, capable of compression up to 35%, of width and thickness indicated.
- B. Compressible Insulation at Top of Walls: A high-density mineral fiber insulation rated non-combustible as tested per ASTM E136.

1. Basis of Design: Provide "TopStop - Head-of Wall"; Thermafiber with 3M "Firedam" fire rated sealant, or approved equal. Refer to Section 07840 for Fire-Resistive Joint Systems.
 2. Insulation shall sustain temperature above 2,000°F in accordance with ASTM E119 and comply with ASTM E84 for the following:
 - a. Flame Spread: 0
 - b. Smoke Developed: 0
 3. Provide size and shape to suit indicated conditions.
- C. Fire Rated Control and Expansion Joints, Joint Filler and Sealant:
1. Provide fire-rated sealant in accordance with UL Listed design for fire-rated joint assemblies.
 2. For expansion and control joint filler and sealant as specified in Section 07900.
- D. Weepholes: Provide the following for weepholes:
1. Plastic, Rectangular with screen: Item # 342 W/S; Hohmann & Barnard, Inc.; or approved equal.
 - a. Medium density polyethylene 3/8 inch x 1-1/2 inch x 3-1/2 inch clear color plastic with stainless steel screens and cotton wicks.
- E. Mortar Net: Basis of Design: Provide Mortar Net as manufactured by Mortar Net USA, Ltd., Tel. # 800 664-6638; or approved equal.
1. Size: 10 inches high x 1 inch thick x 5 feet long.
 2. Provide mortar net inside masonry cavity walls to keep weepholes open. Install in accordance with manufacturer's printed instructions.
- F. Waterstops: Provide 16 oz. copper waterstops at indicated expansion joints; Catalog # 94-V with Type "A" flange as manufactured by Heckmann Building Products Inc.; or approved equal.
- G. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

2.10 CAVITY INSULATION: Refer to Section 07200.

2.11 AIR/ VAPOR BARRIER: Refer to Section 07270.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting

methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.

- B. Do not wet concrete masonry units.
- C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.
- D. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.
- E. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8 inch of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.
- F. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- G. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible. No discoloration of units caused by cutting will be acceptable.
- H. Pattern Bond:
 - 1. Brick: Running bond, unless otherwise shown.
 - 2. Concrete masonry units: Running bond, unless otherwise shown.
 - 3. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2 inches.
- I. All concrete masonry units and courses below grade shall be filled solid with grout.

3.2 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4 inch in 10 feet, or 3/8 inch in a story height not to exceed 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4 inch in any story or 20 feet maximum, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints do not exceed plus or minus 1/4 inch in 10 feet, 1/2 inch maximum.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in any bay or 20 feet maximum, nor 1/2 inch in 40 feet or more. For top surface of bearing walls do not exceed 1/8 inch between adjacent floor elements in 10 feet or 1/16 inch within width of a single unit.

- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.
- E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not exceed head joint thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- D. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
 - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
 - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
 - 3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.
- E. Extend all interior walls full height to underside of structure of deck, unless otherwise indicated. Include compressible insulation at top to completely close space between wall and structure above.
- F. Support and protect masonry, indicated to remain, which surrounds removal area.
 - 1. Refer to BIA, Technical Note #46: "Maintenance of Brick Masonry", www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf, for two recommended methods to properly support existing brickwork when installing new mechanically keyed through wall flashing, and as indicated below:
 - a. Method 1: Remove alternate sections of masonry in 2'-0" to 5'-0" (610 mm to 1.52m) lengths.

- b. Method 2: Temporary braces can be installed to permit the removal of longer sections of masonry.

Note: The replaced masonry should be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay solid brick size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- C. Set stone units in full bed of mortar with all vertical joints slushed full. Fill dowel, anchor and similar holes solid. Wet stone joint surface thoroughly before setting; for stone surfaces which are soiled, clean bedding and exposed surfaces with fiber brush and soap powder followed by thorough rinsing with clear water.
- D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8 inch joints.
- E. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.
- F. Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.

1. Tool exposed joints for stack bond with scored joints in concrete masonry block walls as indicated, or if not indicated as directed by the Architect in the field.

- G. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.5 CAVITY WALLS

- A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.
- B. Tie exterior wythe to back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.
- C. Provide weep holes in exterior wythe of cavity wall located immediately above ledges and flashing, spaced 2'-0" o.c., unless otherwise indicated.
- D. Provide concealed flashing in cavity walls at all required locations and as indicated herein after.

- E. On units of plastic insulation, install small pads of mastic spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

3.6 AIR/ VAPOR BARRIER: Refer to Section 07270.

3.7 HORIZONTAL JOINT REINFORCEMENT

- A. Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
 - 1. Space continuous horizontal reinforcement as follows:
 - a. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcement acts as structural bond or tie between wythes, space reinforcement as required by code but not more than 16 inches o.c. vertically.
 - b. For single-wythe walls, space reinforcement at 16" o.c. vertically, unless otherwise indicated.
 - 2. Cut reinforcement units at walls intersecting and/or abutting firewalls. Provide control joints with fire-rated sealant as indicated in Section 07900.
- D. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

3.8 ANCHORING MASONRY WORK

- A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back-up involved.
 - 1. Strap anchors for masonry at existing walls.
 - 2. Do not anchor fire walls to Structural Steel, intersecting and/or abutting walls.

3.9 CONTROL AND EXPANSION JOINTS

- A. General: Provide vertical and horizontal expansion, control and isolation joints in masonry maximum 30 feet on center. Build-in related items as the masonry work progresses.

1. Coordinate location of all control and expansion joints in the field with Architect prior to commencement of work.
- B. Build in joint fillers where shown: See Section 07900, Joint Sealers. Joint width for sealants: 3/8 inch unless otherwise indicated. Include straight joints at vertical recessed brick detail.

3.10 LINTELS

- A. Install loose lintels weighing 200 lbs. or less of steel and other materials where shown. Steel lintels weighing more than 200 lbs. will be installed by Structural Steel Contractor.
- B. Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Precast lintels shall be scored to simulate adjacent blockwork. Cure precast lintels before handling and installation. Temporarily support formed-in-place lintels.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.11 FLASHING OF MASONRY WORK

- A. **NOTE: When Contractor must remove a portion of the existing masonry wall veneer in order to install through wall flashing or other work, the Contractor MUST follow the Brick Industry Association (Technical Note #46) and the Concrete Masonry Industry methodology to support and protect the existing adjacent masonry, indicated to remain, which surrounds removal area. The Contractor shall remove the proper length of masonry and leave adjacent masonry in place to support existing masonry above the work in lengths indicated below.**

1. Refer to BIA, Technical Note #46: "Maintenance of Brick Masonry", www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf, for two recommended methods to properly support existing brickwork when installing new mechanically keyed through wall flashing, and as indicated below:
 - a. **Method 1:** Remove alternate sections of masonry in 2'-0" to 5'-0" (610 mm to 1.52m) lengths.
 - b. **Method 2:** Temporary braces can be installed to permit the removal of longer sections of masonry.

Note: The replaced masonry should be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.

- B. General: Provide concealed flashing in masonry work at, or above, shelf angles, lintels, ledges and the base of perimeter cavity walls and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing in wall and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and turn down to form drip.

1. **Contractor shall provide concealed flashing in masonry at all required conditions, whether shown or not, and shall be typical and/or similar for all building conditions when details and notes are shown on drawings.**
 2. **Contractor shall provide spandrel beam membrane flashings for all steel beams exposed to cavity, whether shown or not, and shall be typical and/or similar for all building conditions when details and notes are shown on drawings.**
- C. Extend flashing the full length of ledges. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within third of width of the inner wythe as indicated on drawings.
- D. Extend flashing the full length of lintels and shelf angles and minimum of 4 inches into masonry each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within 1/2" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches.
1. At heads and sills flashing shall extend 6 inches beyond each side of the opening and to be turned up at the sides/ends not less than 2 inches to form a pan, (end dam). All corners shall be folded, not cut.
- E. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer.
- F. Provide weep holes in the head joints of the same course of masonry bedder in the flashing mortar. Space 24 inches o.c., unless otherwise indicated.
- G. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

3.12 DATESTONE

A. EXAMINATION

1. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. INSTALLATION

1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
2. Drench units with clear water just before setting.

3. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build anchors and ties into mortar joints as units are set.
4. Fill dowel holes and anchor slots with mortar.
5. Fill collar joint solid as units are set.
6. Leave head joints open in coping and other units with exposed horizontal surfaces. Keep joints clear of mortar, and rake out to receive sealant.
7. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
8. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
9. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
10. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated, or as recommended by units manufacturer.
11. Sealing joints is specified in Division 7 Section "Joint Sealants."
12. Keep joints free of mortar and other rigid materials.

C. INSTALLATION TOLERANCES

1. Variation from Plumb: Do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
2. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet.
3. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

D. ADJUSTING AND CLEANING

1. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
2. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
3. In-Progress Cleaning: Clean cast stone as work progresses. Remove mortar fins and smears before tooling joints.

4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
 - a. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - b. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

3.13 QUALITY CONTROL TESTING

- A. Engage an independent testing and inspection agency to inspect engineered masonry and to perform tests and prepare test reports.
 1. Perform tests for condition, size, location and spacing of reinforcement and anchorage of engineered masonry assemblies.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with design requirements and indicated standards, and specifically state any deviations therefrom.
 1. Provide access for testing agency to places where structural steel reinforcement and anchorage work is being fabricated or produced so that required inspection and testing can be accomplished.
 2. Testing agency may inspect structural steel reinforcement and anchorage work at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- C. Correct deficiencies in structural steel reinforcement and anchorage work which inspections and laboratory test reports have indicated to be not in compliance with requirements.
 1. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

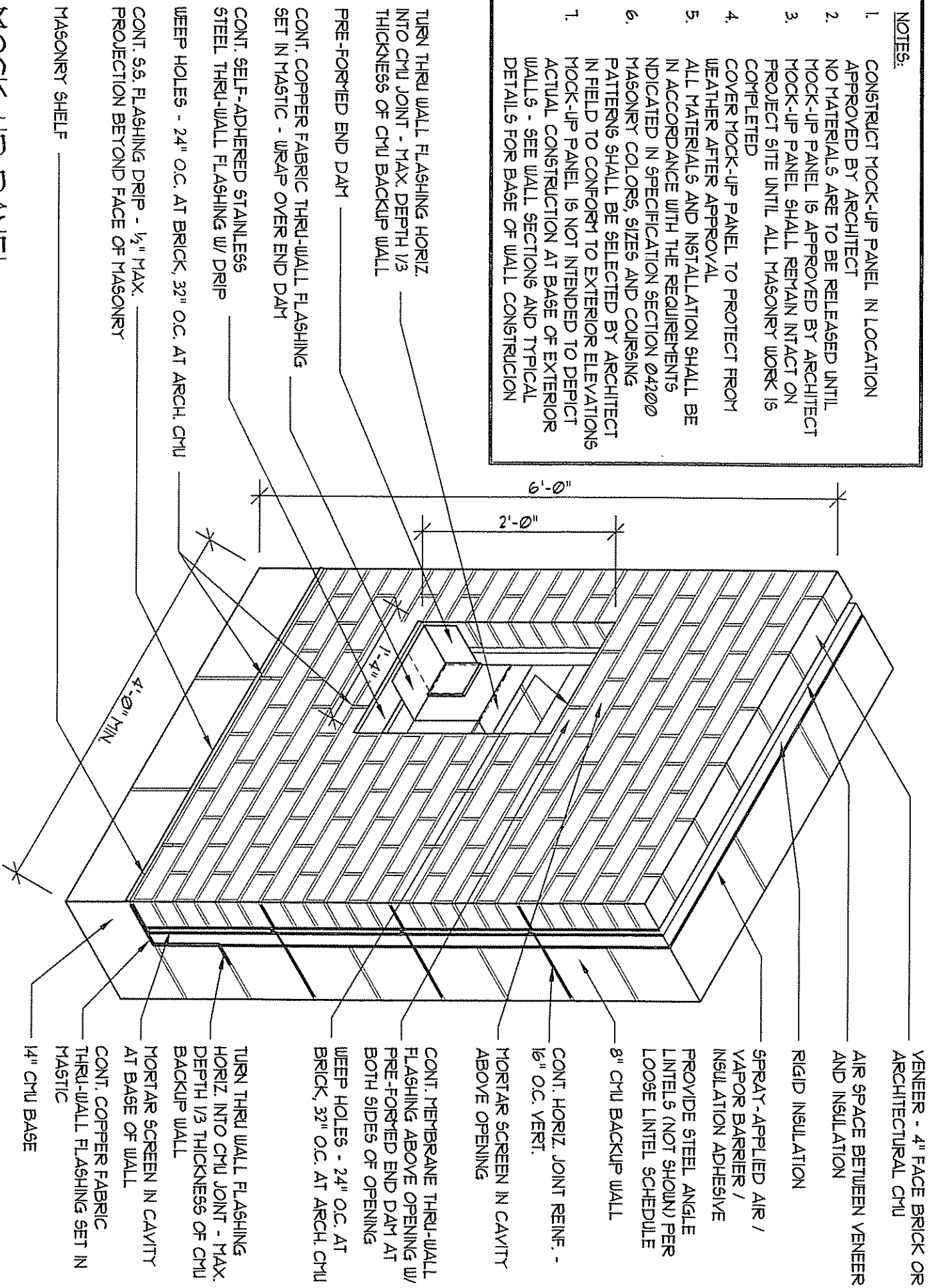
3.14 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.

- C. Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements of BIA Technical Notes No. 20 "Cleaning Brick Masonry".
 - 1. Use commercial cleaning agents in accordance with manufacturer's instructions.
- D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.
 - 1. Prepare exposed to view CMU surfaces to receive paint coatings in accordance with Section 09900.

END OF SECTION 04200

- NOTES:**
1. CONSTRUCT MOCK-UP PANEL IN LOCATION APPROVED BY ARCHITECT
 2. NO MATERIALS ARE TO BE RELEASED UNTIL MOCK-UP PANEL IS APPROVED BY ARCHITECT
 3. MOCK-UP PANEL SHALL REMAIN INTACT ON PROJECT SITE UNTIL ALL MASONRY WORK IS COMPLETED
 4. COVER MOCK-UP PANEL TO PROTECT FROM WEATHER AFTER APPROVAL
 5. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS INDICATED IN SPECIFICATION SECTION 04200
 6. MASONRY COLORS, SIZES AND COURSING PATTERN SHALL BE SELECTED BY ARCHITECT IN FIELD TO CONFORM TO EXTERIOR ELEVATIONS
1. MOCK-UP PANEL IS NOT INTENDED TO DEPICT ACTUAL CONSTRUCTION AT BASE OF EXTERIOR WALLS - SEE WALL SECTIONS AND TYPICAL DETAILS FOR BASE OF WALL CONSTRUCTION



MOCK-UP PANEL

SCALE: N.T.S.

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere and non-ferrous items listed herein.
- B. Type of work in this section includes metal fabrications for assemblies which include but are not limited to the following:
 - 1. Rough hardware.
 - 2. Miscellaneous structural shapes.
 - 3. Aluminum pipe railing and handrails.
 - 4. Cast nosings.
 - 5. Pipe Trench Cover.
 - 6. ADA Vanity Brackets.
 - 7. Expansion joint covers.
- C. Related Work:
 - 1. Section 03300 - Concrete Work.
 - 2. Section 09650 - Resilient Flooring
 - 3. Section 11011 - Wood Casework
 - 4. Division 15 - Mechanical Work

1.3 QUALITY ASSURANCE

- A. Codes and Standards:

ASTM A108-99 - Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.

ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A563-00 - Standard Specification for Carbon and Alloy Steel Nuts.

ASTM A569/A569M-91a - Standard Specification for Steel, Carbon (.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality (superseded by A1011).

ASTM A780-01 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

ASTM A1011/A1011M-03 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

ASTM F844-00 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrications might delay work.
- C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D. Regulatory Requirements: Products and finished installations to be used by persons with disabilities must comply with requirements of the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC / ANSI A117.1.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
- C. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.
- D. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.
- E. Mill test reports: Reports indicating metals to be furnished comply with project requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work.

1. Alloy and Temper: Provide alloy and temper as recommended by the aluminum producer or finisher, with not less than the strength and durability properties specified in ASTM B 632/B 632 M, alloy 6061-T6.
 2. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.
 3. Fasteners: Finish of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Unless otherwise shown, provide Phillips flat-head screws for exposed fasteners.
 4. Bituminous Paint: SSPC-Paint (cold-applied asphalt mastic).
 5. Protective Lacquer: Clear non-yellowing, of type recommended by metal producer for protection of the finished metal surfaces.
 6. Aluminum Pipe and Tube: ASTM B 429, Alloy 6063-T6.
 7. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
 8. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
 9. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- C. Steel
1. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
 2. Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
- D. Stainless Steel Sheet, Strip, Plate and Flat Bars: ASTM A 666, Type 304, unless otherwise indicated.
1. Stainless Bars and Shapes: ASTM A 276, Type 304.
- E. Gray Iron Castings: ASTM A 48, Class 30.
- F. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
- G. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- H. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

I. Grout:

1. Non-Shrink, Metallic Grout: Pre-mixed, factory-packaged, ferrous-aggregate grout complying with CE CRD-C588, Type M, and ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications and not to be used in wet areas or on exterior applications.
2. Non-Shrink, Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621, and ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

J. Fasteners:

1. General: Provide zinc-plated fasteners complying with ASTM B 633, Class Fe/Zn 5, for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
2. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A, with hex nuts, ASTM A 563; and where needed, flat washers.
3. Weathering Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3, with hex nuts, ASTM A 563, Grade C3; and where needed, flat washers.
4. Lag Screws: Square head type, ASME B18.2.1.
5. Machine Screws: Cadmium plated steel, ASME B18.6.3.
6. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
7. Plain Washers: Round, carbon steel, ASME B18.22.1.
8. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
9. Expansion Anchors: Anchor bolt and sleeve assembly; Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
10. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as needed.
11. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
12. Anchor Bolts: ASTM F 1554, Grade 36, of dimension indicated; with nuts, ASTM A 563; and where indicated, flat washers.

K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

L. Cast-in-Place in Concrete: Either threaded type or wedge type unless otherwise indicated;

galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

M. Post-Installed Anchors:

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 and nuts, ASTM F 594.

N. Paint:

1. Metal Primer Paint: Red lead mixed pigment, alkyd varnish, linseed oil paint, FS TT-P-86I, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, FS TT-P-615, Type II.
2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900.
3. Galvanizing Repair Paint: High-zinc-dust content paint for regalvanizing welds in galvanized steel, complying with the Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20 and compatible with paints specified to be used over it.

2.2 FABRICATION, GENERAL

A. Workmanship

1. Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.
5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- B. Galvanizing:
1. Provide a zinc coating for exterior steel items and those items indicated or specified to be galvanized, as follows:
 - a. ASTM A 153 for galvanizing iron and steel hardware.
 - b. ASTM A 123 for galvanized rolled, pressed and forged steel angles, corner guards, other indicated shapes, plates, bars, bollards and strip 1/8" thick and heavier.
 - c. ASTM A 386 for galvanizing assembled steel products.
- C. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- D. Shop Painting
1. Shop paint miscellaneous metal work, except members of portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.
 2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning", or SSPC SP-3 "Power Tool Cleaning", or SSPC SP-7 "Brush-Off Blast Cleaning".
 3. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".
 4. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
 5. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items as specified in Division-6 sections.

2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.
- B. Miscellaneous Structural Shapes, Framing and Supports, Etc.
1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
 2. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricated from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
 3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 4. Galvanize exterior miscellaneous frames and supports.
- C. Aluminum Pipe Railing and Handrails:
1. Aluminum Railings and Handrails: Basis of Design: "Majestic Series", or as selected by the Architect as manufactured by AVCON, Lakewood, New Jersey, Ameristar Perimeter Security, USA; Integrity Aluminum Products, LLC; or approved equal.
 2. Provide handrails to comply with applicable State and Local Regulatory Requirements and in accordance with minimum requirements indicated in the Uniform Construction Code, American National standard, Accessible and Usable Buildings and Facilities, ICC/ANSI A117.1.
 3. Structural Performances: Provide railing and handrail assemblies which, when installed, shall comply ASCE standards for minimum design loads for Handrail assemblies and Guardrail Systems and capable of withstanding the following loads applied as indicated:
 - a. To resist a load of 50 pound per linear foot applied in any direction at the top and to transfer this load through the supports to the structure.
 - b. To resist a single concentrated load of 200 pounds applied in any direction at any point along the top, and have attachment devices and supporting structure to transfer this loading to the building structural assemblies, walls, floors or slabs. This load shall act concurrently with loads indicated in paragraph "a" above.
 - c. Guards: Intermediate rails and balusters capable of withstanding a horizontal concentrated load of 200 lb. applied on a one square foot area at any point in system of gross area of guard, including any open areas, of which they are a part. Load need not be assumed to be acting concurrently with uniform horizontal loads on top rails of railing assembly in determining stress on guard supporting members.

- d. Guards shall be designated and constructed for a uniform load of 50 pounds per foot applied horizontally at required guardrail height and a simultaneous uniform load of 100 pounds applied vertically downwards at top of guardrail.
- e. In-fill Area:
 - 1) Concentrated Load: 200 pounds, horizontal load , applied on a 1 square-foot area at any point in the system, including intermediate rail or other elements serving this purpose.
 - 2) This loading condition shall not be applied simultaneously with loading conditions indicated above, (a. b. and c.).
- 4. Fabricate pipe railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of pipe of sizes and wall thickness indicated, or if not shown, as required to support indicated design loading. Unless otherwise indicated all shown dimensions for pipes, rails and other round shapes are outside diameter.
- 5. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - a. At tee and cross intersections provide coped joints.
 - b. At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radiuses indicated.
 - c. Perform welding to comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- 6. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.
- 7. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.
- 8. Close exposed ends of pipe by welding 3/16" thick aluminum plate in place or by use of prefabricated fittings.
- 9. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.
- 10. Finish: Provide clear anodized finish.

D. Nosing:

1. Provide nosings for edge of slab and similar conditions, fabricated of structural steel shapes as shown, of all welded construction with mitered corners and continuously welded joints. Provide anchors welded to nosings for embedding in concrete or masonry construction, spaced not more than 6" from each curb end, 6" from corners and 24" o.c., unless otherwise shown.
2. Galvanize exterior nosings.

E. Pipe Trench Cover: (At Science Rooms)

1. Basis of Design: Model # TST-375, as manufactured by Balco Inc., Wichita, Kansas, Tel. # 800.767.0082 / 316.945.0789; www.balcousa.com; or approved equal.
 - a. Trench covers shall be aluminum, ASTM B209, alloys 6061-T6, 5052-H32 in clear anodized finish.
 - 1) Aluminum surfaces in contact with concrete shall be prime painted.
 - b. Trench Liners: Aluminum: ASTM B209, alloy 5052-H32, 0.063" thick.
 - c. Frames shall be aluminum, ASTM B 221, alloy 6063-T5 in clear anodized finish.
 - d. Provide aluminum frame with anchor bolts at 32" o.c., unless otherwise shown.
 - e. Fabricate trench and access covers, as detailed.
 - 1) Fabricate trench and access cover liners of width, length, and depth as shown on shop drawings.
 - 2) Fabricate splices, special transitions, corner units, corner fittings, intersections, and end closures, as required.
 - 3) Miter and weld joints shall be factory manufactured.
 - 4) Standard fasteners required for assembly and installation shall be included.
2. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
 - a. Architectural Art Mfg., a Division of Pittcon Architectural Metals, LLC, Riverdale, MD, Local Rep. Bob Fanneron, Architectural Specialty Products Corp., Maplewood, NJ, Tel.# 973.763.6420 www.archart.com
 - b. Or approved equal.

F. Countertop Brackets

1. Basis of Design: ADA Vanity Bracket, as manufactured by A&M Hardware Inc., Mount Joy, PA, Tel.# 888-647-0200; or approved equal.
 - a. 23" Stainless steel brackets for countertop.

- b. Dimensions: 3" w x 23" d x 22" h x 12 gauge.
- c. US made ADA Stainless.
- d. Pre-drilled mounting holes.
- e. * GC to provide a stainless steel skirt to mount on the front of the bracket(s) to hide the plumbing.

G. Expansion Joint Covers and Control Joint Covers:

1. Basis of Design: Provide extruded aluminum expansion and control joint covers as manufactured by Balco Inc., Wichita, Kansas, Tel. # 800.767.0082 / 316.945.9328; www.balcousa.com; or approved equal.
 - a. Other acceptable manufacturers:
 - 1) CS Construction Specialties, Muncy, PA, Tel.# 800.233.8493, www.c-sgroup.com
 - 2) MM Systems, Pendergrass, GA, Tel.# 800.241.3460, www.mmsystemscorp.com
 - 3) Gordon Interior Specialties Division, Bossier, LA, Tel. # 800.747.8954, www.gordon-inc.com
 - 4) Or approved equal.
 - b. Aluminum Finish: Provide clear anodized finish or as selected by the Architect to suit adjacent construction conditions, finishes and colors.
2. Provide type and size where shown on drawings, or as required at all building areas to receive expansion joint and column covers. Where used in rated construction, provide fire rated units.
 - a. Submit to the Architect a complete layout drawing indicating all locations of expansion joint and column covers, type, size and detailed construction conditions.
3. Do not proceed with fabrication and/or installation until you receive Architect's approval.
4. Provide assemblies including manufacturer's available anchors, hardware and accessories.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION

A. General

1. **Fastening to In-Place Construction:** Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
2. **Cutting, Fitting and Placement:** Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. **Fit exposed connections accurately together to form tight hairline joints.** Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. **Field Welding:** Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

B. Setting Loose Lintels and Plates:

1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
2. Set Loose Lintels, leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.
3. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 PIPE RAILINGS AND HANDRAILS

- A. Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
- B. Anchor posts in concrete by means of sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

1. Leave anchorage joint exposed; wipe off excess grout and leave 1/8 inch build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.
- C. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
- D. Anchor rail ends to steel with aluminum oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.
- E. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:
 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
- F. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
- G. For hollow masonry anchorage, use toggle bolts having square heads.

3.4 ADJUST AND CLEAN

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.8 mils.
- B. For galvanize surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint.

END OF SECTION 05500

SECTION 06100 - CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Type of work in this section includes rough carpentry for:
 - 1. Dimensional lumber,
 - 2. Wood grounds, nailers and blocking.
 - 3. Rough hardware,
 - 4. Construction panels.

1.3 SUBMITTALS

- A. Material Certificates: Where dimensional lumber is provided to comply with minimum allowable unit stresses, submit listing of species and grade selected for each use, and submit evidence of compliance with specified requirements. Compliance may be in form of a signed copy of applicable portion of lumber producer's grading rules showing design values for selected species and grade. Design values shall be as approved by the Board of Review of American Lumber Standards Committee.
- B. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.
- C. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.
- D. For water-borne treatment include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.
- E. Fire-Retardant Treatment: Include certification by treating plant that treated material complies with specified standard and other requirements.

1.4 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
- B. Do not deliver finish carpentry materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be

stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.5 PROJECT CONDITIONS

- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.
- B. Maintain temperature and humidity in installation areas as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:
 - WWPA - Western Wood Products Association.
- C. Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
- D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
- E. Provide dressed lumber, S4S, unless otherwise indicated.
- F. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing.

2.2 DIMENSION LUMBER

- A. For light framing (2" to 4" thick, 2" to 4" wide) provide the following grade and species:
 - 1. Construction grade.
 - a. Any species of specified grade.
- B. For structural framing (2" to 4" thick, 5" and wider), provide the following grade and species:
 - 1. Any species and grade which meets or exceeds the following values:
 - a. Fb (minimum extreme fiber stress in bending); 1500 psi.
 - b. E (minimum modulus of elasticity); 1,500,000 psi.

- C. For exposed framing lumber provide material complying with the following requirements:
 - 1. Definition: Exposed framing refers to dimension lumber which is not concealed by other work and is indicated to receive a stained or natural finish.
 - 2. Grading: Hand select material at factory from lumber of species and grade indicated below for compliance with "Appearance" grade requirements of ALSC National Grading Rule; issue inspection certificate of inspection agency for selected material.
 - 3. Same species and grade as indicated for structural framing.

2.3 MISCELLANEOUS LUMBER

- A. Provide wood for support or attachment of other work including cant strips, nailers, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:
 - 1. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
 - 2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards or No. 2 Boards.

2.4 CONSTRUCTION PANELS

- A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.
- B. Trademark: Factory-mark each construction panel with APA trademark evidencing compliance with grade requirements.
- C. Concealed APA Performance-Rated Panels: Where construction panels will be used for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.
- D. APA RATED SHEATHING
 - 1. Exposure Durability Classification: EXTERIOR.
 - a. Span Rating: As required to suit joist spacing indicated.
- E. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
 - a. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- F. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED INT with exterior glue, in thickness indicated, or, if not otherwise indicated, not less than 15/32".

2.5 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.
- B. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).
- C. Building Paper: ASTM D 226, Type I; asphalt saturated felt, non-perforated, 15-lb. type.

2.6 WOOD TREATMENT BY PRESSURE PROCESS

- A. Preservative Treatment: Where lumber or plywood is indicated or required to be treated, comply with applicable requirements of AWPB Standards C2 (Lumber and C9 (Plywood)) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.
 1. Pressure-treat above-ground items with water-borne preservatives to comply with AWPB, UC1, UC2, UC3A and UC3B. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:

- a. Wood cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 - c. Wood framing members less than 18" above grade.
2. Treatment products: The following products, provided they comply with requirements of the contract documents will be among those considered acceptable:
- a. "Wolmanized Natural Select Wood, CA treatment.
 - b. Or approved equal.
- B. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment and to comply with AWWA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
- C. Fire-Retardant Treatment: Where fire-retardant treated wood ("FRT") is indicated or required, pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWA C20 and C27, respectively, identify "FRT" lumber with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products Inspection or other testing and inspecting agency acceptable to authorities having jurisdiction.
- 1. Fire treated wood shall have a flame spread of 25 or less and shall be dried to 19% moisture content for lumber and 15% for plywood. Exposed wood or wood subject to high humidity conditions shall be identified that the moisture content shall not exceed 28% when tested at 92% relative humidity in accordance with ASTM D3201.
 - 2. Treatment products: The following products, provided they comply with requirements of the contract documents will be among those considered acceptable:
 - a. "Dricon"; Hickson Corporation.
 - b. "Flame Proof LHC"; Osmose Wood Preserving, Inc.
 - c. "Pyro-Guard"; Hoover Treated Wood Products, Inc.
 - d. Or approved equal.
 - 3. Treat members shown on drawings and/or as required to meet the code requirements.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Foretop concealed spaces of wood framed walls and partitions at each floor level and at the ceiling line of the top story. Where foretops are not automatically provided by the framing system used, use close-fitted wood blocks of nominal 2" thick lumber of the same width as framing members.
- B. Discard units of material with defects which might impair quality of work, and units which

are too small to use in fabricating work with minimum joints or optimum joint arrangement.

- C. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
- D. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.
- E. Countersink nail heads on exposed carpentry work and fill holes.
- F. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.
- D. Height of nailers shall be matched to that of the insulation being used. Nailers shall be firmly anchored to the deck to resist a force of seventy-five pounds per lineal foot. The type of anchors shall be as recommended by the roofing manufacturer and shall be secured at intervals required to ascertain a resistance force of seventy-five pounds per lineal foot.

3.3 INSTALLATION OF CONSTRUCTION PANELS

- A. General: Comply with applicable recommendations contained in Form No. E 30F, "APA Design/Construction Guide- Residential & Commercial," for types of construction panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Sheathing: Screw to framing or substrates.

END OF SECTION 06100

SECTION 06650 - SOLID POLYMER FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Plastic window stools.

1.3 SUBMITTALS

- A. Product Data: Written technical information for unit specified. Indicate product description, fabrication information and compliance with specified performance requirements.
- B. Shop Drawings:
 - 1. Submit rough-in drawings. Include the following details and all other information necessary to demonstrate compliance with contract documents:
 - a. Dimensions.
 - b. Required clearances.
 - c. Methods of assembling components.
 - d. Anchorages.
 - e. Coordination requirements with adjacent work.
- C. Samples: Submit minimum 2 inch by 2 inch samples. Indicate full range of colors and pattern variation. Approved samples will be retained as a standard for work.
- D. Certificates: Submit certification that work complies with requirements of contract documents.
- E. Manufacturer's Instructions: Submit for each product specified in this section.
 - 1. Include installation instructions and instructions for examination, preparation, and protection of adjacent work.
- F. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions and maintenance video.
 - 1. **Provide maintenance kit for indicated finishes. Include in project close-out documents.**

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver no components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.5 QUALITY ASSURANCE:

- A. Allowable Tolerances: Variation in component size: ±1/8 inch.

1.6 WARRANTY:

- A. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of **ten (10) years**, beginning at Date of Substantial Completion.
 - 1. For fabrications with installed warranty coverage, identify by affixing manufacturer's fabrication/installation source plate.

PART 2 - PRODUCTS

2.1 SOLID POLYMER FABRICATIONS:

- A. Basis of Design: Corian Surfaces as manufactured by Du Pont De Nemours & Co., Inc., Tel.# 800.426.7426; or approved equal.
- B. Subject to compliance with indicated requirements manufacturers offering products which may be incorporated in the work include the following:
 - 1. Meganite Inc., Fessenden Hall Inc., Tel.# 800.220.2233.
 - 2. LG Solid Surfaces, Tel.# 609 495-4081.
 - 3. Wilsonart, Tel.# 800.433.3222.
 - 4. Avonite Surfaces, Tel.# 800.428.6648.
 - 5. Or approved equal.
- C. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124 1980, Type Six, and FS WW-P-541E/GEN dated August 1, 1980.

2.2 PERFORMANCE CHARACTERISTICS:

<u>PROPERTY</u>	<u>REQUIREMENT</u> (min/max)	<u>TEST PROCEDURE</u>
Tensile Strength	5000 psi min	ASTM D638
Tensile Modulus	1.0 x 10 ⁶ psi min	ASTM D638
Flexural Strength	7000 psi min	ASTM D790
Flexural Modulus	1.0 x 10 ⁶	ASTM D790
Elongation	0.3% min.	ASTM D638
Strain at Break	0.8% min.	ASTM D638
Hardness	90-Rockwell "M" scale 52-Barcol Impressor min.	ASTM D758

Thermal Expansion	3.5 x 10 ⁻⁶ in/in/deg C max 1.95 x 10 ⁻⁶ in/in/deg F max	ASTM D696
Color Stability	No change, min. 100 hours	NEMA LD3-3.10
Wear and Cleanability	Passes	ANSI Z124.3
Abrasion Resistance	No loss of pattern Weight loss (1000 cycles)=0.9 g. max.	NEMA LD3-3.01 ANSI Z124.3
Boiling water Surface Resistance	No Change	NEMA LD3-3.05
High Temperature Resistance	No Change	NEMA LD3-3.06
Conductive Heat Resistance	No Change	NEMA LD3-3.08
Impact Resistance Notched Izod	0.24 ft.-lbs./in. of notch min.	ASTM D256, Method A
Gardner	9.0 ft-lbs min.	ASTM D3029
Ball drop 1/4" sheet	36" min. with 1/2 lb ball, no failure	NEMA LD3-303
1/2" sheet	140" min. with 1/2 lb ball, no failure	
3/4" sheet	200" min. with 1/2 lb ball, no failure	
Stain Resistance	Passes	ANSI Z124.3
Weatherability	No change, min. 1000 hours	ASTM D1499-84
Fungi and Bacteria	No Attack	ASTM G21, ASTM G22
Specific Gravity	1.6 min.	

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Water Absorption Weight (% max.)	24 hrs. 0.05 (1/4") max. 0.10 (3/4") max.	Long Term 0.50 (1/4") max. 0.90 (3/4") max.	ASTM D570
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Flammability ASTM E84

	Solid Colors		
	1/4"	1/2"	3/4"
Flame spread	25 max	25 max	25 max
Smoke Developed	30 max	30 max	30 max
Class	1	1	1

	Particulate Patterns		
	1/4"	1/2"	3/4"
Flame spread	25 max	25 max	25 max
Smoke Developed	30 max	30 max	30 max
Class	1	1	1

Pittsburgh Protocol Toxicity (as used by NY state)	solids-80 grams min. particulate patterns-65 grams min.	"LC50" Test
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2.3 ACCESSORY PRODUCTS

- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints by chemical bond.
- B. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive complying with ANSI A136.1-1967, UL listed.
- C. Sealant: Manufacturer's standard mildew-resistant, FDA, UL listed silicone sealant in colors matching components.

2.4 FABRICATION:

- A. Factory fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed Instructions and technical bulletins.

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- B. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints. Reinforce with strip of solid polymer material, 2" wide.
- C. Rout and finish component edges with clean, sharp returns. Rout cutouts, radii and contours to template. Smooth edges. Repair or reject defective and inaccurate work.
- D. Window Stools: 1/2 inch thick solid polymer material, adhesively joined with inconspicuous seams, having round edge, 1" thick minimum and with 1" minimum projection from face of wall, unless otherwise shown on the Drawings.
 - 1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's **Color Group - 1 - 5**.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Prior to final approval of shop drawings, erect at project site one full size mock-up of each component required, for Architect's review.
- B. Should mock-up not be approved, re-fabricate and reinstall until approval is secured. Remove rejected units from project site.
- C. Approved mock-ups may remain as part of finished work.

3.2 INSTALLATION

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
- B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Reinforce joints as required.
- C. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

3.3 CLEANING

- A. Clean shop finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

3.4 PROTECTION

- A. Contractor to take all precautions as recommended by the manufacturer for protection of installed window stools and other solid plastic products from damage by work of other trades.

END OF SECTION 06650

SECTION 07050 - ROOF DEMOLITION

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 GENERAL

- A. The Contractor will be responsible for the removal and disposal of all materials generated from work of this contract.
- B. Provide all labor, material equipment, and tools as required to prepare the existing roof section for roofing replacement work as specified in this Section and other Division 7 sections.
- C. Provide for the proper disposal of all existing materials designated to be removed. Use approved trash receptacles in areas designated by the Owner's representative.
- D. Coordinate work, in such a manner as to keep the new insulation and roofing materials, building, and building interior absolutely clean, dry and watertight.
- E. Contractor is to maintain the building roof in a watertight condition at the completion of each day's work and ensure that no water enters into the building. Roof areas are to be "watertight at night" at all times during the job. Failure to do so is grounds for dismissal. Contractor will reimburse Owner the cost to repair interior damages resulting from roof leaks during construction.
- F. Contractor is to maintain the building and site in a neat and orderly fashion at all times. Completely remove all scrap and debris on a daily basis. Failure to do so is grounds for dismissal.

1.3 SUBMITTALS

- A. Proposed Demolition Activities:
 - 1. Submit proposed schedule of demolition activities. Indicate:
 - a. Starting and ending dates for each activity as appropriate.
 - b. Interruption and restoration of utility services.
 - 2. Submit proposed methods of operations.
- B. Project Record Documents:
 - 1. Indicate unanticipated structural, electrical, or mechanical conditions.
- C. Photographs: Before starting work, file with the Architect photographs documenting existing conditions that later could be mistaken for damage caused by demolition operations.

1.4 PROJECT CONDITIONS

- A. Occupancy: The Owner will continue to occupy portions of the existing building.
- B. Hazardous Materials:
 - 1. If present, the removal and disposal of said asbestos shall be handled by/ or through the General Roofing Contractor, and performed in full compliance with all State and Federal laws and regulations, and in compliance with the requirements of all authorities having jurisdiction including, but not limited to the regulations of the U.S. Dept. of Labor, the Occupational Safety and Health Administration [OSHA], the State Department of Environmental Protection and Health relating to the treatment, removal and disposal of asbestos.
 - 2. Although this removal project falls under N.J.A.C. 5:23-8.24[c], all other pertinent regulations, such as disposal in a proper landfill, must be followed.
 - 3. The Roofing Contractor/ or his subcontractor responsible for removal and disposal of asbestos material shall be solely responsible for the proper and safe removal and legal disposal of the material.
 - 4. The Roofing Contractor shall be responsible to engage and pay for the services of a certified testing laboratory to write the specifications for and monitor the removal and disposal of the asbestos contaminated materials.
 - a. The testing lab shall provide legal documentation to the Owner for the removal and disposal of the asbestos materials.
 - b. The laboratory name and certification to perform this type of work shall be provided as part of the bid documents.
- C. The Architect, has no authority or professional involvement relative to the asbestos removal or disposal phase of the project and will not be available for questions and / or directions in this regard.
 - 1. This asbestos reference is included as a convenience to the Owner, and the Architect accepts no responsibility nor liability for the accuracy of information, bidders conclusions, methods to be used, nor for any aspect of approvals required by the contractor in undertaking and completing this project insofar as asbestos is concerned.
- D. Unforeseen Conditions:
 - 1. Should unforeseen conditions be encountered that affect design or function of project, investigate fully and submit an accurate, detailed, written report to the Owner / Architect. While awaiting the Owner / Architect's response, reschedule operations if necessary to avoid delay of overall project.

PART 2

2.1 EQUIPMENT

- A. Demolition equipment and materials are provided by the Contractor.

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PART 3

3.1 EXECUTION

- A. Contractor shall take all necessary precautions during roof preparation to protect the building exterior, building interior, and adjacent surfaces from being soiled or damaged.
- B. When weather threatens, cease work under this Section and return roof to a watertight condition.
- C. Contractor shall restore to original condition any damages caused during work on this project. Damages found on this project prior to start of work must be documented by contractor and brought to Owner's attention prior to start of work.
- D. All roof drains are assumed to be in good operating condition. Contractor is to verify good operating condition of roof drains prior to start of work on this project. Damaged, clogged or partially clogged drains must be documented by Contractor and brought to Owner's attention prior to start of work on this project.
- E. Return all roof drains to operating condition at the end of each working day.
- F. The roofing assembly (ie.: roof membrane, aggregate, walkway pads, recovery board, thermal barrier board, adhesives, fasteners, insulation, etc.) will be removed down to the structural deck. Deteriorated decking will be replaced as necessary on a unit price basis (refer to Section 01151).
- G. Immediately prior to insulation attachment, sweep the deck surface. Do not allow foreign objects to become trapped under the insulation board by being left on the deck surface.
- H. If, during observation of the prepared surface, the Architect or the manufacturer's representative determined the deck surface was not prepared properly, Contractor shall re-prepare the surface to the satisfaction of the Architect or manufacturer's representative.
- I. Properly dispose of all debris from roof preparation on a daily basis.
- J. Do not store debris on roof. Contractor shall take care not to over stress roof deck.
- K. Provide closed trash chutes or other approved means for removal of debris.
- L. Construct all necessary bridges, barricades, fencing, warning sign, scaffolding, etc., required to protect personnel and property.
- M. Prior to the completion of the work, remove from the job site all tools, equipment, debris and waste.

END OF SECTION 07050

SECTION 07130 - WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Application of bentonite sheet waterproofing under the acid waste pit, as indicated.
 - 2. Protection of installed waterproofing.
- B. Related Sections:
 - 1. Section 02200 - Earthwork.
 - 2. Section 03300 - Concrete Work.

1.3 SUBMITTALS

- A. Product Data: Submit 2 copies of specifications, installation instructions and general recommendations from manufacturers of waterproofing system materials, for types of waterproofing required. Include data substantiating that materials comply with requirements.
- B. Shop Drawings: Submit complete shop drawings showing waterproofing configuration, sheet layout, seam locations, colors (as applicable), details at perimeter, and special conditions.
 - 1. Indicate layout of seams and type of sealant material to be used where indicated or required.
- C. Samples:
 - 1. Waterproofing material: Submit 6-inch-square samples.
- D. Certificate of Compliance: Submit a certification, signed by the contractor and installer, certifying that work of this section has been completed in accordance with the manufacturer's written instructions and in compliance with contract requirements.
- E. Manufacturer's Warranty: Manufacturer's standard executed warranty, agreeing to repair or replace components of bentonite waterproofing system that fail in material within **five (5) years** starting at date of substantial completion. Failures include, but are not limited to the following:
 - 1. Water penetration into the building or structure.
 - 2. Deteriorated or displaced waterproofing material.
 - 3. Also refer to Section 01900 for special project warranty conditions for bentonite waterproofing system.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A company that has produced waterproofing materials and accessories of the type included in this section for a recommended five years.
- B. Installer Qualifications: A company licensed or certified by the waterproofing materials manufacturer to install waterproofing material similar to the type included in this section.
- C. Pre-Application Meeting: A pre-waterproofing application meeting shall take place 5 days prior to the installation of the membrane. Those in attendance will be the Contractor, the waterproofing subcontractor, the manufacturer's representative, the inspection service, Owner's representative and the Architect.
- D. Inspection: Manufacturer's representative and the inspection service shall inspect the bentonite waterproofing installation on regular basis and provide written certification that waterproofing has been installed in accordance with the manufacturer's recommendation.
 - 1. **The General Construction Work Contractor to provide and independent waterproofing Inspection Firm utilized not less than one (1) day per week, during the waterproofing activities and provide written report of same.**
 - 2. **Waterproofing Inspection Firm to be approved by the Architect and the Construction Manager.**

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver bentonite materials to project site dry and protected from contact with moisture.
- B. Store materials in dry, well ventilated space.
- C. Maintain bentonite materials in dry state during placing and backfilling. Replace materials which come in contact with moisture before completion of backfill.

1.6 SITE CONDITIONS

- A. Comply with manufacturer's recommendations regarding weather conditions before and during installation, condition of the substrate to receive waterproofing, and protection of the installed waterproofing system.
- B. Do not install bentonite waterproofing on surfaces with visible standing water, ice, or frost.

PART 2 - PRODUCTS

2.1 BENTONITE WATERPROOFING MATERIALS AND ACCESSORIES

- A. Bentonite Sheets Waterproofing:
 - 1. Basis of Design: Provide Bentonite System; "CCW MiraClay" as manufactured by Carlisle Coatings & Waterproofing, Inc., Wylie, TX, Tel.# 800.527.7092, www.carlisle-ccw.com; or approved equal.

- a. Bentonite Content; 1.0 lb./ft. sq.
- b. Dry thickness: 1/4 inch.
- c. Weight: 75 lb./ sq. ft
- d. Permeability Rating: 5x10⁻¹⁰ cm/sec., ASTM D-5084.
- e. Grab Tensile Strength: 95lb. , ASTM D-4632.
- f. Grab Elongation: 150%, ASTM D-4632.
- g. Puncture Resistance: 120 psi., ASTM D-4833.
- h. Hydrated Internal Sheer: 500psf, ASTM- D-5321
- i. Swell Index: 2g., min., ASTM D5890
- j. Fluid Loss: 18 ml., max., ASTM D 5891.

B. Bentonite waterproofing system accessories by waterproofing manufacturer:

1. Mastic: "CCW MiraClay Mastic" for use in detailing at terminations and filling minor voids in concrete.
2. Waterstop: "CCW MiraSTOP" for use as waterstop between concrete slabs and walls, between existing and new concrete, as indicated or required.
3. Termination Bar: Extruded or formed aluminum bars with upper flange formed to receive sealant.
4. Fasteners: Case-hardened nails or hardened steel powder-actuated fasteners. Provide minimum 1-inch-diameter washers under fastener heads.
5. Sealants and Waterstop Types: Manufacturer's standard.
 - a. Width and thickness of waterstops and sealant bead as per manufacturer's recommendations and written instructions for indicated applications.

C. Subject to compliance with requirements, manufacturers of bentonite sheet waterproofing which may be incorporated in the work include, but are not limited to, the following:

1. Volclay Waterproofing, a CETCO Building Materials Group, Arlington Heights, IL, Tel.# 800.527.9948 or 847.392.5800, www.cetco.com.
2. Or approved equal.

2.2 REPAIR AND PREPARATIONS TO INTERIOR SIDE OF ACID WASTE PIT

- A. Primer: Provide "Conpro Primer"; as manufactured by Conproco Corporation. Materials shall be water based bonding primer to meet requirements of ASTM C882.
- B. Repair Mortar: Provide "One Shot Ag"; as manufactured by Conproco Corporation. Materials shall be single component, polymer modified, portland cement concrete with "ECB" anti-corrosion coating.

2.3 WATERPROOFING APPLICATION ON INTERIOR SIDE OF WALLS AND SLAB AT ELEVATOR PIT

- A. Basis of Design: Provide "Conpro Super Seal" as manufactured by Conproco Corporation.
- B. Potable water for mixing.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that substrate is clean, smooth, and dry, and that all work which will penetrate waterproofing is complete and rigidly installed. Substrate should be without sharp deflection or pockets.
- B. Verify locations and limits of waterproofing termination. Coordinate waterproofing with adjacent work.
- C. Formed Concrete Surfaces: Remove projections and rough concrete by grinding.
- D. Fill stone or rock pockets, form tie holes, and other voids with gravel compacted to a minimum of 85% modified proctor density. Crushed stone must not be larger than 3/4" in size.

3.2 INSTALLATION - GENERAL

- A. Waterproofing and Accessories: Adhere to manufacturer's instructions, standard details, and recommended installation procedures. Where contract documents and manufacturer's instructions appear to conflict, consult the architect for resolution.
- B. Coordinate work in vicinity of waterproofing to ensure proper conditions for waterproofing system installation and to prevent damage to the waterproofing after installation.

3.3 INSTALLATION - BENTONITE WATERPROOFING

- A. General:
 - 1. Unless indicated otherwise, install bentonite waterproofing with ends and edges overlapped a minimum of 4 inches. Stagger sheet ends a minimum of 12 inches.
 - 2. Protect waterproofing from damage and wetting before and during subsequent construction operations.
- B. Under Slabs:
 - 1. If concrete slabs are poured in sections, bentonite waterproofing should extend 12" beyond the slab edge to allow for overlapping for subsequent slab section pours.
 - 2. Provide proper waterstoppage material at tie into to vertical walls.
 - 3. Provide waterstoppage at all areas of penetrations, around piping, conduits, or at other penetrations.
- C. Walls:
 - 1. Install waterproofing starting at bottom of wall; lap ends and edges. Secure with fasteners or mastic.
 - 2. Continue waterproofing to bottom of footing, grade beam, or wall.

3. Horizontal-to-vertical transitions: Follow manufacturer's standard details.
4. Termination: Install bentonite waterproofing to extend indicated, but in no case less than 12" in horizontal direction under slabs. Secure top edge with termination bar. Apply sealant to top edge of termination bar.

3.4 REPAIR AND PREPARATIONS TO INTERIOR SIDE OF ACID WASTE PIT

- A. Remove loose and deteriorated materials, dirt, dust, oil and any surface contaminants that will inhibit proper penetration.
- B. Apply primer in a uniform 6 mils, wt application, in accordance with manufactures instructions. Apply to all surfaces to receive repair mortar materials including corners and edges.
- C. Apply repair mortar materials when primer is orange color and within 72 hours. Re-apply primer if more than 72 hours pass without placing repair mortar materials.
- D. Remove all Scaling rust from reinforcing steel, apply ant-rust corrosion coating.
- E. Mechanically mix repair mortar materials with potable water in accordance with manufacturer's instructions and recommendations.
- F. Fill existing holes with mortar material. Trowel apply repair mortar materials to existing interior wall and slab surfaces continuously to break points.
- G. Curing: Dampen the repair material with a fine mist of water for 24 hours or moist cure with wet burlap and polyethylene and/or apply manufacturer's recommended cure and seal material. Protect all surfaces until application of waterproofing.

3.5 WATERPROOFING APPLICATION ON INTERIOR SIDE OF ACID WASTE PIT

- A. Walls: At time of application, surfaces should be saturated surface dry but hold no standing water.
 1. Clean and pre-stripe non-structural cracks, up to 1/16 inch, with one 4" wide, 50 mils application of material.
 2. All dynamic cracks, joints and transitions must be properly detailed with a closed cell backer rod and polyurethane sealant. Apply 4-6 inch wide strip of material over cured sealant. Embed mesh fabric while material is plastic.
 3. Apply a 50 mils. coat over entire wall and slab surfaces with stiff bristle brush or spray, as recommended by the manufacturer for indicated application. Do not exceed 60 mils. per coat.
 4. Apply a second coat once first coat is thumb-print hard.
- B. Curing: Follow manufacturer's instructions. Apply manufacturer's recommended cure and seal material when needed. Protect all surfaces of waterproofing until substantial completion of the project.

END OF SECTION 07130

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SECTION 07200 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Work included in this Contract: Contractor shall include all labor, materials, services, installation, equipment, etc., necessary to complete all building insulation (except roof insulation) to achieve complete and tight building thermal barrier to prevent the passage of exterior air into conditioned spaces and prohibit the formation of condensation.
 - 1. Provide indicated types of insulation as shown on drawings, as specified herein, and/or as required by all job conditions and building assemblies, whether clearly shown or not to achieve included work.
 - 2. Insulation types include but are not limited to the following:
 - a. Blanket type building insulation with foil facing for concealed application and unfaced for exposed application,
 - b. Rigid board type perimeter insulation,
 - c. Rigid board type cavity wall insulation,
 - d. Blanket Thermal Insulation,
 - e. Fire safing insulation with UL approved coating,
 - 3. Related Work:
 - a. Section 03300 - Concrete Work,
 - b. Section 04200 - Unit Masonry,
 - c. Section 05450 - Cold-Formed Metal Framing
 - d. Section 07600 - Roof Accessories,
 - e. Section 07840 - Through-Penetration Firestop Systems,
 - f. Section 09250 - Gypsum Drywall.
 - g. Division 5 - Mechanical Work

1.3 QUALITY ASSURANCE

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value at 75°F) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thicknesses.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
 2. Fire-Resistance Ratings: ASTM E 119.
 3. Combustion Characteristics: ASTM E 136.
- C. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with governing regulations as interpreted by authorities.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation required. Include data substantiating that materials comply with specified requirements.
- B. Samples: Submit triplicate samples of the following listed items, in accordance with Contract Documents. Obtain Architect's approval before proceeding with ordering or fabrication of items of this section:
1. Each type of insulation specified - 12 inches square.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General Protection and Handling: Protection from Deterioration: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Extruded-Polystyrene Board Insulation:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company.
 - c. Owens Corning.
 - d. Tenneco Building Products.
 - e. Or approved equal.
 2. Glass-Fiber Insulation:
 - a. CertainTeed Corporation.
 - b. Johns Manville.
 - c. Owens Corning.
 - d. Guardian Building Products, Inc.
 - e. Knauf Insulation.
 - f. Or approved equal.

3. Blanket Thermal Insulation:
 - a. Industrial Insulation Group, LLC
 - b. Fibrex Insulations.
 - c. Isolatek International.
 - d. Owens Corning.
 - e. Rockwool, North America.
 - f. Or approved equal.

4. Fire Safing Insulation:
 - a. Industrial Insulation Group, LLC
 - b. Fibrex Insulations.
 - c. Isolatek International.
 - d. Owens Corning.
 - e. Rockwool, North America.
 - f. Or approved equal.

- B. Mineral/Glass Fiber Blanket/Batt Insulation
 1. Inorganic fibers formed into flexible resilient blankets or semi-rigid resilient sheets:
 - a. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with a max. flame-spread index of 25 and smoke-developed index of 50, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
 - b. Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

- C. Mineral-Wool Board Insulation:
 1. Semi-Refractory Fiber Board Fire Safing Insulation: Semi-rigid boards designed for use as a fire stop at openings between edge of slab and exterior wall panels, at top of masonry and wallboard walls/deck interface, and shall be produced by combining semi-refractory mineral fiber manufactured from slag with thermosetting resin binders.
 2. Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with a flame-spread index of 15 and a smoke-developed index of zero, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
 - a. Nominal density of 8 lb/cu. ft., Type III, thermal resistivity of 4.35°F x h x sq. ft./Btu x in. at 75°F.
 3. Provide darkened fiber color, where indicated for applications exposed to view.
 4. At all rated masonry and wallboard walls and partitions, rated slabs and exterior wall panels, the fire safing insulation shall be coated with 3M Firedam products, or approved equal, to achieve indicated UL design requirements.

- D. Rigid, closed-cell polystyrene insulation board; ASTM C578-87A, Type IV, 25 psi compressive strength; 1.1 perm-inch maximum vapor transmission; 0.1% maximum water absorption; manufacturer's standard lengths and widths. Provide insulation complying with a flame spread rating of 5 when tested in accordance with ASTM E84.
1. Basis of Design: Provide "Styrofoam Square Edge", by Dow Chemical Co., U.S.A.
 - a. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) DiversiFoam Products.
 - 2) Owens Corning.
 - 3) Tenneco Building Products.
 - 4) Or approved equal.
 - b. k-value of 0.20 per inch and an R value of 5.0 per inch.
 2. ANSI/ASHRAE/IES Standard 90.1-2013, requires R-15 rigid insulation under all slab on grade conditions along the perimeter of the exterior wall.
- E. Rigid Insulation (cavity wall insulation)
1. Rigid, moisture resistant, closed-cell extruded polystyrene insulation board; ASTM C578, Type IV, 25 psi compressive strength; 1.1 perm-inch maximum vapor transmission; 0.1% maximum water absorption; manufacturer's standard lengths and widths. Provide insulation complying with a flame spread rating of 10 and smoke developed of 160, when tested in accordance with ASTM E84.
 - a. Basis of Design: Provide "Cavitymate Ultra", by Dow Chemical Co., U.S.A.; or approved equal.
 - 1) Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a) DiversiFoam Products.
 - b) Owens Corning.
 - c) Tenneco Building Products.
 - d) Or approved equal.
 - b. R value of 5.6 per inch; ASTM C518.
 - c. Thickness: 1-3/4", unless indicated otherwise.
- F. Blanket Thermal Insulation:
1. Basis of Design: ROXUL COMFORTBAT®, or approved equal.
 2. Performance: Batt Insulation for mansard roof, ASTM C665, Type 1.

- a. Fire Performance:
 - 1) Non-combustibility: ASTM E136.
 - 2) Surface Burning Characteristics: ASTM E84.
 - a) Flame spread: 0.
 - b) Smoke developed: 0.
 - b. Thermal Resistance: ASTM C518.
 - c. Density: 2 lb/ft³, ASTM C167.
 - d. Recycled content: [40] [16] % minimum.
3. Product: Non-combustible, lightweight, semi-rigid mineral wool batt insulation, ASTM C665, Type 1.
- a. Size: 24.25 x 48 inches.
 - b. Thickness: Two layers of 3.5 inches with overlapping edges.
 - c. R value 7 @ R-1 per inch at 75 °F: 4.0 h ft²/Btu.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
 - 1. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
 - 2. Provide complete and tight building thermal barrier, to prevent the passage of exterior air into conditioned spaces and prohibit the formation of condensation.
 - 3. Provide indicated types of insulation as shown on drawings, as specified herein, and/or as required by all job conditions, building assemblies, and whether clearly shown or not.
 - 4. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - a. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
 - 5. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

C. Batt Insulation

1. General:

- a. Set vapor barrier faced units with vapor barrier to warm side of construction.
- b. Tape joints and ruptures in vapor barriers, and seal each continuous area of insulation to surrounding construction to ensure vapor-tight installation.
- c. Insert and secure insulation to fill voids to create barrier to prevent the pass of air and moisture.

D. Cavity Wall Insulation

1. On units of plastic insulation, install small pads of mortar or mastic spaced approximately 1'-0" on center both ways on inside face, as recommended by manufacturer. Press courses of insulation between wall ties and other confining obstructions in the cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - a. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 2'-0" on center both ways.

E. Perimeter Insulation

1. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.

F. Blanket Thermal Insulation

1. Install insulation in accordance with manufacturer's written recommendations.
2. Install insulation to maintain continuity of thermal protection to building elements and spaces.
3. Do not compress insulation to fit into spaces.
4. Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
5. Keep insulation minimum [3] inches from heat emitting devices such as recessed light fixtures, and minimum [2] inches from sidewalls of chimneys and vents.
6. Do not enclose insulation until before inspection and receipt of Consultant's written approval.

G. Fire Safing Insulation

1. Install fire safing insulation at all indicated locations, as required by authorities having jurisdiction and in accordance with manufacturer's instructions.

2. Provide sealant material and type required for indicated applications. Provide fire rated type at rated assemblies.
 3. Provide coating materials at indicated UL. Rated assemblies.
- H. All installations of insulation and work of this section shall meet approval of Architect and all code authorities having jurisdiction at no additional cost to the Owner.

END OF SECTION 07200

SECTION 07270 - FLUID APPLIED AIR / VAPOR BARRIERS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01- General Requirements shall be read in conjunction with and govern this section.
- B. The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the installing Subcontractor the extent of their Work.

1.02 SUMMARY

- A. This Section includes requirements for supplying labor, materials, tools, and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to, the following:
 - 1. Adhesive/Primer
 - 2. Fluid Applied Impermeable Air and Vapor Barrier
 - 3. Air Barrier/Thru-wall Flashing
 - 4. Sealant
 - 5. Insulation Adhesive

1.03 RELATED SECTIONS

- A. Section 04200 - Unit Masonry
- B. Section 05500 - Metal Fabrications
- C. Section 07200 - Building Insulation
- D. Section 07500 - Roofing, General
- E. Section 07530 - Single-Ply Roofing Membrane System
- F. Section 07535 - Modified Bitumen Roofing System - Cold Applied
- G. Section 07600 - Flashing, Sheet Metal and Roofing Accessories
- H. Section 07900 - Joint Sealer Assemblies
- I. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems
- J. Section 08415 - Aluminum Storefront
- K. Section 08520 - Aluminum Windows
- L. Section 08900 - Glazed Curtain Wall

1.04 SUBSTITUTIONS

- A. Submit requests for substitutions in accordance with AIA A201 and Section 00800.

- B. Substitution submission format to include:
1. Evidence that alternate materials meet or exceed performance characteristics of product requirements and documentation from an approved independent testing laboratory certifying that the performance of the system including auxiliary components exceed the requirements of the local building code.
 2. References clearly indicating that the Air / Vapor Barrier Manufacturer has successfully completed projects of similar scope and nature on an annual basis for a recommended minimum of ten (10) years.
 3. Air Barrier Manufacturer's guide specification.
 4. Air Barrier Manufacturer's complete set of technical data sheets for assembly.
 5. Air Barrier Manufacturer's complete set of details for assembly.
 6. Product certification confirming assembly components are supplied and warranted by a single source Air Barrier Manufacturer.
 7. Air Barrier Manufacturer statement that anticipated wall assembly compliance with NFPA 285.
 8. Sample warranty, as specified.
- C. Submit requests for substitutions to this specification within fourteen (14) days following award date. Include a list of a recommended twenty (20) projects executed over the past five (5) years.
- D. Substitute materials not approved in writing shall not be permitted for use on this project.

1.05 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 711-13 - Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products
 2. AAMA 2400-02 - Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction
- B. American Society for Testing and Materials (ASTM):
1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheet
 2. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
 4. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
 5. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen

6. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
7. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials
8. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

C. National Fire and Protection Agency (NFPA):

1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.06 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation meetings:

1. When required, and with prior notice, an Air Barrier Manufacturer representative will meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the assembly.

1.07 SUBMITTALS

A. Provide the following requested information in accordance with AIA A201 and Section 00800 - Submittal Procedures.

B. Action Submittals:

1. Product Data:
 - a. Air Barrier Manufacturer's guide specification.
 - b. Air Barrier Manufacturer's complete set of technical data sheets for assembly.
 - c. Air Barrier Manufacturer's complete set of guide details for assembly.
2. Certificates:
 - a. Product certification confirming assembly components are supplied and warranted by a single source Air Barrier Manufacturer.
3. Tests and Evaluation Reports:
 - a. NFPA 285 wall assembly compliance:
 - 1) Air Barrier Manufacturer statement that anticipated wall assembly complies with NFPA 285.
4. Warranty:
 - a. Sample warranty, as specified.

1.08 QUALITY ASSURANCE

A. Single Source Responsibility:

1. Obtain air barrier and auxiliary materials including adhesive/primer, air barrier, flashings, and sealants from a single Air Barrier Manufacturer regularly engaged in the manufacturing and supply of the specified products.
2. Contactor to verify product compliance with Federal, State, and Local regulations controlling use of Volatile Organic Compounds (VOC).

B. Manufacturer Qualifications:

1. Air Barrier Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:

- a. Air Barrier Manufacturer must not issue warranties for terms longer than they have been manufacturing and supplying specified products for similar scope of Work.
- C. Installer Qualifications:
1. Perform Work in accordance with the Air Barrier Manufacturer's published literature and as specified in this section.
 2. Maintain one (1) copy of the Air Barrier Manufacturer's installation instructions on site.
 3. At all times during the execution of the Work allow access to site by the Air Barrier Manufacturer representative.
 4. If meeting with the Air Barrier Manufacturer during project construction, contact the Air Barrier Manufacturer a minimum of two weeks prior to schedule meeting.

1.09 MOCK-UPS

- A. Mock-ups: Construct mock-ups to verify selections made under submittals and to set quality standards for materials and execution in accordance with Section 04200 for mock-ups and as follows:
1. Where directed by Architect, construct typical exterior wall section, incorporating substrate materials, and adjacent materials including flashing, typical wall opening (door / window), attachment of insulation; showing vapor permeable water resistive air barrier application details.
- B. Notify Architect a minimum seven (7) days prior to mock-up construction.
- C. Review and acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically notes such deviations in writing.
- D. Once reviewed by Architect, acceptable mock-up can form a permanent part of the Work and will form the basis for acceptance for the remainder of the project.
- E. Remove and replace materials found unacceptable at no additional cost to the Owner.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials:
1. Materials shall be delivered to the jobsite in unopened, undamaged and clearly marked containers indicating the name of the Air Barrier Manufacturer and product.
- B. Storage of Materials:
1. Store materials as recommended by the Air Barrier Manufacturer and conforming to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, SDS information, Product Data sheets, product labels, and specific instructions for personal protection.
 2. Keep solvents away from open flame or excessive heat.
 3. Store materials in original packaging.
 4. Protect rolls from direct sunlight until ready for use.

5. Refer to Air Barrier Manufacturer's published literature.
- C. Handling:
1. Refer to Air Barrier Manufacturer's published literature.

1.11 SITE CONDITIONS

- A. Environmental Requirements:
1. No Work shall be performed during rain or inclement weather.
 2. No Work shall be performed on frost covered or wet surfaces.
- B. Protection:
1. It is the responsibility of the installing Subcontractor to protect all surfaces not included in scope of Work from overspray including, but not limited to, windows, doors, adjacent areas, and vehicles.
 2. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Do not proceed with the application of the field air barrier until the roof has been installed
- C. Ensure all preparation Work is completed prior to installing air barrier.
- D. All equipment shall be grounded during operations.

1.12 WARRANTY

- A. Manufacturer's Single Source Warranty:
1. Fluid Applied Air and Vapor Barrier:
 - a. Product Warranty: Manufacturer warrants the material against product defect for a period of **five (5) years** from date of purchase.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Air Barrier and auxiliary materials must be obtained as a single-source from the Air Barrier Manufacturer to ensure total system compatibility and integrity.
- B. Basis of Design: Henry® Co., 999 N. Sepulveda Blvd., Suite 800, El Segundo, CA 90245, Tel.# 800.486.1278, www.henry.com; or approved equal.

2.02 MATERIALS

- A. Air and Vapor Barrier Primary Fluid-Applied, Air and Vapor Barrier - Basis of Design: Henry® Air-Bloc® 16MR:
1. Fluid-applied vapor impermeable air and water barrier consisting of a single component water-based elastomeric formulation that cures to a tough monolithic rubber-like membrane; having the following typical physical properties:
 - a. Color: Gray
 - b. Water Vapor Permeance (ASTM E96 Method A): 0.03 perms
 - c. Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass

- d. Air Permeance (ASTM E2178): Pass
 - e. Elongation (ASTM D412): 270%
 - f. Tensile Strength (ASTM D412): 100 psi (689 kPa)
 - g. Surface Burning Characteristics (ASTM E84):
 - 1) Flame Spread: Class A
 - 2) Smoke Development: Class A
 - h. Minimum Application Temperature: 20F (-6°C)
 - i. Water Penetration Resistance Around Nails (ASTM D1970): Pass
 - j. Maximum VOC:100 g/l
2. Assembly Auxiliary Materials:
- a. Adhesives/Primers[st1]:
 - 1) Low VOC adhesive:
 - a) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
 - (1) Basis of Design: Henry® Blueskin® LVC Adhesive
 - (2) Color: Blue
 - (3) Maximum VOC: <240 g/L
 - (4) Drying time (initial set): 30 minutes
 - (5) Low Application Temperature: 10F (-12°C)
 - 2) Quick setting primers:
 - a) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
 - (1) Basis of Design: Henry® Blueskin® LVC Spray Primer
 - (2) Color: Blue
 - (3) Maximum VOC: 250 g/L
 - (4) Dry time: 1-3 minutes
 - (5) Low Application Temperature: 40F (4.4°C[st2][st3])
 - b) Polymer emulsion water based quick setting adhesive with low VOC content; having the following typical physical properties:
 - (1) Basis of Design: Henry® Aquatac™ Primer
 - (2) Color: Aqua
 - (3) Maximum VOC: 50 g/L
 - (4) Drying time (initial set): 30 minutes
 - (5) Low Application Temperature: 25F (-4°C)
 - b. Liquid-Applied Flashing:
 - 1) Moisture-curing single component elastomeric liquid-applied flashing using a highly advanced Silyl-Terminated Polyether (STPE) polymer curing to a monolithic membrane; having the following typical physical properties:
 - a) Basis of Design: Henry® Air-Bloc® LF Liquid-Applied Flashing
 - b) Color: Blue
 - c) Air Permeance (ASTM E2178): Pass
 - d) Water Vapor Permeance (ASTM E96): 21.8 perms @ 25 mils
 - e) Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
 - f) Water Resistance (AC212/ASTM D2247): Pass
 - g) Nail Sealability (AAMA 711): Pass
 - h) Surface Burning Characteristics (ASTM E84):

- (1) Flame Spread: Class A
- (2) Smoke Development: Class A
- i) Elongation (D412): 264%
- j) Low Application Temperature: 20F (-7C)

c. Self-Adhered Flashing:

Note: The following product is to be used in conjunction with the copper fabric flashing as specified in Section 04200. The self-adhered flashing shall overlap the copper fabric flashing.

- 1) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of a synthetic butyl compound integrally laminated to a white engineered polypropylene film surface; having the following typical physical properties:
 - a) Basis of Design: Henry® Blueskin® Butyl Flash
 - b) Color: White
 - c) Thickness: 14 mils (0.36 mm)
 - d) Water Vapor Permeance (ASTM E96): 0.14 perms
 - e) Nail Sealability (ASTM D1970): Pass
 - f) Elongation (ASTM D412): 825% minimum
 - g) Low Application Temperature: 25F (-4C)
- 2) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a high strength polyethylene with surface layer of metallic aluminum film; having the following typical physical properties:
 - a) Basis of Design: Henry® Metal Clad® Self-Adhered Water Resistive Air Barrier
 - b) Color: Metallic Aluminum
 - c) Thickness: 45 mils (1.14 mm)
 - d) Water Vapor Permeance (ASTM E96): 0.014 perms
 - e) Nail Sealability (ASTM D1970): Pass
 - f) Elongation (ASTM D412): 85%
 - g) Low Application Temperature: 20F (-7C)
- 3) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:
 - a) Basis of Design: Henry® Blueskin® SA Self-Adhered Water Resistive Air Barrier
 - b) Color: Blue
 - c) Thickness: 40 mils (1 mm)
 - d) Water Vapor Permeance (ASTM E96): 0.86 perms
 - e) Nail Sealability (ASTM D1970): Pass
 - f) Elongation (ASTM D412-modified): 200% minimum
 - g) Low Application Temperature: 41F (5C)
- 4) Low temperature non-vapor permeable, self-adhered water resistive air

and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:

- a) Basis of Design: Henry® Blueskin® SA LT Low Temp Self-Adhered Water Resistive Air Barrier
 - b) Color: Blue
 - c) Thickness: 40 mils (1 mm)
 - d) Water Vapor Permeance (ASTM E96): 0.86 perms
 - e) Nail Sealability (ASTM D1970): Pass
 - f) Elongation (ASTM D412-modified): 200% minimum
 - g) Low Application Temperature: 10F (-12°C)
- d. Sealants:
- 1) Building Envelope Sealant:
 - a) Moisture cure, medium modulus polymer modified sealing compound; having the following typical physical properties:
 - (1) Basis of Design: Henry® 925 BES Sealant
 - (2) Color: Varies
 - (3) Elongation: 450 - 550%.
- e. Joint Treatment Mesh:
- 1) Open weave glass fabric yarn saturated with synthetic resins, having the following typical physical properties:
 - a) Basis of Design: Henry® 183 Repair Fabric Yellow Fiberglass
3. Additional Materials:
- a. Through-Wall Flashing:
 - 1) Non-vapor permeable self-adhered through-wall flashing consisting of an SBS rubberized asphalt compound integrally laminated to a yellow engineered thermoplastic film surface; having the following typical physical properties:
 - a) Basis of design: Henry® Blueskin® TWF Thru-Wall Flashing
 - b) Color: Yellow
 - c) Thickness: 40 mils (1.0 mm)
 - d) Water Vapor Permeance (ASTM E96): 0.03 perms
 - e) High Temperature Stability - Flow Resistance (ASTM D5147): Pass
 - f) Low Application Temperature: 20F (-7°C)
 - b. Insulation Adhesive:
 - 1) Trowel grade solvent-type, synthetic rubber-based insulation contact adhesive; having the following typical physical properties:
 - a) Basis of Design: Henry® Air-Bloc® 21 Air and Vapor Barrier & Insulation Adhesive
 - b) Color: Cream
 - c) Water Vapor Permeance (ASTM E96): 0.03 perms
 - d) Maximum VOC: < 250 g/L

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify substrates to receive Work and surrounding adjacent surfaces are in accordance with Air Barrier Manufacturer published literature prior to installation of self-adhered air barrier assembly.
 - 2. Existing substrate must be continuous and secured prior to application of air barrier.
 - 3. Sheathing panels must be securely fastened and installed flush to ensure a continuous substrate in accordance with Air Barrier Manufacturer published literature.
 - 4. Fastener penetrations must be set flush with sheathing and fastened into solid backing.
 - 5. Strike masonry joints full and flush.
 - 6. Concrete surfaces shall be smooth and without large voids, spalled areas or sharp protrusions.
 - 7. New concrete should be cured for a minimum of sixteen (16) hours after forms are removed.
 - 8. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.
 - 9. Do not install air barrier over saturated substrates.
- B. Notify General Contractor in writing of any conditions that are not acceptable.
- C. The installing contractor shall examine and determine that surfaces and conditions are ready to accept the Work of this section in accordance with published literature. Commencement of Work or any parts thereof shall mean installer's acceptance of the substrate.
- D. Do not apply air barrier until substrate and environmental conditions are in accordance with Air Barrier Manufacturer's published literature.

3.02 PREPARATION

- A. All surfaces must be sound, dry, clean, and free of oil, grease, dirt, excess mortar, frost, laitance, loose and flaking particles, or other contaminants.
- B. Protect adjacent surfaces not included in scope of Work to prevent spillage and overspray.
- C. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.
- D. Hot weather or direct-sun applications over porous substrates, such as concrete, promote rapid surface drying and can form blisters in the fluid applied membrane air barrier during curing. To aid in blister prevention prepare substrate in accordance with one of the following optional procedures:
 - 1. Prime coat:
 - a. Apply a thin prime coat of air barrier to substrate.

- b. Allow air barrier to fully cure prior to subsequent application.
 - c. Install air barrier to Air Barrier Manufacturer minimum recommended mil thickness.
2. Two coat:
- a. Apply air barrier to achieve one-half (1/2) of Air Barrier Manufacturer minimum recommended mil thickness.
 - b. Allow air barrier to fully cure prior to subsequent application.
 - c. Apply air barrier to achieve one-half (1/2) of Air Barrier Manufacturer minimum recommended mil thickness.
 - d. Overall dry mil thickness shall be in accordance with Air Barrier Air Barrier Manufacturer published literature.

3.03 INSTALLATION

- A. Ensure substrate is ready to receive air barrier in accordance with Air Barrier Manufacturer's published literature.
- B. Temperature limitation:
 - 1. Primary air barrier:
 - a. Substrate temperature must be above 20F (-6°C) and rising.
 - 2. Auxiliary products:
 - a. Temperature limitations may vary. Refer to Air Barrier Manufacturer published literature.
- C. Application of Flashing:
 - 1. Self-adhered Flashing:
 - a. Where required install adhesive/primer recommended by Air Barrier Manufacturer continuously at rate recommended ensuring complete substrate coverage of anticipated flashing installation area.
 - 1) Allow adhesive/primer to cure to a tacky film prior to application of flashing.
 - 2) Only apply adhesive/primer to surfaces which will be covered during the same working day. Primed areas not covered by end of day must be re-primed prior to installation of flashing.
 - b. Measure and cut self-adhered flashing to ensure adequate length to achieve continuous coverage of desired installation.
 - c. Peel protective film from self-adhered flashing and align top of membrane verifying proper positioning prior to complete film removal and flashing placement.
 - d. Press self-adhered flashing firmly into place by applying hand pressure to the middle of the membrane and working the pressure to the edges eliminating wrinkles and air bubbles.
 - e. Install self-adhered flashings in shingle fashion to eliminate reverse laps.
 - f. Where required, prime laps at rate recommended by air barrier manufacture to ensure complete coverage of anticipated lap installation.
 - g. Lap adjoining edges a minimum of two (2) inches.
 - h. Roll flashing and laps with countertop roller to obtain thorough adhesion.
 - i. Seal end of day exposed reverse laps of self-adhered flashing with building envelope sealant.

- D. Detailing/Flashing:
1. Complete detailing and flashing installations per Air Barrier Manufacturer's published literature.
 2. Refer to Air Barrier Manufacturer guide details for further clarification and installation procedures including, but not limited to, the following:
 - a. Inside corners
 - b. Outside corners
 - c. Pipe penetrations
 - d. Shelf angles
 - e. Wall to foundation transitions
 - f. Rough openings:
 - 1) Install rough opening details per Window Manufacturer's published literature and in accordance with ASTM E2112.
 - 2) Wall assemblies containing a vapor retarder on the interior wall assembly:
 - a) Extend flashing into rough opening to ensure sufficient membrane for connection with vapor retarder and provide a continuous air barrier assembly.
 - 3) Reverse laps:
 - a) Seal permanently exposed reverse laps with sealant:
 - (1) Building envelope sealant
 - (2) Liquid flashing
 - 4) Moving Joints:
 - a) Contact Air Barrier Manufacturer.
 - 5) Transitions:
 - a) Contact Air Barrier Manufacturer to coordinate transition of self-adhered air barrier to adjacent areas including, but not limited to, the following:
 - (1) Roof to air barrier
 - (2) Air barrier to waterproofing
 - (3) Fastener penetrations
- E. Thru-Wall Flashing:
1. Coordinate with Section 07600 and 08520.
- F. Application of Primary Fluid-Applied, Air and Vapor Barrier:
1. Apply air barrier in continuous, monolithic application without sags, runs, or voids, transitioning onto flashing membrane and overlapping one (1) inch, to create uniform drainage plane and air barrier.
 2. Install air barrier so that subsequent membrane installation laps one (1) inch onto flashing ensuring an air and air barrier assembly.
 3. Allow air barrier to fully cure prior to placement of insulation.
 4. Total Dry Film Thickness (DFT):
 - a. Coverage rates may vary due to surface texture or porosity. Refer to Air Barrier Manufacturer Technical Data Sheet for recommended coverage rates.
- G. Insulation Adhesive:
1. Coordinate with Section 07200 for insulating materials.
 2. Upon curing of the air barrier apply insulation adhesive in a serpentine pattern.
 3. Immediately embed insulation into the adhesive and press firmly into place to

- ensure full contact. Apply additional adhesive if allowed to skin over.
4. Fully butter all joints of insulation panels with adhesive during installation, with the exception of expansion joints.
- H. Fastener Penetrations Through Primary Air Barrier:
1. It is the responsibility of the installer penetrating the air barrier assembly to properly install fasteners and components in accordance with the Air Barrier Manufacturer's published literature.
 2. Installation requirements:
 - a. Drill fasteners and components with sufficient compression to maintain continuity in the air barrier assembly.
 - b. Refer to "Self-tapping fasteners" and/or "Pre-drilled fasteners".
 3. Supplemental sealant:
 - a. Penetrations that do not meet installation requirements require the addition of sealant at point of insertion through the air barrier membrane to maintain continuity in the air barrier assembly.
 4. Self-tapping fasteners:
 - a. Fastener head must be larger in diameter than the shank.
 - b. Drill fasteners perpendicular to the substrate until flush with the air barrier. Drill fasteners to provide a continuous compression firmly against the air barrier membrane creating a gasketing seal without damaging the membrane.
 - d. Do not install fasteners through air barrier over unsupported areas of the substrate such as sheathing joints.
 - e. Overdriven fasteners, improperly installed fasteners, defective/broken fasteners, or fasteners not properly fastened into the building structure beyond the air barrier membrane should be removed and the vacated hole sealed with sealant prior to the installation of the cladding or veneer system.
 5. Pre-drilled fastening assemblies:
 - a. Fastening head or assembly component must be larger in diameter than pre-drilled hole.
 - b. Fastening head or assembly component must be mounted flush with the air barrier.
 - c. Fastening head or assembly component must provide a continuous compression firmly against the air barrier creating a gasketing seal without damaging the integrity of the air barrier.
 - d. Do not install fastening components through air barrier over unsupported areas of the substrate such as sheathing joints.
 - e. Seal improperly drilled and/or vacated holes with sealant prior to the installation of the cladding or veneer system.

3.04 FIELD QUALITY CONTROL

- A. Damage to surface by other trades shall not be the responsibility of the installing Subcontractor.
- B. Final Observation and Verification:
1. Final inspection of air barrier assembly shall be carried out by the Owner's representative, the Contractor, or Air Barrier Manufacturer as required by warranty.
 2. Contact Air Barrier Manufacturer for warranty issuance requirements.

- C. Air barrier assembly is not designed for permanent UV exposure. Refer to Air Barrier Manufacturer published literature for product limitations.

3.05 CLEANING

- A. Promptly as the Work proceeds, and upon completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.
- B. Clean soiled surfaces, spatters, and damage caused by Work of this Section.
- C. Check area to ensure cleanliness and remove debris, equipment, and excess material from the site.

END OF SECTION 07270

SECTION 07500 - ROOFING, GENERAL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The requirements of this section apply to the work specified in the following sections:
 - 1. Section 05300 - Metal Decking,
 - 2. Section 06100 - Carpentry,
 - 3. Section 07050 - Roof Demolition,
 - 4. Section 07530 - Single-Ply Roofing Membrane System,
 - 5. Section 07535 - Modified Bitumen Roofing System - Cold Applied,
 - 6. Section 07600 - Flashing and Sheet Metal,
 - 7. Section 07800 - Roof Specialties and Accessories,
 - 8. Division 15 - Mechanical Work,
 - 9. Division 16 - Electrical Work.

- B. This section includes alterations and tie-ins to existing roofing systems and as shown on the drawings.

1.2 QUALITY ASSURANCE

- A. Roofing and associated work, including work of all sections listed in 1.1 above, must be included in a single subcontract, so that there will be undivided responsibility for the specified performance of all component parts.

- B. Installer Prequalification: Installer must be a recognized Roofing Contractor, skilled and experienced in the types of work required, and equipped to perform workmanship in accordance with recognized standards.
 - 1. Minimum Experience: Not less than a recommended five (5) years experience in applications for indicated roofing systems, and in roofing projects of magnitude equivalent to the required work.

 - 2. Maintenance Proximity: Recommended location of not more than two hours normal travel time from Installer's maintenance plant to project site.
 - a. Optional Proximity: At Contractor's option, and with Owner's prior acceptance of Installer's certification that work of the Maintenance Agreement will be performed by a designated roofing contractor whose plant is located not more than two hours normal travel time from project site, the above requirements will be waived.

- C. Product Bid: The product bid must have past performance of installation on a roof in the state where project is located for a recommended minimum of five (5) years, under the same name of manufacturer as bid.

- D. Alterations to existing roofs: Contractor shall make necessary tie ins and alterations to existing roofs in accordance with details indicated and "Basis of Design" product requirements so as

to maintain original warranty on existing roofs and/or achieve complete weather tight conditions.

- E. **Independent Roof Inspection Services:** The **Contractor** shall engage and pay for the services of a qualified independent Roofing Inspection Firm (RIF) to monitor and record all construction activities during the Work and provide written reports of same to the Architect.
1. A Qualified (RIF) is required to be a licensed business in the State of New Jersey and offer the services of a Registered Roof Observer (RRO) certified by the Roof Consultants Institute. The RRO is observe on-site roof construction. Qualifications and sample report format of the RIF are to be submitted to and approved by the Architect. Provide project experience and references noted below.
 2. The RIF is required to be an independent competent consultant and shall provide services meeting the standard of care of a qualified roof consultant operating in the jurisdiction of this Project. The RIF will be held responsible for the accuracy of all reporting prepared by the RIF.
 3. The RIF must not be affiliated with, have relation with, nor engage directly or indirectly in the manufacturing, installation or sales of any roofing or building materials used on this Project. The RIF shall not be or have been previously been an employee of the Contractor and/or Roof Subcontractor / Installer.
 4. The RIF must provide on-site observation services not less than three (3) days per week during the times of all roof removal and replacement activities are in progress including all associated sheet metal, counter flashing and waterproofing Work and shall document same in a written daily report form acceptable to the Architect.
 - a. Roofing projects of less than 10,000 sq. ft.: RIF must provide daily on site observations of all roofing and associated Work when in progress.
 - b. **The RIF firm must be on-site and monitor all roofing replacement and restoration work while the Roofing Contractor is performing their work.**
 5. RIF and its assigned RRO inspector(s) for the Work of this Project must have a recommended minimum of three (3) years of experience in monitoring and observing roofing reconstruction with roof systems similar to specified system. Note: Past project references including project name, roof contractor and design professional and contact phone numbers for the project are required to be submitted along with the RIF's qualifications.
 6. A computer generated daily field report must be submitted to the Architect's office by E-mail (in PDF file format) and facsimile within three (3) days of visit. Hard copy of all reports are required to be submitted with the Contractor's final closeout documents.
 - a. Field reports shall include all roofing Work as indicated in this sections, other related roofing work sections, but not be limited to the following:
 - 1) Date of visit;
 - 2) Contractor's company name;

- 3) Contractor's subcontractor's name(s);
 - 4) Foreman's name;
 - 5) Extent of roofing contractor's work force, including subcontractors, and all tasks that have been performed during the visit (number of workers);
 - 6) Weather conditions including range of day temperatures;
 - 7) Record of overnight rain events and presence of moisture upon arrival;
 - 8) Documentation of materials delivered and/or used by Workers during the RIF presence on site;
 - 9) For projects with use of hot bitumen products: record the type of materials, required EVT temperature and record the temperature at the kettle/tanker source and at the point of application on the Roof;
 - 10) Roof area and locations of roof areas where work in progress is taken place (Roof Key Plan to be Provided by Architect);
 - 11) Percent of roofing work completed;
 - 12) Documentation of all fastener type, size, coating and number used by the Contractor prior to allowing concealment of same by other Work. Note: Provide digital photographs to document Contract compliance.
 - 13) Status of Project Schedule;
 - 14) Punch list items one week before substantial completion date of work and in accordance with Contract Documents;
 - 15) Items which are deficient and/or not in compliance with Contract Documents;
 - 16) Status of prior reported deficiencies;
 - 17) Summary of visual work completed between visits;
 - 18) Inspector's name and report writer's name if different.
7. The RIF is required to provide regular communications through out the project. The RIF is to contact the Architect immediately from the project site upon observation of deviations of all the requirements of the Contract Documents by the Contractor and/or other Work forces.

1.3 SUBMITTALS

- A. Submit certification that the roof materials furnished for roof alterations and tie-ins is Tested and Approved by Factory Mutual as a Class 1-SH roof system with 1-90 Wind Uplift Requirements, or Listed by Underwriters Laboratories or Warnock Hersey for external fire tests of ASTM E - 108 Class A.
- B. Product Data for each type of product specified include manufacturer's technical product data, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with specified requirements.
- C. For all modified bituminous sheet roofing include independent test data according to ASTM designation D-5147-91 "Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material" substantiating that materials comply with specified requirements. A separate Certificate of Analysis for each production run of material shall indicate the following information:
 1. Material type.
 2. Lot number.
 3. Production dates.

4. Dimension and Mass.
 5. Physical and Mechanical Properties.
- D. Shop Drawings: Submit roofing membrane layout drawings showing the outline of existing roof and locations of flashings and tie-ins, specific roofing details illustrating relationships with adjacent construction, and flashing details at indicated tie-in conditions.
1. Submit shop drawings of manufactured and/or fabricated sheetmetal work.
 2. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the contract document details, the manufacturer shall provide the roofing contractor with acceptable details to be submitted to the Architect for approval. This Project must receive Architect's approval through this process prior to shipment of materials to the project site. All roofing work required by the roofing system manufacturer shall be included in the contract at no additional cost to the Owner.
- E. Samples: Samples of each material specified, properly labeled.
1. Roof membrane: For project records, submit 8- by 10-inch samples of membrane cut from rolls of each type of material used on the project.
 2. Flashing membrane: Submit 12-inch-square samples of sheet material to be used for base flashings.
 3. Fasteners: Submit (2) of each type.
 4. Adhesives: Submit samples for each type to be used.

1.4 JOB CONDITIONS

- A. Roofing Conference: Prior to the installation of the roofing and associated work, meet at the project site with the Installer, the Installers of each component of associated work, and the Architect and other representatives directly concerned with performance of the work, including, where applicable, product manufacturers and the Owner. Record (by Contractor) the discussions of the conference and the decisions and agreements, or disagreements reached, and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the roofing work including, but not necessarily limited to, the following:
1. Review Project requirements (drawings, specifications and other contract documents).
 2. Review status of existing conditions and substrate (by the Roofing Installer), including extent of moisture penetration in existing work, drying and similar considerations.
 3. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 4. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 5. Review regulations concerning Code compliance, environmental protection, health, safety, fire and similar considerations.

6. Establish units of work, including preparation, such that each unit may be completed prior to end of each day's work.
- B. Weather Condition Limitations:
1. During periods of inclement weather, Contractor shall use wet power vacuums, on the day following each rain, to remove standing water so as not to delay his operations.
 2. Proceed with roofing and associated work only when weather conditions will permit unrestricted use of materials and quality control of the work being installed, complying with the requirements and the recommendations of the roofing materials manufacturers.
 3. Proceed only when the Contractor is willing to guarantee the work as required and without additional reservations and restrictions.
 4. Protect existing work and property from damage during the course of the work. Be prepared for all weather and other contingencies as prudence may dictate. Maintain on the site at all times sufficient and proper materials for temporary roofing and other protection when weather conditions prevent continuance of work and do not permit completion of each unit of work prior to the end of each working day. Temporary protection and roofing work must be provided at no additional cost to the Owner.
 5. Remove and discard materials which have been used for temporary roofs, protection, water seals, and related work. Do not incorporate used materials into the work.
- C. Storage of Materials and Property: Do not overstress roof decks and supporting structures. Avoid placing loads at midspans of framing. All superimposed loads shall be well distributed. Do not store more material on roofs than can be installed in one and one-half working days. Store materials, except membrane, in dry area and protect from water and direct sunlight. Damaged materials shall be replaced at Contractor's expense. Protect adjacent work from damage due to roofing operations and related work. Provide temporary protection against walls adjacent to roofing work; remove protection upon completion.

PART 2 - PRODUCTS

2.1 GENERAL ROOFING MATERIALS

- A. Refer to other sections for new roofing work and all requirements of roofing materials, products and systems.
- B. Alterations and Tie-ins to Existing Roofs**
1. Provide Roofing materials, flashings, primers, adhesives and all other required accessories to meet or exceed the following "Basis of Design" minimum performance requirements. All roofing materials shall be UL Class A, FM Class 1-SH listed and shall comply with the International Building Code, and CGSB 37-GP-56M standards.
 2. Wood Cants and Curbs: Lumber; #2 grade free from warping and visible decay; fire retardant treated, and marked.

3. Mechanical Fasteners: Manufacturer's standard FM approved fasteners for this type of application.
4. Other Materials and Accessories: Manufacturer's standard and/or approved products for indicated applications.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Contractor shall prepare a plan and submit it to the Architect for which identifies how the roofing repairs and all associated work will be performed so as to prevent foot traffic on the newly installed roofing system.
- B. Coordinate the installation of roofing materials and associated work so as to provide a complete system complying with the combined recommendations of manufacturers and installers involved in the work.
- C. Protect other work from spillage of roofing materials, and prevent materials from entering and clogging drains and conductors. Replace or restore other work which is soiled or otherwise damaged by the performance of the roofing and associated work.

3.2 PERFORMANCE REQUIREMENTS

- A. Initial Weather Resistance: It is required that the roofing and associated work be durable in normal weather exposure and not leak water during rainstorms. After completion of the roofing and associated work, and either during or immediately after a rainstorm, (and just before final acceptance of the work) the Installer shall meet with the Contractor at the project and inspect the building for evidence of leaks in the roofing and associated work. Prepare a written report without delay (by Contractor) covering the inspection, and submit to Owner (with copy to Architect). Should no rain occur between the time the roof is completed and when all punch list items have been corrected, this requirement shall be waived.
- B. Repair or replace roofing and associated work as required to eliminate leaks or other inability of roofing to initially withstand normal weather exposure.
 1. Abnormal weather exposure is recognized to include hailstorms, lightning strikes, hurricane and tornadic winds, and other unusual phenomena of the weather as frequently covered by building insurance.
- C. **Alterations and Tie-ins to Existing Roofs**
 1. Examine substrate surfaces to receive roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
 2. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.
 3. Cooperate with inspection and test agencies engaged or required to perform services in connection with roofing system installation.

4. Insurance/Code Compliance: Install roofing and flashing work (and test where required to show) compliance with governing regulations.
 5. Coordinate the installation of roofing sheets, flashings, stripping, coatings and surfacing, so that felts are not exposed to precipitation nor exposed overnights. Provide cut-offs at the end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work. Glaze coats installed ply-sheet courses at the end of each day's work where final surfacing has not been installed.
 6. Substrate Joint Penetrations: Do not allow adhesive to penetrate substrate joints and enter building or damage existing or new insulation, vapor barriers (retarders) or other construction.
 7. General Requirements: Apply roofing membrane in accordance with roofing material manufacturer's instructions. Application of roofing shall immediately follow application of base sheet and/or insulation as a continuous operation.
- D. Agreement to Maintain Roofing: See Part 1, Section 01900, Guarantees and Warranties.

END OF SECTION 07500

PRE-APPROVED INDEPENDENT ROOFING INSPECTION FIRMS

Precision Construction Consulting, LLC

524 Sunset Avenue
Maple Shade, NJ 08502
Phone: 609-560-1361
Contact: John Hoffner

H.J. Cannon Group

520 Fellowship Road - Suite A-111
Mount Laurel, NJ 08054
Phone: 856-914-0900/800-233-6986
Fax: 856-914-0600
Contact: Chris Cifone, RRO

Sharp Roofing Associates, Inc.

P.O. Box 219
Ironia, NJ 07845
Phone: 973-895-7330
Fax: 973-895-7332
Contact: Steven Sharp

System Design & Analysis, Inc.

640 Herman Road, Suite 4
Jackson, NJ 08527
Phone: 732-833-9766
Fax: 732-833-9733
Contact: Jan Chrostowski

Roof Maintenance Systems

5118 Highway 33-34
Farmingdale, NJ 07727
Phone: 732-938-7373
Fax: 732-938-9646
Contact: Bill Tipton, RRC

James D. Cummins & Co.

35 Broad Street, Suite 4
Keyport, NJ 07735
Phone: 732-203-2008
Fax: 732-203-2009
Contact: Henry Vitale, RRO

SECTION 07530 - SINGLE PLY EPDM ROOFING MEMBRANE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The extent of the single-ply membrane roofing system is shown on the drawings.
- B. System Type: Fully Adhered System.
- C. Section Includes:
 - 1. Substrate preparation;
 - 2. Roof insulation board;
 - 3. Roof recovery board;
 - 4. Roof membrane;
 - 5. Flashings.
- D. Related Sections:
 - 1. Section 06100 - Carpentry - wood blocking and nailers,
 - 2. Section 07050 - Roof Demolition,
 - 3. Section 07600 - Flashing, Sheet Metal and Roof Accessories,
- E. Furnish all labor, materials and incidentals required to complete insulation, roofing, flashing, and all other roofing components supplied by the roofing membrane manufacturer and as shown on the drawings and/or specified herein.

1.3 SUBMITTALS

- A. **Product Data:** Submit technical product information and installation instructions for each major roofing product or system required as necessary to demonstrate products comply with project requirements. Transmit a copy to the installer.
- B. **Shop Drawings:** Submit roofing membrane layout drawings showing outline of roof and roofing size, seam locations, specific roofing details illustrating relationships with adjacent construction, and flashing details at roof perimeter and roof penetrations.
 - 1. Shop drawings must be submitted to the roofing manufacturer and the Architect for review and obtaining approvals. The Architect shall not provide final review on shop drawings, unless manufacturer's review and stamped approval are indicated. Contractor to allow sufficient time required for shop drawings reviews.

2. Shop drawings shall include, but not limited to the following:
 - a. Completely executed Notice of Awards roofing work from the roofing membrane manufacturer.
 - b. Outline of roof and size.
 - c. Roof deck type.
 - d. Roof slope and designated direction of slope.
 - e. Location and type of all penetrations.
 - f. Roof perimeter condition.
 - g. All roofing items which will be supplied by the roofing membrane manufacturer.
 - h. Fastener manufacturer; include brand name and thickness.
 - i. Insulation manufacturer; include brand name and thickness.
 - j. Manufacturer's warranty type and period.
 3. Submit installation diagrams and instructions for installation of roofing system.
 4. Submit shop drawings of manufactured and/or fabricated sheet metal work.
- C. Submit Installer Certification that Installer is franchised and/or approved by the roofing material manufacturer for installation of a fully guaranteed roof.
1. The installer certification shall be submitted on the manufacturer's letterhead.
- D. Samples:
1. Roof membrane sheet: Submit 12-inch-square samples.
 2. Insulation: Submit 12-inch-square samples.
 3. Thermal barrier board (If applicable): Submit 12-inch-square samples.
- E. Warranty:
1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.
- F. Agreement to Maintain Roofing:
1. Submit Roofing Subcontractor's sample of unexecuted agreement to maintain the roof system and related roof sheet metal work in accordance with indicated requirements.
- G. Certifications: The Contractor / Installer / Manufacturer (grantor) shall submit certifications to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results.
1. Contractor shall provide manufacturer's "Roof Assembly Letter" confirming each proposed roof system and decking description as follows:
 - a. Assembly,
 - b. Construction Type,
 - c. Maximum Slope,
 - d. Deck Type,

- e. Insulation - Layer (1),
 - f. Insulation Fastening,
 - g. Insulation Attachment Requirements; Field, Perimeter, Corners,
 - h. Insulation - Layer (2),
 - i. Insulation Attachment; Adhesive,
 - j. Membrane.
2. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**

1.4 REFERENCE STANDARDS

- A. References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.
- 1. ASTM American Society for Testing and Materials, Philadelphia, PA
 - 2. FM Factory Mutual Engineering and Research, Norwood, MA
 - 3. NRCA National Roofing Contractors Association, Rosemont, IL
 - 4. OSHA Occupational Safety and Health Administration, Washington, DC
 - 5. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA
 - 6. UL Underwriters Laboratories, Northbrook, IL

1.5 QUALITY ASSURANCE

- A. Roofing and associated work must be performed by a single firm, called the "Installer" in this section, so that there will be undivided responsibility for the specified performance of all component parts, including the following (even though some parts may be sub-contracted to others).
- 1. Roof insulation.
 - 2. Roof recovery board, if applicable.
 - 3. Elastic roofing and base flashing.
 - 4. Sealant.
 - 5. Related sheet metal work.
- B. Installer: The roofing contract shall be carried out only by an installer who is franchised or otherwise accepted in writing by the roofing materials manufacturer for installation of a fully guaranteed roof in accordance with the manufacturer of the roofing membrane system requirements.
- C. Roofing Contractor: The roofing contractor shall have a recommended minimum of five (5) years experience in the installation of the specified roofing system, with roofing projects of magnitude equivalent to the required work. Foreman employed for this project must submit evidence of having been trained by the roofing manufacturer.

1. Minimum experience: Not less than a recommended five (5) years experience with roofing projects of magnitude equivalent to the required work.
2. Maintenance Proximity: Recommended location of not more than two hours normal travel time from Installer's maintenance plant to project site.
3. Optional Proximity: At contractor's option, and with Owner's prior acceptance of installer's certification that work of the maintenance agreement will be performed by a designated roofing contractor whose plant is located not more than two (2) hours normal travel time from project site, the above requirement will be waived.

D. Definitions:

1. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
2. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered Systems", before multiplication by a safety factor.
3. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered Roofing Systems", after multiplication by a safety factor.

E. Performance Requirements

1. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
3. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
4. FM Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FM 4450 and FM 4470 as part of a membrane roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
 - a. Fire/Windstorm Classification: Class 1A-90.
5. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

- a. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
 - b. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.
6. Initial Weather Resistance: It is required that the roofing and associated work be durable in normal weather exposure and not leak water. After completion of the roofing and associated work, and either during or immediately after a rain storm, (and before final acceptance of the work) the installer shall inspect the building for evidence of leaks in the roofing and associated work. Prepare a written report, within five (5) working days, covering the inspection, and submit to Owner (with a copy to the Architect).
- a. The installer shall repair or replace roofing and associated work as required to eliminate leaks or other inability of roofing to initially withstand normal weather exposure.
 - b. Abnormal weather is recognized to include hailstorms, lightning strikes, hurricanes and tornadic winds and other unusual phenomena of the weather as frequently covered by the buildings insurance.
- F. Manufacturer of Roofing Materials: Obtain primary roofing materials from a single manufacturer, who has published complete information on the required roofing system, and offers to guarantee the completed roofing installation as required. Obtain secondary materials from sources acceptable to the manufacturer of the primary roofing materials.
1. **Special attention is called to the manufacturer's specified twenty (20) Years Total Roofing System Warranty.**
 - a. Warranty must be a **NDL (no dollar limit)**.
 2. Manufacturer of Roofing System is further limited to one who will fulfill the following requirements:
 - a. Participates in a pre-roofing conference.
 - b. Shows a record of continued production of the specified materials for at least twenty (20) years.
 - c. Provides a list of executed projects in the State of New Jersey.
 - d. Provides complete manufacturer's produced printed manuals describing the roofing membrane and accessory materials, technical specifications, method of installation, including manufacturer's standard detailed drawings.
 - e. Furnishes guarantee as hereinafter specified.
 3. Inspection: Upon completion of the installation, an inspection shall be made by a technical representative of the roofing manufacturer to ascertain that the roofing system has been installed according to roofing manufacturer's latest published specifications and details.

- a. There shall be no deviation made from this specification without prior written approval by the manufacturer and the Architect.

G. Independent Roof Inspection Services: The **Contractor** shall engage and pay for the services of a qualified independent Roofing Inspection Firm (RIF) to monitor and record all construction activities during the Work and provide written reports of same to the Architect.

1. Roofing Inspection Firm to be approved by the Architect / Owner.
2. Inspection firm must be utilized not less than three (3) days per week of roofing activities including all associated metal and waterproofing work and shall provide written report of same.
 - a. Roofing projects of less than 10,000 sq. ft., Roofing Inspection Firm must be utilized every day of roofing and associated work is performed.
3. Roofing Inspection Firm must not be affiliated with, have relation with, nor engage directly or indirectly in the manufacturing, installation, sales of any roofing or building materials.
4. Roofing Inspection Firm and its assigned inspector(s) for the work of this project must have a recommended minimum of five (5) years of experience in monitoring roofing systems similar to specified system.
5. A computer generated daily field report must be submitted to the Architect's office by FAX within three (3) days of visit. Hard copy of reports shall be submitted with closeout documents.
 - a. Field reports shall include all roofing work as indicated in this sections, other related roofing work sections, and include but not limited to the following:
 - 1) Date of visit;
 - 2) Contractor's company name;
 - 3) Contractor's subcontractor's name(s);
 - 4) Foreman's name;
 - 5) Extent of roofing contractor's work force, including subcontractors, and all tasks that have been performed during the visit;
 - 6) Weather conditions including day temperatures;
 - 7) Roof area and locations of roof areas where work in progress is taken place;
 - 8) Percent of roofing work completed;
 - 9) Status of Project Schedule;
 - 10) Punch list items one week before substantial completion date of work and in accordance with Contract Documents;
 - 11) Items which are deficient and/or not in compliance with Contract Documents;
 - 12) Status of prior reported deficiencies;
 - 13) Summary of visual work completed between visits;
 - 14) Inspector's name and report writer's name if different.

H. Roof Code Requirements:

1. Roofing System Design to meet roof covering wind resistance and wind test standards as described in Section 1504 of the IBC and shall be tested in accordance FM 4474, UL 580 or UL 1897.
 - a. Basic wind speed for this project as per the IBC and must be used to determine the basic Velocity Pressure (Pv) and the building minimum design wind and wind resistance standards required by code (and comply with Table 1504.8).
2. Roofing membrane system shall comply with Rubber Manufacturers Association (RMA), RP-1, or ASTM D4637, or CGSB 37-GP-52M.
3. Roofing Insulation. Above-deck thermal insulation board shall comply with the standards in Table 1508.2, Polyisocyanurate board ASTM C 1289, Type I or Type II.

I. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the contract document details, the manufacturer shall provide the roofing contractor with acceptable details to be submitted to the Architect for review and approval.

1. This Project must receive Architect's approval through this process prior to shipment of materials to the project site.
2. All roofing work required by the roofing system manufacturer shall be included in the contract at no additional cost to the Owner.
3. Any unusual conditions or requirements must be brought to the attention of the manufacturer of the roofing membrane system.
4. When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawings which include outlining all modifications shall be submitted to the manufacturer for revisions and obtaining his approval.

J. Final Inspection:

1. Approved Applicators must supply the roofing manufacturer with an as-built shop drawing for final inspection.
2. As-Built shop drawings must be approved and given a shop drawing number by the roofing manufacturer's construction materials department.

K. Warranty:

1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.
2. Provide manufacturer's guarantee on the work for indicated period **twenty (20) years**, extending to flashings, metal edge copings, gravel stops, insulation and including all other materials for a single source warranty, (i.e.: Total System Warranty) signed by an authorized representative of the sheet manufacturer, guaranteeing the roofing materials against failures resulting from normal roof exposure.

3. Special Manufacturer's Warranty Wind Speed.
 - a. Warranty Wind Speed, (Maximum Peak Gusts), for this project for fully adhered roofing system shall be a minimum of 90 mph (With 1/2" Securerock Gypsum-Fiber Roof Board); or approved equal..

L. Agreement to Maintain Roofing:

1. Provide Roofing subcontractor's agreement to maintain the roof systems and related roof sheet metal work in a weathertight and watertight condition for a period of **two (2) years** starting from the date of approved substantial completion date and in accordance with special Maintenance Contract outlined herein.
 - a. During the Maintenance Period, the Roofing subcontractor agrees that within 24 hours of receipt of notice from the Owner he will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing work. He further agrees that within a reasonable time, he will restore the affected items to the standard of the original specifications and without voiding the Manufacturer guarantee. All emergency and permanent work during the life of the agreements to maintain the roof systems will be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricanes, tornado, hailstorm, other unusual climatic phenomena of the elements, or failure of related work (except related roof sheet metal work included under the Agreement) installed by other parties.
 - b. Agreement to maintain roofing system shall be in a written form acceptable to the Architect/Owner and before final payment is released for the project.
 - c. If, 48 hours after notification of roof leakage, Contractor has not responded, Owner shall have the right, without invalidating his warranties and at the expense of the Contractor, to make any emergency temporary repairs that are required in order to protect the building and its contents from damage due to roof leakage.

1.6 PROJECT CONDITIONS

- A. Begin roofing installation when weather conditions are within acceptable limits according to manufacturer's installation instructions.

1.7 PRODUCT HANDLING

- A. Deliver materials to project site in manufacturer's unopened sealed containers or unopened packages, with manufacturer's labels intact.
- B. Store materials in weather-protected environment, clear of ground and moisture.
 1. Storage of Materials will not be permitted on the roof, unless guaranteed, in writing, by the contractor, not to damage.

1.8 JOB CONDITIONS

- A. Proceed with roofing work only after substrate and penetrating work and repair of any damage, have been completed.
- B. Pre-Roofing Installation Conference:
 - 1. Prior to the installation of the roofing and associated work, meet at the project site with the installer, the installer of each component of associated work, the Architect, the Roofing Inspection Firm and other representatives directly concerned with performance of the work including, the roofing membrane system manufacturer and the Owner.
 - 2. Provide Record of the discussions of the conference and the decisions and agreements (or disagreements) reached, and furnish a copy for the record, to each party attending.
 - 3. Provide at least 48 hours advance notice to participants prior to convening pre-roofing conference.
 - 4. Review foreseeable methods and procedures related to the roofing work, including but not limited to the following;
 - a. Review Project requirements (Drawings, Specification and other Contract Documents).
 - b. Review status of conditions and substrates (by the roofing installer), including extent of moisture penetration in existing work, drying and similar considerations.
 - c. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - d. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
 - e. Review regulations concerning code compliance environmental protection, health, safety, fire and similar considerations.
 - f. Establish units of work, including scheduling removals, preparation and replacement, such that each unit may be completed prior to end of each day's work.
 - g. Review the schedule for the work.
- C. Weather Conditions: Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's recommendations.
- D. Certification: The roofing contractor (guarantor) shall submit a certification to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results. In so doing, the Guarantor also agrees either that the materials and methods specified herein are such as to insure the result required or he will, at no additional expense, furnish such additional or alternative items of

labor and materials (or both) as may be necessary to accomplish the stated intent of the contract documents.

- E. Conditions not as Anticipated: The contractor shall immediately notify the Architect of upon discovery of conditions which may jeopardize successful accomplishment of and prevent execution of the work as intended by the Architect, as provided in, or not anticipated by the Contract.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. "Basis of Design": Fully Adhered System: Provide Carlisle Syntec Inc., Sure Seal - Black, Design "A" Fully Adhered System, Tel.# 800.479.6832, www.carlisle-syntec.com; or approved equal.
 - 1. Subject to compliance with requirements of the "Basis of Design", products by the following manufacturer may be incorporated in the work include:
 - a. "RubberGuard™ LS-FR PT" by Firestone Building Products Company
 - b. "EPDM Fit" by John Mansville
 - c. "VersiGuard EPDM with QAT" by Versico Inc.
 - d. Or approved equal.
- B. All Components of the Roofing System shall be products indicated in manufacturer's product data for the Roofing Systems or to be approved materials and components by the indicated manufacturer(s).

2.2 ROOFING MEMBRANE

- A. Black Membrane: .060 inches thick (60 mil), non-reinforced, minimum ten (10) feet wide, length to be determined by job conditions, 6" wide Factory-Applied Tape (FAT), UL Class A, EPDM (Ethylene Propylene Diene Monomer) compound elastomer conforming to the following minimum physical properties:
 - 1. Color: Black
 - 2. Tolerance on Nominal Thickness: ASTM D412; +/- 10%.
 - 3. Elongation, Ultimate: ASTM D412; 300% pass.
 - 4. Tearing Strength: ASTM D624 (Die C); 150 lbf./in.
 - 5. Brittleness Point: ASTM D746; - 49°F.
 - 6. Resistance to Heat Aging, Properties after four (4) weeks at 240°F; ASTM D 573:
 - a. Tensile Strength: ASTM D412; 1,205 min. psi.
 - b. Tear Strength: ASTM D624; 125 lbf/in.
 - c. Elongation, Ultimate: ASTM D412; 200% min.
 - d. Linear Dimensional Change: ASTM D1204; +/- 1.0% max.
 - 7. Ozone Resistance:
 - a. Condition after exposure to 100 pphm, Ozone in air for 168 hours at 104°F, Specimen is at 50% strain; ASTM D1149; No Cracks.
 - 8. Resistance to Water Absorption after seven (7) days immersion at 158°F, Change in mass; ASTM D471; +8% / -2%.
 - 9. Factory Seam Strength; ASTM D816 - Modified; Membrane Rupture.

6. Surface - Burning Characteristics: Tested in accordance with ASTM E 84 and IBC 719.2;
 - a. Flame Spread: Not more than 25
 - b. Smoke - developed: Not more than 450
 7. Insulation boards must pass the tests of:
 - a. ASTM C1289-06, Type II, Class 2, Grade 3 (25 psi).
 - b. FM Class 1 approval for steel roof deck construction: FM 4450 or UL1256.
 - c. FM 4470 (subject to the conditions of approval described in www.Roofnav.com).
- * No substitution will be allowed.

2.5 RELATED MATERIALS

- A. Flashing: Elastoform clean cured EPDM flashing furnished by membrane manufacturer.
- B. Bonding Adhesive: Compatible with materials to which the membrane is to be bonded, furnished by membrane manufacturer.
- C. In Seam Sealant: Furnished by membrane manufacturer.
- D. Splicing Tape: Furnished by the membrane manufacturer, 3" and 6" wide splicing tape for indicated applications and as per manufacturer's requirements for each indicated warranty.
- E. Splicing Cement: Furnished by membrane manufacturer.
- F. Lap Sealant: Compatible with materials with which it is used, shall be trowel or gun consistency furnished by membrane manufacturer.
- G. Water Cut-Off Mastic: Compatible with materials with which it is used, furnished by membrane manufacturer.
- H. Insulation Fasteners: Furnished by membrane manufacturer.
 1. Contractor to provide manufacturer's recommended roof fasteners in required fastening patterns for each of the actual encountered roof deck materials.
- I. Insulation Adhesive: Furnished by the membrane manufacturer.
 1. Contractor to provide manufacturer's recommended adhesives for required application.
 - a. DASH Adhesive: A spray or extruded applied, two-component polyurethane, low-rise expanding foam adhesive used for attaching approved insulations to compatible substrates (concrete, cellular lightweight insulating concrete, gypsum, cementitious wood fiber, wood or steel) or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.
 - b. DASH Catalyst: Added to DASH Adhesive (Part B Side) to quicken adhesive reaction time.

- c. DASH DC or Bag in a Box Adhesive: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
 - d. OlyBond 500 BA - A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates using a mechanical dispenser system.
 - e. OlyBond Spot Shot - A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
 - f. One-Step: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
2. See roof assembly drawing for insulation adhesive bead spacing.
- J. Wood Nailers: Fire-Retardant Treatment: Where fire-retardant treated wood ("FRT") is indicated or required, pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWA C20 and C27, respectively, identify "FRT" lumber with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products Inspection or other testing and inspecting agency acceptable to authorities having jurisdiction.
- 1. Fire treated wood shall have a flame spread of 25 or less and shall be dried to 19% moisture content for lumber and 15% for plywood. Exposed wood or wood subject to high humidity conditions shall be identified that the moisture content shall not exceed 28% when tested at 92% relative humidity in accordance with ASTM D3201.
 - 2. Treatment products: The following products, provided they comply with requirements of the contract documents will be among those considered acceptable:
 - a. "Dricon"; Hickson Corporation.
 - b. "Flame Proof LHC"; Osmose Wood Preserving, Inc.
 - c. Or approved equal.

* Treat members indicated on drawings and/or as required to meet the code requirements.
 - 3. Lumber treated with any of the wood preservatives such as, Creosote, Pentachlorophenol, Copper Naphthenate and Copper 8-quinolinolate will adversely effect the EPDM membrane when in direct contact and are, therefore, unacceptable.
- K. Splice Cleaner or Primer: Furnished by membrane manufacturer.
- L. Expansion Joints: Sure-Seal joint supports as indicated.
- M. Reinforced Securement Strips : Manufacturer's standard 6 inch or 9 inch wide by 100 feet long reinforced membrane perimeter fastening strip.

- N. Seam Fastening Plates: 2 inch diameter FM approved metal plates used in conjunction with reinforced securement strip.
- O. All other related roofing materials and accessories supplied by the roofing membrane manufacturer for inclusion under the Twenty (20) Years "Total System Roofing Warranty."
 - 1. Seam splice tape, prime, seam joint cover and seam flashing: Manufacturer's standard.

2.6 MANUFACTURED FLASHING MATERIALS:

- A. Manufacturer's standard in accordance with his detailed drawings and printed specifications and instructions for installation.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all work in conformance with the manufacturers printed specifications and as shown on approved shop drawings.
- B. Cautionary Requirements:
 - 1. Do not use oil base or plastic roof cement.
 - 2. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with EPDM roofing system.
 - 3. Do not expose membrane and accessories to a constant temperature in excess of 180°F.
 - 4. Cement and bonding adhesives contain petroleum distillates and are extremely flammable. Do not breath vapors or use near fire.
 - 5. Splice wash: Furnish by membrane manufacturer.
 - 6. Splicing and bonding surfaces shall be dry and clean.
 - 7. Roofing system may be installed during cold weather. Follow specified precautions for storage of materials and expose only enough cement and adhesives to be used within a four (4) hour period.
 - 8. Roof surface shall be free of ponded water, ice, or snow to eliminate future condensation problems.
 - 9. Seal Splice Wash used in the splicing procedure is extremely flammable; do not use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.
- C. Delivery, Storage and Handling:
 - 1. Deliver materials in original unopened containers.

2. Containers labeled with manufacturer's name, brand name, installations, instructions and identification of various items.
3. Store materials, except membrane, between 60°F and 80°F. If exposed to lower temperature, restore to proper temperature before using.
4. Store materials, except membrane in a dry area and protect. Do not install damaged material. Damaged materials shall be replaced at contractor's expense.

3.2 INSPECTION

- A. Installer must examine substrates and conditions under which roofing work is to be performed and must notify contractor in writing of unsatisfactory conditions. Do not proceed with roofing work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- B. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**
 1. The Roofing Contractor can start snapping on the manufacturer's pre-finished metal edge, coping, fascia only after the cleats, chairs and anchor plates are inspected and approved by the manufacturer.

3.3 PREPARATION OF SUBSTRATES

- A. Roof substrate shall be dry and free of foreign materials. Remove nails, nail heads and other protrusions from existing deck.
 1. Roof substrate shall be free of ponded water, ice, or snow to eliminate future condensation problems.

3.4 INSTALLATION (GENERAL)

- A. Comply with instructions of the primary roofing materials manufacturer, and comply with the requirements for **twenty (20) Year** Total Roofing System Warranty.
- B. Coordinate with all roof mounted items to facilitate roofing installation.
- C. Coordinate with the installation of all metal flashing.
- D. Confinement of Materials: Do not allow fluid and plastic to spill or migrate beyond surfaces of intended application.
 1. Contractor to clean all migrated materials exposed to view.
- E. Performance: It is required that roofing work be water-tight for normal weather exposure and not deteriorate in excess of normal weathering.

- F. Clean site of all debris and contractor materials; restore damaged site work, (i.e.; shrubs, turf, curbs, etc.) to conditions prior to start of this work.
- G. Install accessories as shown and as recommended by the prime materials manufacturer.
- H. Insulation Under Roofing: Do not advance the installation of new roof insulation excessively ahead of roofing. Do not install roofing or new insulation over wet insulation; remove and replace with dry insulation before proceeding.
- I. Coordinate Roofing with flashing and other adjoining work to ensure proper sequencing of entire work.

3.5 PROTECTION

- A. Contractor shall provide protection for roofing during construction period, so that the work will be without damage or deterioration except for normal weathering at time of acceptance.

3.6 INSTALLATION OF ROOFING INSULATION BOARDS

- A. Install roofing insulation boards in accordance with instructions of the prime materials manufacturer, use fasteners and accessories approved or supplied by the thermal board manufacturer and approved by the roofing membrane manufacturer.
- B. Exposure: Do not install roofing insulation boards each day than will be covered by new roofing by the end of same day. Provide water cut-off as required each day.
- C. Provisions shall be made by the contractor for the completion of roofing and on the area of roofing undertaken each day. No roofing area may be left uncompleted overnight. Contractor shall construct, where necessary, watertight waterstops at the completion of each day's work. Waterstops shall be entirely removed before continuing with the roofing operation.
- D. Apply a layer of insulation of the required thickness, unless otherwise shown or required to make up the total thickness. Stagger joints in one direction as recommended by the manufacturer.
- E. Place roof insulation on substrates as recommended by the roofing systems manufacturers. Ensure that the top surface of all insulation panels are uniformly abutted and without "steps".
- F. Fully Adhered Roofing System:
 - 1. Mechanically fasten lower layer of insulation to roof deck with manufacturer's approved insulation fasteners. Pattern of fasteners as per manufacturer's recommendations to achieve the required FM approvals. Quantity shall be a minimum of one (1) fastener for every two (2) square feet of insulation unless otherwise specified by the roofing manufacturer.
 - 2. Secure top layers of insulation and recovery board with manufacturer's approved adhesives and in compliance with manufacturer's instructions and recommended rates for application. Stagger all joints between layers.

3.7 INSTALLATION, MEMBRANE

- A. Position Roofing Membrane over approved substrate without stretching.
- B. Allow membrane to relax approximately (1/2) hour prior to bonding.
- C. Fold sheet back so (1/2) of underside of the sheet is exposed. Sheet fold shall be smooth, with no wrinkles or buckles.
- D. Apply bonding adhesive evenly, no globs or puddles, with nine (9) inch plastic core paint roller. Adhesive shall be applied to both sheet and substrate. One (1) gallon of bonding adhesive applied correctly will cover approximately 60 square feet of finished surface. Allow adhesive to dry until tacky but not stringy or sticky to a dry finger touch.
 - 1. Roll coat membrane into adhesive; avoid wrinkles.
 - 2. Brush down bonded half of the sheet with push broom to achieve maximum contact.
 - 3. Fold back the unbonded half of the sheet and repeat bonding procedure.
 - 4. Apply adjoining sheets in same manner lapping edges a minimum of three (6) inches. Do not apply bonding adhesive to the splice area.
- E. Join sheets together using 6" Factory – Applied Tape (FAT) whenever possible to properly prepared surfaces following manufacturers' instructions.
 - 1. Set tape in place and roll with 2" seam roller to bond to the seam area of each sheet.

3.8 MISCELLANEOUS

- A. Wood nailer treated with fire-retardant treatment, shall be installed at the gravel stop perimeter of each roof.
 - 1. Anchor wood nailers in accordance with minimum criteria established by FM Loss Prevention Data Sheet 1-49 and to resist a minimum lateral force of 75 pounds per lineal foot.
- B. Daily Seal: Care should be exercised to ensure that water does not flow beneath any complete sections of roof. Temporarily seal loose edge of membrane when weather is threatening.
- C. Roof Accessories: Install in accordance with requirements indicated in other Division 7 - Specification Sections.

END OF SECTION 07530

SECTION 07535 - MODIFIED BITUMEN ROOFING SYSTEM - COLD APPLIED

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specification sections "General Conditions," "Special Requirements" and "General Requirements" form a part of this section by this reference hereto and shall have the same force and effect as if printed herewith in full.

1.2 SUMMARY

- A. Extent of Modified bitumen roof membrane system which includes but is not limited to the following:
 - 1. Modified bitumen roof membrane system with mineral surface, cold applied.
 - 2. Roof thermal, insulation and recovery boards.
 - 3. Metal Roof edge / fascia and coping systems.
 - 4. Expansion joints.
 - 5. Roof walk-ways.
- B. Related Sections:
 - 1. Section 06100 - Carpentry for wood blocking and nailers.
 - 3. Section 07050 - Roof Demolition.
 - 4. Section 07500 - Roofing General.
 - 5. Section 07600 - Flashing, Sheet Metal and Roof Accessories.
 - 6. Section 07800 - Roof Specialties and Accessories.
 - 7. Section 07900 - Joint Sealer Assemblies.
 - 8. Section 15000 - Mechanical Work.

1.3 SCOPE OF WORK

- A. Furnish and install 2-Ply Modified Bitumen Roof Membrane System, SBS Adhesive, flashing torch applied, insulation and other roofing boards, roof metal edge and coping, and all miscellaneous materials required for a "**Total No Dollar Limit (NDL) Roofing System Warranty**".

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer ("Roofer") incorporated under same name for a recommended period of five (5) years, with experience in installation of specified system, to perform roofing work who has specialized in the installation of roofing systems similar to that required for this project and who is acceptable to manufacturer of primary roofing materials.
 - 1. Installer Certification: Obtain written certification from manufacturer of roofing system certifying that Installer is approved by manufacturer for installation of specified roofing system. Provide copy of certification to The Professional prior to award of roofing work.

- B. **Manufacturers Qualifications:** Obtain primary products, including each type of roofing sheet, adhesives, mopping asphalt, composition flashings, roofing boards, roof metal edges and copings, and other roofing components from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified.
1. All roofing components shall be supplied or approved by a manufacturer having a recommended minimum of five (5) years experience in the production of the specified roofing system which having properties as further defined in this specifications.
- C. **MANUFACTURER'S INSPECTIONS**
1. When the project is in progress, the Roofing System Manufacturer will provide the following:
 - a. Keep the Professional informed as to the progress and quality the work as observed.
 - b. Provide job site inspections a minimum of one day a week.
 - c. Report to the Professional in writing, any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 - d. Confirm, after completion of the project and based on manufacturer's observations and tests, that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.
- D. **Certificate of Analysis:** The Manufacturer shall submit, during the shop drawing process the anticipated pertinent information and an actual certificate of analysis at close-out which identifies pertinent information of the actual product which is being manufactured for this project. Refer to the following example (following this specification section) of the information which must be furnished.
1. The Architect, shall at their discretion, take samples of the product delivered to the project site and send the samples to an Independent Testing Laboratory to verify the information provided by the manufacturer.
 - a. If the anticipated 'Certificate of Analysis' furnished by the Manufacturer during the shop drawing process vastly differs from the physical properties of the manufacturer's product indicated in the specifications, the Architect may reject the deficient shop drawing / products before the materials are shipped to the site
 - b. If the 'Certificate of Analysis' of the installed products differ from the physical properties indicated in the specification manual submitted with the close-out documents, the Architect **shall reject** the deficient product. The Manufacturer shall, at their own cost, remove all deficient products from the site including labor and materials to remove and replace the installed products, including freight costs, and Liquidated Damages if the Milestone Dates identified in Section 01800.

- E. Insurance Certification: Assist the Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.
- F. UL Listing: Provide roofing system and component materials which have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for Class A external fire exposure.
 - 1. Provide roof covering materials bearing UL Classification Marking on bundle, package or container indicating that materials have been produced under UL's Classification and Follow-up Service.
- G. Factory Mutual Approval Standard 4470 Listing: Provide built-up roofing system and component materials which have been evaluated by Factory Mutual System for fire spread, wind-uplift, and hail damage and are listed in "Factory Mutual Approval Guide" for I-90 Wind Uplift. Roof system must be a Class 1A rate roof system. The roof shall be approved by FM Global for minimum I-90 wind uplift construction as listed in RoofNav.
 - 1. Provide roof covering materials bearing FM approval marking on bundle, package or container, indicating that material has been subjected to FM's examination and follow-up inspection service.
- H. Roof Code Requirements:
 - 1. Code Compliance: Modified Bitumen Roof Covering System shall comply with the International Building Code.
 - 2. Roofing System Design to meet roof covering wind resistance and wind test standards as described in Section 1504 of the IBC and shall be tested in accordance FM 4474, UL 580 or UL 1897.
 - a. Basic wind speed for this project as per the IBC and must be used to determine the basic Velocity Pressure (Pv) and the building minimum design wind and wind resistance standards required by code (and comply with Table 1504.8).
 - 3. Roofing assemblies shall meet UL for external fire exposure using UL Test No. 790 (ASTM E 108) Class A, as described in Section 1505, of the IBC.
 - 4. Material Standards: As described in Section 1507.11.2, of the IBC. Modified Bitumen roof coverings shall comply with CGSB 37-GP-56M, ASTM D 6162, ASTM D 6163, ASTM D 6164, ASTM D 6222, ASTM D 6223, ASTM 6298 or ASTM D 6509.
 - 5. Roofing Insulation: Above-deck thermal insulation board shall comply with the standards in Table 1508.2, Polyisocyanurate board ASTM C 1289, Type I or Type II.

1.5 REFERENCE STANDARDS

- A. References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

- | | | |
|----|--------|---|
| 1. | ASTM | American Society for Testing and Materials, Philadelphia, PA |
| 2. | FM | Factory Mutual Engineering and Research, Norwood, MA |
| 3. | NRCA | National Roofing Contractors Association, Rosemont, IL |
| 4. | OSHA | Occupational Safety and Health Administration, Washington, DC |
| 5. | SMACNA | Sheet Metal and Air Conditioning Contractors National Association,
Chantilly, VA |
| 6. | UL | Underwriters Laboratories, Northbrook, IL |
| 7. | IBC | International Building Code, Washington, DC |

1.6 PROJECT CONDITIONS

- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle roofing materials in a manner which will ensure that there is no possibility of significant moisture pick-up. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

1.8 WARRANTIES

- A. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's agreement including flashing endorsement (including metal), signed by an authorized representative of roofing system manufacturer, on form which was published with product literature as of date of Contract Documents, for the following period of time:
1. Total Roofing System Warranty: **Twenty (20) years** from approved date of substantial completion.
 2. Warranty must be a **NDL (no dollar limit)**.
 3. The following exclusions are permitted in the warranty:
 - a. Natural disasters such as lightning, hail, floods, tornadoes or earthquakes.
 - b. Damage from traffic or storage of material or equipment on roof.
 - c. Structural failure of roof deck, parapet or coping.
 - d. Infiltration of moisture in, through or around walls, coping, or building structure.
 - e. Damage to the building, (other than roofing system and specified components), or its components adjacent to roof areas.
 4. The warranty shall be supplemented by the following requirements:
 - a. If upon proper notification, the warrantor fails to promptly repair the roof, the Owner may take temporary action for repairs to avoid damage the facility. Such action shall not be considered a breach of the provisions of the warranty.

- b. The Owner shall be permitted to make alterations, additions and repairs to the roof within the written approval guidelines of the warrantor without jeopardizing the unexpired portion of warranty's original term.
5. Refer to Section 15000 for Roofing Manufacturer's requirement to include warranty information for the inclusion of the new and/or retro-fit roof drains into the overall roof system warranty.

1.9 SUBMITTALS

- A. Submit certification that the roof system furnished is Tested and Approved by Factory Mutual as a Class 1A roof system with 1-90 Wind Uplift Requirements, or Listed by Underwriters Laboratories or Warnock Hersey for external fire tests of ASTM E - 108 Class A and the following:
 1. Evidence of Factory Mutual Approval Standard 4470 for the proposed membrane system.
 2. Underwriters' Laboratories Class A acceptance of the proposed roofing system shall include cold adhesive without additional requirements for gravel or coatings. No other testing agency approvals will be accepted.
 3. The roof configuration (including fastening of base sheet or insulation) shall be approved by FM for minimum 1-90 windstorm construction.
 4. The roof membrane configuration shall be approved by FM for Class 1-SH (severe hail) exposure.
- B. Submit product data for each type of product which is part of the roofing assembly, including sheet roofing plies, flashings, roofing boards, sheet metal work, with manufacturer's technical product data, test data and Physical Properties and Performance. Include typical details, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with specified requirements.
- C. Shop Drawings: Submit roofing membrane layout drawings showing outline of roof and roofing size, specific roofing details illustrating relationships with adjacent construction, and flashing details at roof perimeter and roof penetrations.
 1. **Submit shop drawings of pre-manufactured and/or fabricated sheet metal work.**
 2. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the contract document details, the manufacturer shall provide the roofing contractor with acceptable details to be submitted to the Professional for approval.
 - a. This Project must receive the Professional's approval through this process prior to shipment of materials to the project site.
 - b. All roofing work required by the roofing system manufacturer shall be included in the contract at no additional cost to the Using Agency.

- D. Samples: Samples of each material specified, properly labeled.
1. Roof membrane: For project record, submit 8- by 10-inch samples of membrane cut from rolls of each type of material used on project.
 2. Flashing membrane: Submit 12-inch-square samples of sheet material to be used for base flashings.
 3. Fasteners: Submit (2) of each type.
 4. Coatings and adhesives: Submit samples for each type to be used.
- E. Submit independent test data according to ASTM designation D-5147-91 "Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material" substantiating that materials comply with specified requirements.
- F. Submit evidence and description of manufacturer's quality control/quality assurance program for the primary roofing products supplied. The quality assurance program description shall include all methods of testing for physical and mechanical property values. Provide confirmation of manufacturer's certificate of analysis for reporting the tested values of the actual material being supplied for the project prior to issuance of the specified guarantee.
- G. Submit a letter from the primary roofing manufacturer confirming that proposed membrane manufacturer has been producing SBS products in the United States for a recommended minimum of five (5) years without a change in the basic product design, physical and mechanical properties, or SBS modified bitumen blend, polymer specification, asphalt and filler formulation.
1. Letter shall confirm the number of years it has directly manufactured the proposed primary roofing system under the trade name and/or trademarks as proposed.
 2. Letter shall confirm that a phased roof application, with only the modified bitumen base ply in place for a period of up to 10 weeks, is acceptable and approved for this project.
 3. Letter shall include a list of five (5) of the proposed primary roofing manufacturer's projects, located in the United States, of equal size and degree of difficulty which have been performing successfully for a period of at least 5 years.
 4. Letter shall confirm that the filler content in the elastomeric blend of the proposed roof membrane and flashing components does not exceed 35% in weight.
 5. Letter shall include a complete list of material physical and mechanical properties for each sheet including: weights and thicknesses; low temperature flexibility; maximum load; elongation @ 5% maximum load (ultimate elongation); dimensional stability; high temperature stability; granule embedment and resistance to thermal shock (foil faced products).
 6. Letter shall confirm that the proposed roof membrane and flashing components meet or exceed the physical and mechanical requirements listed in Part 2 of this specification.

7. Letter shall confirm that the proposed roof membrane system meets the requirements of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles in an unaged specimen and 200 cycles in a specimen after heat conditioning.
- H. Submit a sample of unexecuted Manufacturer's warranty. Include separate supplement as required to comply with special warranty requirements indicated in this specifications.
- I. Certifications: The Contractor / Installer / Manufacturer (grantor) shall submit certifications to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results.
 1. Contractor shall provide manufacturer's "Roof Assembly Letter" confirming each proposed roof system and decking description as follows:
 - a. Assembly,
 - b. Construction Type,
 - c. Maximum Slope,
 - d. Deck Type,
 - e. Insulation - Layer (1),
 - f. Insulation Fastening,
 - g. Insulation Attachment Requirements; Field, Perimeter, Corners,
 - h. Insulation - Layer (2),
 - i. Insulation Attachment; Adhesive,
 - j. Membrane.
 2. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**

PART 2 - PRODUCTS

2.1 ROOFING MATERIALS

- A. Basis of Design: "Paradiene 20/30 FR Roofing System"; Siplast Inc.; or approved equal.
 1. Subject to compliance with the "Basis of Design" for roofing system performance requirements, the following manufacturers/roofing systems may be incorporated in the work:
 - a. Soprema:
 - 1) Base Ply Sheet: Elastophene HR - ASTM D 6163, Type II, Grade S.
 - 2) Cap Sheet: Elastophene FR GR - ASTM D 6163, Type I, Grade G.
 - 3) Flashing Sheet: Sopralast 50 TV ALU
 - 4) Soprema Extruded TerminEdge
 - 5) Sopra-Iso-25

- b. Johns Manville:
 - 1) Base Ply Sheet: DynaBase - ASTM D 6163, Type I, Grade S.
 - 2) Cap Sheet: DynaGlas FR - ASTM D 6163, Type I, Grade G.
 - 3) Flashing Sheet: DynaClad
 - 4) JM - Presto-Tite Fascia
 - 5) Enrgy 3, 25 psi
- c. Or approved equal.

2.2 ROOFING MATERIALS

- A. Basis of Design Roofing System: All roofing system materials and components as specified herein are based upon the Paradiene 20/30 FR Roofing System, as manufactured by Siplast Inc.; or approved equal.
- B. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate.
 - 1. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend.
 - 2. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C).
 - 3. Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles.
 - 4. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.
- C. Roofing Materials and Accessories:
 - 1. Modified Membrane Sheets: Manufacturer's standard and as following:
 - a. **"Siplast Paradiene 20;" Modified Bitumen Base, Stripping, and Flashing Reinforcing Ply:**
 - 1) Thickness (avg): 91 mils (2.3 mm) (ASTM D 5147)
 - 2) Thickness (min): 87 mils (2.2 mm) (ASTM D 5147)
 - 3) Weight (min per 100 ft² of coverage): 62 lb (3.0 kg/m²)
 - 4) Maximum filler content in elastomeric blend - 35% by weight
 - 5) Low temperature flexibility @ -13°F (-25°C): PASS (ASTM D 5147)
 - 6) Maximum Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
 - 7) Maximum Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
 - 8) Elongation @ 5% Maximum Load (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
 - 9) Dimensional Stability (max): 0.1% (ASTM D 5147)

- 10) High Temperature Stability (min): 250°F (121°C) (ASTM D 5147)
- 11) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
- 12) Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria

b. “Siplast Paradiene 30 FR”; Modified Bitumen Finish Ply:

- 1) Thickness (avg): 130 mils (3.3 mm) (ASTM D 5147)
- 2) Thickness at selvage (coating thickness) (avg): 98 mils (2.5 mm) (ASTM D 5147)
- 3) Thickness at selvage (coating thickness) (min): 94 mils (2.4 mm) (ASTM D 5147)
- 4) Weight (min per 100 ft² of coverage): 90 lb (4.4 kg/m²)
- 5) Maximum filler content in elastomeric blend: 35% by weight
- 6) Low temperature flexibility @ -13° F (-25° C): PASS (ASTM D 5147)
- 7) Maximum Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
- 8) Maximum Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
- 9) Elongation @ 5% Maximum Load (avg.) @ 73°F (23°C): 55% (ASTM D 5147)
- 10) Dimensional Stability (max): 0.1% (ASTM D 5147)
- 11) High Temperature Stability (min): 250°F (121° C) (ASTM D 5147)
- 12) Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)
- 13) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
- 14) Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria
- 15) Surfacing: ceramic granules

c. Flashing Sheets:

- 1) **“Siplast, Veral Flashing System”:**
 - a) 134 mil SBS Fiberglass reinforced with fiberglass scrim composite, homogeneous (Styrene-Butadiene-Styrene) block copolymer modified asphalt membrane, UL Class listed, FM approved (products shall bear seals of approval).
 - b) Weight: 90 lbs. Average per 100 square foot of coverage.
 - c) Low Temperature Flexibility: Passes @ - 0°F (-18°C), (ASTM D-5147).
 - d) Breaking Load : 85 lbf/inch @ 73 °F, (ASTM D-5147).
 - e) Elongation : 45% @ 73.0°F, (ASTM D-5147).
 - f) Compound Stability: -230°F (-110°C).
 - g) Surfacing : Aluminum metal foil.

- d. **“Parapro 123 Flashing System by Siplast”; Catalyzed Acrylic Resin Flashing System:** A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

Concrete and masonry surfaces to receive Parapro must be cleaned and wire brushed down to a new surface and primed with Pro Primer W.

NOTE: Parapro is not compatible with the solvents in PA-311 M cold adhesive used to install the 20/30 system. Hold back the PA-311 M twelve (12) inches from the Parapro. Use SFT adhesive (solvent free technology) or PS-304 elastomeric sealant to adhere the 20/30 membrane adjacent to and underneath the Parapro. Use SFT flashing cement or PS-304 to adhere the stripping ply on the vertical surface. Priming is not required.

2. Membrane Cold Adhesive: An asphalt, solvent blend conforming to ASTM D 4479, Type II requirements.
 - a. Siplast PA-311 R Cold Adhesive by Siplast;; or approved equal.
3. Flashing Adhesive: A slump resistant, asphalt cutback flashing adhesive, reinforced with non-asbestos fibers, conforming to ASTM D 4586 Type II requirements.
 - a. Siplast PA-828 Flashing Cement; or approved equal.
4. Rigid Roofing Boards: Types which provided or approved by the roofing system manufacturer which include but are not limited to the following
 - a. ROOF INSULATION BOARD: Provide "Paratherm CG" polyisocyanurate insulation with coated fiberglass facer by Siplast Inc; for Uniform and Tapered Insulation; or approved equal:
 - 1) Board Size: 4' x 4' only.
 - 2) Thickness (Uniform): As necessary to achieve the required "R" value. See also minimum thickness indicated on drawings and tapered areas.
 - a) Bottom layers on existing flat metal decking shall be a minimum of 3 1/2" thick, two layers of 1 1/2" thick with staggered joints plus 1/2" minimum of tapered insulation at the low point, as indicated.
 - (1) Tapered insulation; 1/4" to the foot slope for the roof area; and 1/2" or 3" to the foot slope for gussets/crickets (Refer to Roof Plans). Stagger all joints between layers.
 - 3) R-Value (Uniform): Minimum of R=30.0, per one layer of 2 1/2" and one layer of 3 1/2" thick, [LTTR: R-5.6. per 1"; R-11.4 per 2"; R-17.4 per 3"; R-23.6 per 4"], unless indicated otherwise in the roof assemblies illustrations.
 - 4) Meet or exceed ASTM C 1289 Type II Class 2. Compressive Strength: 25 psi, minimum, Grade 3.
 - 5) Density: 1.5 pcf.
 - 6) Surface - Burning Characteristics: Tested in accordance with ASTM E 84;
 - a) Flame Spread: Not more than 25
 - b) Smoke - developed: Not more than 200
 - 7) FM approved for Wind Uplift, tested for 90 psf.
 - b. Top Over laying Board:
 - 1) THERMAL BARRIER BOARD

- a) Basis of Design: "Securerock Gypsum-Fiber" Roof Board as manufactured by USG; or approved equal.
 - (1) Water-resistant and silicone-treated gypsum core board, UL 790 Class A listing as a barrier board, and tested in accordance with ASTM E-84;
 - (a) Flame Spread: 0
 - (b) Smoke developed: 0
 - (2) Board Size: 4' x 4'.
 - (3) Thickness (Uniform): 1/2", R-Value per ASTM C518 = R.5.
 - (4) FM approved for Wind Uplift, tested for 90 psf.
 - (5) Stagger all joints with bottom layer.

- c. Adhesive for Top Over Laying Boards: Para-Stik; Flexible Products Co.; or approved equal.
 - 1) Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a) Fas-n-Free Adhesive, as manufactured by Tremco
 - b) High Velocity Insulation III adhesive by Soprema.
 - c) Urethane Insulation adhesive by Johns Manville.
 - d) Or approved equal.

- 5. Sealant: A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:
 - a. Siplast PS-209 Elastomeric Sealant by Siplast; or approved equal.

- 6. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.

- 7. Perlite Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.

- 8. Walktread: "Paratread Roof Protection Material by Siplast"; or approved equal: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.
 - a. Thickness: 0.217 in (5.5 mm)
 - b. Weight: 1.8 lb/ft² (8.8 kg/m²)
 - c. Width: 30 in (76.2 cm)

- 9. Bituminous Cutback Material:
 - a. Primer: A high flash, quick drying, asphalt solvent blend which exceeds ASTM D 41-85 requirements; PA-917 LS Asphalt Primer; Siplast.
 - b. Mastics: Asphalt cutback mastic, reinforced with non-asbestos fibers, conforming to ASTM D 4586-86 Type II requirements; PA-1021 Plastic Cement; Siplast.

10. Metal Roof Edge: Manufacturer's standard; "Paraguard Extruded Edge TE - Custom Sizes", .050" thick, prefinished Kynar 500, with preformed mitered corners.
 - a. Color to be selected by the Architect / Owner after award of contract. See Section 07600 for additional information.
11. Wood Blocking & Curbs: Lumber; #2 grade free from warping and visible decay; fire retardant treated (FRT) to meet AWWPA C20 (lumber), and marked and in accordance with requirements indicated in section 06100.
12. Mechanical Fasteners: Manufacturer's standard approved fasteners for this type of application.
 - a. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel. Nails and fasteners shall be flush-driven through flat metal discs of not less than 1-inch diameter. Metal discs may be omitted when one piece composite nails or fasteners with heads not less than 1-inch diameter are used.
13. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than 28 gauge and not less than 1-inch in diameter. Discs shall be formed to prevent dishing. Bell or cup-shaped caps are not acceptable.
14. Siplast Expansion Joint Cover: Paraguard - .050" thick pre-finished aluminum, color as selected by Architect; or approved equal.
15. Siplast Metal Extenders: Paraguard (see drawings for thickness of aluminum).

PART 3 - EXECUTION

3.1 INSPECTION EXISTING SUBSTRATE

- A. Immediately after removal of existing roofing materials and exposing existing concrete decking, the Contractor shall schedule on-site field visit with manufacturer's representatives to determine suitability of existing decking. Contractor shall notify the Architect for the date and time of the field visit.
 1. Remove existing roofing in accordance with Section 07050.
 2. Correct, repair and patch any damage and/or defects to existing metal decking prior to start of installation of new roofing system.

3.2 PREPARATION OF SUBSTRATES

- A. Roof substrate shall be dry and free of foreign materials. Remove nails, nail heads and other protrusions from existing deck.
 1. Roof substrate shall be free of ponded water, ice, or snow to eliminate future condensation problems.

2. Preparations, repair and patching of existing metal decking shall be completed prior to start of any roofing work.

3.4 CLEANING OF ROOF DRAIN LINES

- A. Drain lines from the roof shall be electrically cleaned to invert of house storm sewer using power roter ("Roto-Rooter"). Contractor shall provide certification to The Professional at completion of project that this work has been satisfactorily performed.

3.5 INSTALLATION - GENERAL REQUIREMENTS

- A. Comply with instructions of the primary roofing materials manufacturer, and comply with the requirements for **(20) Years Total Roofing System Warranty**.
- B. Coordinate with all roof mounted items to facilitate roofing installation.
- C. Coordinate with the installation of all metal flashing and sheet metal work.
- D. Confinement of Materials: Do not allow fluid and plastic to spill or migrate beyond surfaces of intended application.
 1. Contractor to clean all migrated materials exposed to view.
- E. Performance: It is required that roofing work be water-tight for normal weather exposure and not deteriorate in excess of normal weathering.
- F. Clean site of all debris and contractor materials; restore damaged site work, i.e.; shrubs, turf, curbs, etc. to conditions prior to start of this work.
- G. Install accessories as shown and as recommended by the prime materials manufacturer.
- H. Insulation Under Roofing: Do not advance the installation of new roof insulation excessively ahead of roofing. Do not install roofing or new insulation over wet insulation; remove and replace with dry insulation before proceeding.
- I. Coordinate Roofing with flashing and other adjoining work to ensure proper sequencing of entire work.
- J. Cooperate with inspection and test agencies engaged or required to perform services in connection with roofing system installation.
- K. Protect other work from spillage of roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace/restore other work damaged by installation of roofing system work.
- L. Insurance/Code Compliance: Install roofing system for (and test where required to show) compliance with governing regulations.
- M. Coordinate the installation of insulation, roofing sheets, flashings, stripping, coatings and surfacing, so that insulation and felts are not exposed to precipitation nor exposed overnight.

Provide cut-offs at end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work. Glaze coat installed ply-sheet courses at end of each day's work where final surfacing has not been installed.

- N. Substrate Joint Penetrations: Do not allow adhesive to penetrate substrate joints and enter building or damage insulation or other construction.

3.6 PROTECTION

- A. Contractor shall provide protection for roofing during construction period, so that the work will be without damage or deterioration except for normal weathering at time of acceptance.

3.7 INSTALLATION OF THE INSULATION / ROOFING BOARDS

- A. Each 4'x4' insulation board of the base layer of insulation must be mechanically fastened to the roof deck with at least one (1) fastener every two (2) square feet. Fastening pattern may be increased by Factory Mutual, the insulation manufacturer, and the roofing materials' manufacturer.
- B. Secure subsequent layers and the top cover board to bottom insulation layers using manufacturer's approved adhesive as indicated.
 - 1. Insulation boards will have joints staggered. Gaps between panels of insulation will not exceed 1/4" at wood blocking and joints in the field of insulation will be tight. Panels with broken corners, damaged faces or wet panels of insulation will not be used. Where joints in field in insulation are not tight, joints will be taped with six (6) inch fiberglass tape adhered to insulation in approved adhesive.
- C. Install top laying thermal board in cold adhesive and in accordance with manufacturers' requirements. Stagger all joints with bottom insulation layer.
- D. Install only that amount of insulation that can be covered the same day with new roof system. No phased roofing will be accepted unless pre-approved by the roofing manufacturer.

3.8 INSTALLATION OF MODIFIED BITUMINOUS SYSTEM:

- A. General Requirements: Apply roofing membrane in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing shall immediately follow application of base sheet and/or insulation as a continuous operation.
 - 1. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps of the finish sheet a minimum twelve (12) inches from side laps in the underlying base sheet. Stagger end laps of finish sheet a minimum three (3) feet from end laps in the underlying base sheet.

2. Fully bond the finish ply to the base ply, utilizing minimum 3" side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.
 3. Apply layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Lap seams in the base ply layer should not coincide with the lap seams of the finish ply layer and to be staggered to ensure this.
 4. Choose sheet orientation and application techniques as applicable for the specific roof assembly proposed. Apply all layers of roofing perpendicular/parallel to the slope of deck.
 5. Obtain the manufacturer's acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to specific roof slopes.
 6. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**
 - a. The Roofing Contractor can start snapping on the manufacturer's pre-finished metal edge, coping, fascia only after the cleats, chairs and anchor plates are inspected and approved by the manufacturer.
- B. AESTHETIC CONSIDERATIONS. An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials (i.e. granules, metallic powder, etc.), and exercise care in ensuring that the finished application is acceptable to the Owner.

Contractor shall avoid working off finished cap sheet. Contractor will be responsible for finished cap sheet to be clean and free of excessive adhesive and foot print marks. If it is determined by the Architect, that the cap sheet has excessive marks, the contractor will be responsible for coating the entire roof area with the Manufacturers' approved coating at no cost to the owner. It's the Contractor responsibility to relay this information to the foreman and working crew.

3.9 WALL / CURB FLASHING-COUNTER FLASHING

- A. Abutment wall flashing locations will require the installation of fiber cant strip.
- B. The wall/cant juncture will be examined for air passage. If air flow is present, joint between cant and the wall will be sealed with closed cell joint backing and approved general purpose sealant.

- C. Flash masonry parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane.
1. The reinforcing sheet shall have a minimum three (3) inch side laps and extend a minimum of three (3) inches onto the base sheet surface and three (3) inches up the parapet wall above the cant.
 2. Fully adhere the flashing reinforcing sheet.
 3. The laps of the metal foil flashing layer and the lap seams in the reinforcing layer should not coincide.
 4. After the final roofing sheet has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allow primer to dry thoroughly.
 5. Torch apply the metal foil-faced flashing into place using three (3) foot widths (cut off the end of roll) and always lapping the factory selvage edge.
 6. Extend flashing sheet a minimum of four (4) inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height.
 7. Exert pressure on the flashing sheet during application to ensure complete contact with wall/roof surfaces, preventing air pockets.
 8. Nail the top edge of flashing at nine (9) inch on centers. coverage. Set the flashing in place while exerting pressure on the flashing sheet to ensure complete contact with the wall/roof surfaces and to prevent air pockets. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers.

3.10 WATER CUT-OFF

- A. At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.11 GRANULE EMBEDMENT

- A. Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.

3.12 WALKTREAD

- A. Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.

3.13 DRAINS, PIPING, PITCH POCKETS AND VENT PIPING

- A. Follow manufacturer's standard details and printed instructions for installation of membrane sheet and flashing around drains and vent piping.

3.14 FIELD QUALITY CONTROL AND INSPECTIONS

- A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.
- B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.
- C. Final Inspection
 - 1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.
- D. Issuance of the Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

END OF SECTION 07535

ROOF MEMBRANE PRODUCTS CERTIFICATE OF ANALYSIS

DATE:

LOT NUMBER:

MATERIAL TYPE:

DIMENSIONS & MASS

MINIMUM
SPECIFICATION

AVERAGE TESTED VALUE
±STANDARD DEVIATION

ACTUAL
MINIMUM

LENGTH (ft.):

WIDTH (in.):

THICKNESS AT
SELVAGE (mils):

TOTAL THICKNESS (mils):

WEIGHT (lbs/roll):

SELVAGE WIDTH (in.):

PHYSICAL & MECHANICAL PROPERTIES

SPECIFICATION

AVERAGE TESTED VALUE
±STANDARD DEVIATION

LOW TEMP. FLEXIBILITY (°F):

GRANULE EMBEDMENT
(avg. grams loss/sample):

BREAKING LOAD (lbf/in.):

ULTIMATE ELONGATION (%):

COMPOUND STABILITY (°F):

DIMENSIONAL STABILITY (%):

RESISTANCE TO THERMAL
SHOCK (%):

**Note: Must be provided from Roof
Membrane Manufacturer for each
Product.**

SECTION 07600 - FLASHING, SHEET METAL AND ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pre-manufactured/pre-engineered fascia / gravel stop / metal edge / coping systems.
 - 2. Pre-manufactured metal flashing and counterflashing.
 - 3. Pre-manufactured roof expansion joint covers.
 - 4. Miscellaneous sheet metal accessories.
 - 5. Roof expansion joint covers.
 - 6. Exposed metal field and shop fabricated sheet trim and fascia units, where indicated.
 - 7. Pipe curb assembly.
 - 8. Pipe-Penetration Flashing.
- B. Related Sections:
 - 1. Wood nailers and blocking: Section 06100.
 - 2. Roofing Materials: Elsewhere in Division 7.
 - 3. Roofing Manufacturer's furnished metal edge: Section 07535.
 - 4. Roof Specialties and Accessories: Section 07800.
 - 5. Joint Sealer Assemblies: Section 07900.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Requirements: Design and install work of this section, including attachment to the structure, to safely withstand dead, live and wind loads prescribed by the International Building Code.
- B. Environmental Requirements: Provide for expansion and contraction of system components due to air temperature and solar heat gain. Provide systems which will accommodate movement due to temperature change without buckling, failure of seals, undue stress on structural elements, reduction of performance, or other detrimental effects.
 - 1. Anticipated air temperature range: Minus 10°F to +105°F.

1.4 REFERENCES

- A. Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).
- B. ASTM B 32; Standard Specification for Solder Metal.
- C. ASTM B 209; Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

- D. Aluminum Association, Design System for Aluminum Finishes (AA).
- E. American Architectural Manufacturers Association (AMMA), standards as referenced herein.
- F. ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roof Systems.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's specifications, standard details, and installation recommendations.
- B. Shop Drawings: Submit manufacturer's shop drawings showing material types, thickness, sizes, shapes, connections, layout, joining, profiles and anchorage of fabricated work and relation to adjacent work. edited product data or shop drawings, or a combination thereof, as required to accurately describe products to be provided. Show elevations, field measurements, reinforcement, expansion provisions, installation accessories, and detail sections of composite members. Draw layouts at scale of 1/4 inch per foot, details at scale of 3 inches per foot.
 - 1. **Provide shop drawings for, but not limited to, the following:**
 - a. Covering on minor flat, pitched or curved surfaces.
 - b. Building control and expansion joints.
 - c. Metal edge, fascia, area divider, coping.
 - d. Base flashing and counterflashing.
 - e. Flashing for roof drains and roof penetrations.
 - f. All other sheet metal work requiring fabrication.
 - g. Details of all joints for above.
 - h. Reglets and wedges.
 - 2. Sheet metal shop drawings shall be prepared to reflect SMACNA detail standards and in accordance with ANSI/SPRI ES-1 Test Protocols.
- C. Samples for Color Selection of Coated Finishes: Coating manufacturer's color selection data.
- D. Samples for Color Verification of Coated Finishes: For each type and color of coated finish submit 12-inch-long sections of extrusions and formed sections and 6-inch-square sheets.
- E. Pre-engineered fabricated and pre-finished sheet metal manufacturer's product literature, finish specification and sample finish warranty.
- F. Sheet metal fabricators and installers qualifications.

1.6 QUALITY ASSURANCE

- A. Listing - Roof Perimeter Flashing System: Provide system listed in Factory Mutual System's "Approval Guide," classified for Zone 2 (I-90 windstorm resistance).

- B. Fabricator / Installer: A firm having a recommended minimum of 5 years of successful experience in fabrication and installation of sheet metal work of type and scope equivalent, to work of this section.

NOTE: Metal Coping, Metal Edging, and Area Divider Cover shop fabricated by Contractor is unacceptable and will not be approved by Architect. These metals shall be pre-engineered, fabricated and furnished by the roofing manufacturer and or approved manufacturers below.

1. **Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the work.**

- C. Pre-engineered and Contractor: Fabricate and install sheet metal work in accordance with indicated reference standards.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials off ground, under cover. Protect from damage and deterioration.
- B. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Damaged material shall be rejected and removed from the site.

1.8 WARRANTY

- A. Warrant gravel stop/fascia, coping, gutters, downspouts, scuppers system work to be free of defects in materials and workmanship, to resist blow-off and to be leak tight, due to conditions within stated design limits.
- B. Warrant Fluoropolymer coating to remain free, under normal atmospheric conditions, from peeling, checking, or cracking, and chalking in excess of numerical rating of 8 when measured in accordance with ASTM D659-86, or fading in excess of 5 N.B.S. units during warranty period.
1. The Warranty period shall be **twenty (20) years** which starts the approved date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide pre-engineered manufactured products approved by the roofing system manufacturer(s) which may include but not limited to the following:
1. Formed-Aluminum Metal Edging, Copings and Fascia:
- Hickman: W.P. Hickman Co., Tel.# 828.676.1700, www.wph.com.
 - Imetco, an ESOP Company.
 - Metal-Era, Inc., Tel.# 800.558.2162, www.metalera.com.
 - Southern Aluminum Finishing Co., Tel.# 800.241.7429, www.saf.com.
 - or approved equal.

2. Aluminum Reglets:

- a. Fry Reglet Corporation, Tel.# 800.237.9773, www.fryreglet.com.
- b. Hickman: W.P. Hickman Co., Tel.# 828.676.1700, www.wph.com.
- c. Keystone Flashing Company, Tel.# 800.526.8348, www.keystoneflashing.com
- d. CertainTeed, Saint-Gobain, Tel.# 800-233-8990, www.certainteed.com
- e. or approved equal.

3. Stainless-Steel Reglets:

- a. Cheney Flashing Company, Tel.# 609.394.8175 / 800.322.2873, www.cheneyflashing.com.
- b. Fry Reglet Corporation, Tel.# 800.237.9773, www.fryreglet.com.
- c. Keystone Flashing Company, Tel.# 800.526.8348, www.keystoneflashing.com

2.2 METALS

- A. Type "C"; Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:
1. Type "C-4"; Factory-Painted Aluminum Sheet: ASTM B 209, 3003-H14, with a minimum thickness of 0.040 inch, unless otherwise indicated.

2.3 COPINGS, FASCIA, ROOF EDGE & AREA DIVIDER COVER

- A. Provide pre-engineered manufactured exposed coping components fabricated from the following metal:
1. Formed-aluminum sheet in thickness indicated. Refer to Architectural drawings for thickness / height requirement(s).
 2. **Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the work.**
- B. Provide fascia in shapes and sizes indicated, with shop-mitered and -welded corners.
1. Include water dams formed from at least 0.028-inch- thick, galvanized steel sheet; anchor plates; cleats or other attachment devices; concealed splice plates; and trim and other accessories indicated or required for complete installation, with no exposed fasteners.

2.4 REGLETS

- A. General: Provide reglets of type, material, and profile indicated, compatible with flashing. Form to securely interlock with counterflashing.
1. Type - 3: Masonry Type: Provide "MA-1.5" (Brick) and "MA-4" (CMU) springlok Reglet by Fry Reglet Corp.; or approved equal.

- a. Aluminum: 3003-H14 alloy, meeting ASTM B209-95, 0.040" thick aluminum, color as selected by Architect from manufacturer's standard colors.
 - b. Provide 3" minimum lap joints.
 - c. Sawcut joint to receive reglet to a depth of approximately 1/4" greater than the depth of the horizontal back leg of reglet.
 - d. Insert reglet into sawcut and wedge in place using lead wedges installed at 12" o.c., minimum. Hammer wedges to a depth that will not interfere with sealant or backer rod.
 - e. Install sealant exterior sealant to form fillet bead minimizing holding of water.
2. Type - 5: Roof Top Equipment Curb: Provide "MA" springlok Reglet by Fry Reglet Corp.; or approved equal.
- a. 0.040" thick aluminum, with 1-1/2" top flange, color as selected by Architect.
 - b. Provide 3" minimum lap joints.
3. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing's lower edge.

2.5 COUNTERFLASHING

- A. Provide springlok counterflashing by Fry Reglet Corp.; Metal-Era; Xtreme Trim; or approved equal.
- 1. 0.040" thick aluminum, as indicated on the drawings.
 - 2. Provide inside and outside corners including special angle where required.

2.6 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. GENERAL REQUIREMENTS:

- 1. All miscellaneous materials, accessories or other items essential to the completion of sheet metal installation, though not specifically shown or specified, must be provided.
- 2. All such items, unless otherwise indicated on drawings or specified herein, shall be applied using sheet metal gauges which conform to recognized industry standards of sheet metal practices and without additional cost to the Owner. For sheet metal and pre-manufactured units, provide type of solder, ASTM B23, and corrosion-resistant metal as recommended by the producer of the metal sheets for fabrication and installation.
- 3. Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.

- B. Fasteners: Same metal as flashing/sheet metal, as indicated or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- C. Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
- D. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- E. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed; comply with FS TT-S-00227, TT-S-00230, or TT-S-001543.
- F. Epoxy Seam Sealer: 2-part non-corrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- G. Paper Slip Sheet: 15-lb. rosin-sized building paper.
- H. Polyethylene Underlayment: 6-mil carbonated polyethylene film; FS L-P-512.
- I. Prefabricated Accessories: Provide prefabricated accessories by Metal-Era, Roof Edge Systems, or approved equal.
 - 1. Exposed Termination Bar: 0.05 x 1/2" x 1 1/2" x 1/2" aluminum channel or 1" x 3/16" aluminum bar as manufactured by Metal-Era Inc.; or approved equal. Provide fastening at 8" o.c.
- J. Pipe Curb Assembly:
 - 1. Manufacturer: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Pipe Portal Systems as manufactured by Portals Plus, Inc., Tel.# 800.624.8642.
 - b. The Pate Company, Tel.# 800.243.3018 or 630.705.1920.
 - c. ThyCurb, Tel.# 216.762.0061.
 - d. Or approved equal.

2.7 FABRICATION, GENERAL

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams (Metal other than Aluminum): Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
2. Seams (Aluminum): Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
5. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
6. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
7. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
 - B. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

D. SHEET METAL FABRICATIONS

1. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements.

2.8 ALUMINUM FINISHES

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - a. Color(s): As selected by the Architect from manufacturer's available full range of colors including custom colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence.
- B. Verify that substrates and openings are rigidly set, at proper lines and elevation, properly sized, and ready to receive units.
- C. Do not proceed with installation until conditions detrimental to proper installation have been corrected.
- D. Coordinate installation with roofing work and other adjacent elements of building envelope to ensure watertight construction.

3.2 PREPARATION

- A. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- B. Isolate all dissimilar metals by means of a heavy bituminous coating, approved paint coating, adhered polyethylene sheet, or other means recommended by SMACNA.

3.3 INSTALLATION

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion in metal units. Set units true to line and level indicated. Install work with laps, joints, and seams permanently weatherproof and watertight.
- B. Sealed Joints: Form minimum 1-inch hooked joints and embed flange into sealant or adhesive. Form metal to completely conceal sealant or adhesive.
 - 1. Use joint adhesive for nonmoving joints specified not to be soldered.
 - 2. Moving Joints: When ambient temperature is moderate (40-70°F) at time of installation, set joined members for 50% movement either way. Adjust setting position of joined members proportionally for temperatures above 70°F. Do not install sealant at temperatures below 40°F. Refer to section on sealants elsewhere in Division 7 for handling and installation requirements for joint sealers.
- C. Workmanship: Install sheet metal work with lines, arises, and angles sharp and true. Exposed surfaces shall be free from visible waive, warp, buckle, and tool marks. Exposed edges shall be folded back neatly to form a ½-inch hem on the concealed side. Sheet metal exposed to the weather shall be watertight with provisions for expansion and contraction.
- D. Nailing: Nailing of sheet metal shall be confined generally to sheet metal having a maximum width of 18 inches. Nailing of flashings shall be confined to one edge only. Nails shall be evenly spaced not over 3 inches on centers and approximately ½-inch from edge unless

otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is applied to other than wood surfaces, detailed shop drawings shall include locations for sleepers and nailing strips required to properly secure the work.

- E. Cleats: Provide cleats for sheet metal 18 inches and over in width. Space cleats evenly not over 12 inches on centers unless otherwise specified or indicated. Unless otherwise specified, cleats shall be not less than 2 inches wide by 3 inches long, and of the same material and thickness as the sheet metal being installed. One end of the cleat shall be secured with two nails and the cleat folded back over the nailheads. The other end shall be folded back over the nailheads. The other end shall be locked into the seam. Cleats for soldered seams shall be pretinned.
- F. Bolts, Rivets and Screws: Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.
- G. Seams; General: Comply with SMACNA, Figures 3-2 & 3-3, Tables 2-1 & 3-1R, and other applicable designs to specific installation.
 - 1. Seams: straight and uniform in width and height with no solder showing on the face.
 - 2. Flat-lock Seams for All Non-Moving Seams; Finish not less than 3/4-inch wide.
 - 3. Loose-lock Expansion Seams: Not less than 3 inches wide, and shall provide minimum one-inch movement within the joint. Joint shall be completely filled with the specified sealant, applied at no less than 1/8 inch thick bed. Sealants are specified in Section 07900 - Joint Sealer Assemblies and shall be completely concealed.
 - 4. Flat Seams: Make seams in the direction of the flow.
- H. Soldering, Welding, and Mechanical Fastening: Where soldering is specified herein, it shall apply to copper and lead coated copper and galvanized metal items.
 - 1. Soldering: Cretin edges of sheet metals, except lead coated material, before soldering is begun. Soldering shall be done slowly with well heated soldering irons, so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of lead-coated material to be soldered shall be scraped or wire-brushes to produce a bright surface, and seams shall have a liberal amount of flux brushed in before soldering is begun.
- I. Counterflashing: Except where indicated or specified otherwise, insert counterflashing receiver in horizontal saw cut joints locations as indicated. Snap counterflashing in receiver and extend down vertical surfaces over upturned vertical leg or base flashings not less than 4 inches. Exposed edges of counterflashing shall be folded 1/2-inch. End laps in counterflashings shall be overlapped 6", and shall be made weathertight with sealant.
 - 1. Lengths of metal counterflashings shall not exceed 10 feet. The flashings shall be formed to the required shapes before installation. Corners shall be factory-formed with joints not less than 24 inches from the angle.

2. Flashing receivers shall be secured in the horizontal joint with lead wedges spaced not to exceed 12 inches apart; on short runs, wedges shall be placed closer together.
 3. Counterflashing receiver joints shall be filled with caulking compound. Caulking is covered in Section 07900 - Joint Sealer Assemblies.
- J. Cap Fascia Coping: Prefabricate in the shapes and sizes indicated and in lengths not less than 8 feet. Provide prefabricated mitered corners for internal and external corners.
1. Conceal Splice Plates: 6" wide with vertical legs as required to match coping. Install a continuous bead of sealant on both sides of joint before installing coping to form a watertight gutter.
 2. Hook Strips: The lower edge of fascias shall be hooked at least 3/4 inch over a continuous hook strip of the same material bent outward at an angle of 45° to form a drip. Nail hook strip to a wood nailer at 6 inches maximum on centers.
 3. Where fastening is made to concrete or masonry, screws spaced 12 inches o.c. shall be used and shall be driven in expansion shields set in the concrete or masonry. Where necessary, install hook strips over 1/16 inch thick compatible spacers or washers.
 4. Mechanically fasten fascia at roof side with a stainless steel fastener with a neoprene washer at 2'-0" o.c.

3.4 PROTECTION FROM CONTACT OF DISSIMILAR MATERIAL

- A. Copper or Copper-Bearing Alloys: Surfaces in contact with dissimilar metal shall be painted with heavy bodied bituminous paint, or shall be separated by means of moisture-proof building felts.
- B. Aluminum: Surfaces shall not contact other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, the dissimilar metal shall be painted with a primer followed by two coats of aluminum paint.
- C. All Metal: Surfaces in contact with mortar, concrete, or other masonry materials shall be painted with alkali-resistant coatings such as heavy-bodied bituminous paint.
- D. Wood or Other Absorptive Materials: Surfaces that may become repeatedly wet and in contact with metal shall be painted with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.
- E. Dissimilar Metal: Paint with a non-lead pigmented paint if drainage from it passes over aluminum.
- F. All fasteners shall be compatible with the metal with which it is connected.

3.5 PROTECTION OF ROOFING

- A. Protection of Applied Insulation: Completely cover each day's installation with finished roofing specified. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing is applied. Storing, walking, wheeling, or trucking will not be permitted directly on insulation or on roofed surfaces. Provide smooth, clean board or plank walkways, runways, and platforms near supports, as necessary to distribute weight to conform to indicated live load limits of roof construction.
- B. Upon completion of roofing work (including associated work) Installer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period. At end of construction period, or at a time when remaining construction work will in no way affect or endanger roofing (at Contractor's option), Installer shall make a final inspection of roofing and prepare a written report to Contractor with copy to Owner) describing nature and extend of deterioration or damage found in the work.
- C. Installer shall repair or replace (as required) deteriorated or defective work found at time of final inspection. Installer shall be engaged by Contractor to repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection.
- D. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.

3.6 CLEAN-UP

- A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. Upon completion of the specified work, remove all waste, debris, unused material and equipment from the site. Remove all misplaced material from nearby surfaces. Leave the job in a clean condition, acceptable to Owner.
- C. Advise Contractors of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION 07600

SECTION 07800 - ROOF SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent and locations of roof accessories is indicated on the drawings and by provisions of this section.
- B. Type of units specified in this section includes the following:
 - 1. Prefabricated curb and support units.
 - 2. Pipe and conduit supports.
 - 3. Roof Drains, where noted and as specified herein.
- C. Related Sections:
 - 1. Refer to roofing system sections, for roofing accessories to be built into roofing system (not work of this section).
 - 2. Section 06100 - Carpentry.
 - 3. Section 07600 - Flashing, Sheet Metal and Roof Accessories.
 - 4. Section 07900 - Joint Sealer Assemblies.
 - 5. Division 15 - Mechanical related work.

1.3 SUBMITTALS

- A. Product Data; Roof Accessories: Submit manufacturer's technical product data, rough-in diagrams, details, installation instructions and general product recommendations.
- B. Samples; Roof Accessories: Submit 2 samples, min. 8" square, of each exposed metal and plastic sheet materials, and 2 samples, min. 24" long, of formed or extruded exposed metal member; color and finish as specified.
- C. Coordination Drawings: Submit coordination drawings for items interfacing with or supporting mechanical or electrical equipment, ductwork, piping, or conduit. Indicate dimensions and locations of items provided under this section, together with relationships and methods of attachment to adjacent construction and to mechanical/electrical items.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap-flashing to coordinate with type of roofing indicated. Comply with "NRCA Roofing and Waterproofing Manual" details for installation of units.

- B. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- C. Provide a letter of certification to the Architect indicating that all existing internal roof drain lines have been electrically power cleaned for full length in accordance with this Section.
- D. The installation of roof drain systems shall be in accordance with the National Standard Plumbing Code, International Mechanical Code - New Jersey Edition (latest edition), and all local codes having jurisdiction over this project.

1.5 WARRANTY

- A. Manufacturer's Warranty: Roofing manufacturer must submit warranty agreement including retrofit roof drain(s), signed by an authorized representative of roofing system manufacturer, on form which was published with product literature as of date of Contract Documents, for the following period of time:
 - 1. Total Roofing System Warranty: **Twenty (20) years** from approved date of substantial completion.
 - 2. Warranty must be a **NDL (no dollar limit)**.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS

- A. Provide manufacturers' standard units, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

2.2 MATERIALS, GENERAL

- A. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.
- B. Stainless Steel: AISI TYPE 302/304, ASTM A 167, 2D annealed finish except as otherwise indicated, temper as required for forming and performance.
- C. Aluminum Sheet: ASTM B 209, alloy 3003, temper as required for forming and performance; anodized finish, except mill finish prepared for painting where indicated for field painting.
- D. Extruded Aluminum: Manufacturers standard extrusions of sizes and general profiles indicated, alloy 6063 T6, architectural grade aluminum; 0.078 inch minimum thickness for primary framing and curb member legs and 0.062 inch for dome retaining angle.
- E. Insulation: Manufacturer's standard rigid polyisocyanurate or semi-rigid board of glass fiber of thicknesses indicated.
- F. Wood Nailers: Softwood lumber, fire retardant treated wood, not less than 1-1/2" thick. Refer to Specification Section 06100.

- G. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 1. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.
- H. Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.
- I. Bituminous Coating: FS TT-C-494A or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coating.
- J. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- K. Elastomeric Sealant: Generic type recommended by unit manufacturer, which is compatible with joint surfaces; comply with FS TT-S-00227E, TT-S-00230C, or TT-S-001543A.
- L. Roofing Cement: ASTM D 2822, asphaltic.

2.3 PREFABRICATED CURBS / EQUIPMENT SUPPORTS

- A. Comply with loading and strength requirements as indicated where units support other work. Coordinate dimensions with rough-in sheets or shop drawings of equipment to be supported. Fabricate of structural quality sheet steel (ASTM A 570, Grade as required) which has been prepared for painting and factory-primed and painted with 2-mil thickness of baked-on synthetic enamel, after fabrication.
 - 1. Fabricate with welded or sealed mechanical corner joints. Provide complete with cant strips and base profile coordinated with roof insulation thickness. Provide preservative-treated wood nailers at tops of curbs, coordinate with thickness of insulation and roof flashing as indicated, tapered as necessary to compensate for roof deck slopes of 1/4" per ft. and less.
 - 2. Except as otherwise indicated or required for strength, fabricate units of minimum 14-gauge (0.0747") metal, and to minimum height of 12".
 - 3. Sloping Roofs: Where slope of roof deck exceeds 1/4" per ft., fabricate curb/support units with height tapered to match slope, to result in level installation of tops of units.
- B. Manufacturers: Subject to compliance with requirements, manufacturers offering prefabricated thermally broken curbs/equipment supports which may be incorporated in the work include the following:
 - 1. Custom Curb, Inc.; Chattanooga, TN
 - 2. The Pate Company; Broadview, IL
 - 3. ThyCurb Div./ThyBar Corp.; Addison, IL
 - 4. Or approved equal.

2.4 PIPE AND CONDUIT SUPPORTS

- A. Comply with loading and strength requirements as indicated where units support other work.
- B. Basis of Design: Pillow Block Pipe stand as manufactured by Miro Industries, Inc., Tel.# 800-768-6978; or approved equal.
 - 1. Roller bearing pipe support designed to absorb thermal expansion and contraction of pipes and conduits. Pipes and conduits rest on self-lubricating roller which is a 304 stainless steel rod and a polycarbonate resin roller. Support base is polycarbonate resin.
 - 2. Load weight may not exceed manufacturer's stated capacity. Spacing of supports may not exceed manufacturer's stated maximum. Adjust all pipe stands so that each unit bears equal weight.
 - 3. For up to 3" I.D. (3.75" O.D.) pipe: Model 3-RAH-12.
 - 4. For 3" I.D. (3.75" O.D.) to 4" I.D. (5" O.D.) pipe: Model 4-RAH-12.
 - 5. For 4" I.D. (5" O.D.) to 6" I.D. (8.5" O.D.) pipe: Model 6-RAH-12.

2.5 NEW ROOF DRAINS

- A. New Roof Drains: Provide roof drains, where indicated, as manufactured by J.R. Smith Mfg. Co.; or approved equal.
 - 1. Comparable items as manufactured by Josam, Zurn, Wade, or approved equal are acceptable.
 - 2. Basis of Design:
 - a. General Purpose Regular Type Roof Drains: "Model #1010 RC"; or approved equal.
 - b. Cast iron body with combined flashing collar and gravel stop, underdeck clamp and removable metal dome.
 - 1) Pipe outlet size to be 4-inch.
 - 3. Overflow Drain:
 - a. Basis of Design: Overflow Type: Provide Drain inset and ball strainer as manufactured by Portal Plus Inc., Tel. (800) 624-8642; or approved equal.
 - 1) Drain shall be 15" O.D. spun aluminum drain flange and extruded aluminum outlet pipe in size indicated or as required for indicated applications.

2.6 ALUMINUM FINISH

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 - 1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Except as otherwise indicated install roof accessory items in accordance with construction details of "NRCA Roofing and waterproofing Manual".
- C. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- D. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement, to form a seal.
- E. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter-flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

3.2 ROOF DRAINS

- A. Follow roof manufacturer's printed instruction pertaining to the installation of new roofing flashing and membranes and roof clamping ring and strainers.
 - 1. Installation of drains and flashings shall be in strict accordance with roof drain and roof membrane manufacturer's printed instructions.

2. Anchor through solid treated wood blocking into decking.
- B. Drain lines from the roof shall be electrically cleaned to invert of house storm sewer using power roter ("Roto-Rooter"). Contractor shall provide certification to Architect at completion of project that this work has been satisfactorily performed.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

END OF SECTION 07800

SECTION 07840 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 - 1. Floors.
 - 2. Walls and partitions.
 - 3. Smoke barriers.
 - 4. Construction enclosing compartmentalized areas.
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for construction of openings in concrete slabs and walls.
 - 2. Division 7 Section "Building Insulation" for safing insulation and accessories.
 - 3. Division 7 Section "Sprayed Fire-Resistive Materials."
 - 4. Division 15 Sections specifying duct and piping penetrations and firestop systems to be performed by the Plumbing and HVAC work Contractors.
 - 5. Division 16 Sections specifying cable and conduit penetrations and firestop systems to be performed by the Electrical Contractor.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor assemblies.

- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - 1. Penetrations located outside wall cavities.
 - 2. Penetrations located outside fire-resistive shaft enclosures.
 - 3. Penetrations located in construction containing fire-protection-rated openings.
 - 4. Penetrating items larger than 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.

- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architect and Owner, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and

manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi component materials.

- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Contractor's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Contractor's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PRODUCTS / MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application in the Through-Penetration Firestop System Schedule at the end of Part 3 and as shown on drawings and as produced by one of the following manufacturers:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hilti Construction Chemicals, Inc.
 - 2. Isolatek International.
 - 3. Nelson Firestop Products.
 - 4. 3M Fire Protection Products.
 - 5. Or approved equal.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multi component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: The Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.

- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
 - 1. Firestop Systems with No Penetrating Items: Comply with the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.

END OF SECTION 07840

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SECTION 07900 - JOINT SEALER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Part 1 through Part 6 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes joint sealant assemblies for the following applications which include performances of materials, installation requirements, as indicated herein in this specification and as specified by cross references in other Parts 1 through 6 specification sections.
- B. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
 - 1. Control and expansion joints in cast-in-place concrete.
 - 2. Control and expansion joints in unit masonry.
 - 3. Joints between different materials listed above.
 - 4. Perimeter joints between materials listed above and frames of doors, windows, storefront systems and curtainwall systems, as applicable.
 - 5. Other joints, as indicated.
- C. Exterior joints in the following horizontal traffic surfaces:
 - 1. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - 2. Other joints, as indicated.
- D. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - 1. Control and expansion joints on exposed interior surfaces of exterior walls.
 - 2. Perimeter joints of exterior openings, where indicated.
 - 3. Tile control and expansion joints.
 - 4. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - a. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefront systems and curtainwall systems.
 - b. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - c. Other joints, as indicated.
 - 5. Interior joints in the following horizontal traffic surfaces:
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints, as indicated.
- E. Preparation of all joints to be sealed.
- F. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - 1. Cutting out as needed to give proper depth.
 - 2. Installation of proper back up material for each joint.
 - 3. Cleaning to remove all dust, dirt, oil films, loose material etc.
 - 4. Masking of adjacent surfaces.
 - 5. Priming of joint surfaces.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Where fire rated joint assemblies are indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with the following requirements, tested by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
 - 1. Fire Testing: ASTM E 119/UL 263.
 - 2. Surface Burning Characteristics: ASTM E84/UL 723.
 - a. Flame Spread: 15
 - b. Smoke Developed: 0
 - 3. Through - Penetration Firestopping: ASTM E814/UL 1479.
 - 4. Fire Resistance of Building Joint Systems: UL 2079

- B. VOC Content of Interior Sealants and Sealant Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Sealants: Not more than 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 - 3. Sealant Primers for Porous Substrates: Not more than 775 g/L.

- C. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
 - 1. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
 - 2. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - a. Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - b. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
 - c. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:

- (1) Locate test joints where indicated or, if not indicated, as directed by Architect.
 - (2) Conduct field tests for each application indicated below:
 - (a) Each type of elastomeric sealant and joint substrate indicated.
 - (b) Each type of nonelastomeric sealant and joint substrate indicated.
 - (3) Notify Architect seven days in advance of dates and times when test joints will be erected.
 - (4) Sealant Manufacturer Responsibility:
 - (a) Manufacturer shall provide Technical Representative to perform Sealant Joint Field Pull Test. Manufacturer Sales representative is not acceptable to perform Field Pull Test.
 - (b) Technical Representative performing Field Pull Test must be an employee of the Sealant Manufacturer. Outside Sales Agent or Contract Technical Representative is not acceptable to perform Field Pull Test.
 - (5) Test Method: Test joint sealants by hand-pull method described below:
 - (a) Install joint sealants in 60-inch long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
 - (b) Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
 - (c) Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - (d) For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
 - (6) Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 - (7) Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
3. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
- a. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.
 - b. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

4. PROJECT CONDITIONS

- a. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 - (1) When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - (2) When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40°F.
 - (3) When joint substrates are wet.
- b. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- c. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

D. Special Project Warrantee and Guarantee:

1. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from approved date of Substantial Completion.
2. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from approved date of Substantial Completion.
3. Guarantee shall further state that all exterior sealant will be guaranteed against:
 - a. Adhesive or cohesive failure in joints where movement is under maximum 25% extension or compression.
 - b. Any crazing greater than 3 mils in depth developing on surface of material.

1.4 SUBMITTALS

- A. Product Data from manufacturers for each joint sealer product required, including instructions for joint preparation and joint sealer application, include color samples showing full range of colors available, for each product exposed to view.
 1. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

- B. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.
 - 2. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40°F (4.4°C).
 - 3. When joint substrates are wet due to rain, frost, condensation, or other causes.
- B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Architect from manufacturer's available full range of standard and optional colors.
- C. Grade of Sealant: For each application, provide the grade of sealant (nonsag, self-leveling, no track, knife grade, etc.) as recommended by the manufacturer for the particular condition of installation (location, joint shape, ambient temperature, and similar conditions) to achieve the best possible overall performance. Grades specified herein are for normal condition of installation.

2.2 MISCELLANEOUS MATERIALS

- A. Joint Primer/Sealer: Provide the type of joint primer/sealer recommended by the sealant manufacturer of the joint surfaces to be primed or sealed.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- C. Sealant Backer Rod: Provide materials which are in compliance with ASTM D 1056; compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer.
 - 1. Materials shall be capable of remaining resilient at temperatures down to minus 26 °F.
- D. Joint Fillers:
 - 1. Joint Fillers for Concrete Sidewalks: Provide Isomeric polymer foam, W.R. Meadows Sealtight Ceramar; or approved equal.
 - a. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - b. Closed-cell isomeric foam, flexible.
 - c. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
 - 1) "Expansion Joint", as manufactured by Construction Foam Products, Tel.# 919.380.6640, www.cfoamproducts.com.
 - 2) Or approved equal.
 - 2. Joint Fillers for Concrete Slab on Grade: Provide "Fiber", as manufactured by WR. Meadows Sealtight Ceramar; or approved equal.
 - a. Nonextruding bituminous type: ASTM D 1751.
 - 3. Joint Fillers for Interior Concrete Slabs: Provide "Ceramar" flexible foam expansion joint, as manufactured by W.R. Meadows, Inc., Tel.# 800.342.5976, www.wrmeadows.com; or approved equal.
 - a. Flexible foam expansion joint filler composed of a unique synthetic foam of isomeric polymers in a very small, closed-cell structure. Gray in color, Ceramar is a lightweight, flexible, highly resilient material offering recovery qualities of over 99%. The compact, closed-cell structure will absorb almost no water.
 - b. Non-impregnated and will not stain or bleed.

- c. Non-gassing.
 - d. Complies with:
 - (1) ASTM D 5249, Type 2,
 - (2) ASTM D 1752, Sections 5.1 - 5.4, with compression requirement modified to 10 psi minimum and 25 psi maximum,
 - (3) ASTM D 7174-05.
4. Joint Fillers for Horizontal and Vertical Control and Expansion Joints at Wall and Roof Assemblies:
- a. Provide "EMSEAL" as manufactured by EMSEAL Joint Systems, Ltd.; or approved equal.
 - b. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
 - 1) Model EJ-ES, Vertical Expansion Joint System, as manufactured by Nystrom, Tel.# 800.547.2635, www.nystrom.com.
 - 2) Or approved equal.

2.3 SEALANTS

- A. **Sealant Type 1:** For all control and expansion joints in concrete sidewalks and slabs on grade, two-part, self leveling polyurethane traffic grade sealant, complying with, and ASTM C 920 and ASTM D 1850.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "NR-200 Urexpan"; Pecora Corporation.
 - b. "THC 900/901"; Tremco, an RPM Co.
 - c. "Sikaflex-2c SL"; Sika Corporation.
 - d. Or approved equal.
 - 2. Color to be selected by the Architect.
- B. **Sealant Type 2:** For sealing exterior joints, provide a Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Spectrum 1 / Spectrum 800"; Tremco, an RPM Co.
 - b. "SikaSil - WS290"; Sika Corporation
 - c. "Dowsil 790 Silicone Building Sealant; Dow Corning Corporation
 - d. Or approved equal.

- C. **Sealant Type 3:** For all interior joints, provide a one-part, non-sag, moisture-curing polyurethane rubber sealant, complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, O and as recommended by manufacturer for general use as an interior exposed building construction conditions sealant including floor tiles in Toilets - Section 09300.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Dynatrol I-XL"; Pecora Corporation.
 - b. "Dymonic or Dymonic FC for cold weather"; Tremco, an RPM Co.
 - c. "Chem-Calk 900 /915/945"; Bostik Inc.
 - d. "Sikaflex 1a or Sikaflex 15LM"; Sika Corporation.
 - e. Or approved equal.
- D. **Sealant Type 4:** For all joints at plumbing fixtures, provide one-part, neutral-curing, silicone rubber sanitary sealant, complying with ASTM C920; and containing fungicide for mildew resistance recommended by manufacturer for use at joints for plumbing fixtures; tub and shower, sinks countertops, appliances, etc.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "898 Silicone"; Pecora Corporation.
 - b. "Tremsil 200"; Tremco, an RPM Co.
 - c. "786 Mildew Resistant"; Dow Corning.
 - d. "Sikasil N-Plus"; Sika Corporation.
 - e. Or approved equal.
- E. **Sealant Type 5:** For all interior joints between drywall partitions, CMU walls, hollow metal framing, cabinet heater, other metal mechanical or electrical assemblies, (sealant work performed by other trades and cross-referenced to the work of this section), etc., where all adjacent surfaces will receive paint:
1. Latex Sealant: Non-elastomeric, one part, non-sag, paintable latex sealant recommended for exposed joints applications, complying with ASTM C 834, Type P (opaque sealants), Grade NF.
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. "AC-20 Plus Silicone"; Pecora Corporation.
 - b. "Tremflex 834"; Tremco, an RPM Co.
 - c. "Sonolastic Sonolac"; Sonneborn Building Products Div., ChemRex, Inc.
 - d. Or approved equal.

2.4 FIRE RATED JOINTS

- A. Construction fire rated joint assemblies shall meet indicated fire rating performance requirements. Provide assemblies where required and as indicated on the drawings with the following components:
1. Joint Filler: Subject to compliance with indicated requirements, provide one of the following:

- a. "Ultra Block", as manufactured by Backer Rod Manufacturing,
 - b. "Cerablanket"; Tremco,
 - c. ThermaFiber
 - d. Or approved equal.
 - e. Provide fire rated joint filler in thickness and shape as required to fill joints.
2. Joint Sealant: Subject to compliance with requirements, provide one of the following:
- a. "Dynatrol II"; Pecora Corporation.
 - b. "Tremstop Acrylic"; Tremco, Inc, or "Trimstop IA, Intumescent Acrylic, Tremco, Inc.
 - c. "Sikaflex-2c NS"; Sika Corporation.
 - d. Or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealers, with Installer present, compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer -performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:
- B. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt; and frost.
- C. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
- D. Remove laitance and form release agents from concrete.
- E. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile; and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.
- F. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

- G. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- H. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint fillers.
 - 2. Do not stretch, twist, puncture, or tear joint fillers.
 - 3. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
- I. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.
- J. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.
- K. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

3.3 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

END OF SECTION 07900

SECTION 08110 - HOLLOW METALWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of hollow metalwork for frames, and side lites is indicated and scheduled on drawings.
- B. Related Sections:
 - 1. Section 04200 - Masonry Work.
 - 2. Section 08211 - Wood Doors.
 - 3. Section 08700 - Finish Hardware.
 - 4. Section 08800 - Glazing.
 - 5. Section 09900 - Painting.

1.3 QUALITY ASSURANCE

- A. Provide frames complying with the following:
 - 1. Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
 - 2. American National Standard Institute:
 - a. ANSI Standards A156 Series for Hardware.
 - b. ANSI A115 Steel Door Preparation Standards.
- B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated frame assemblies that have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction, (i.e., UL, Warnock Hersey).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Provide schedule of frames using same reference numbers for details and openings as those on contract drawings.

- C. Samples: Full range of color samples for Architect selection; 2 samples, 6" square min., of each color and texture as selected for factory-finished frames.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Before shipping, label each frame with metal or plastic tags to show its location, size, door swing, and other pertinent information. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering steel frames which may be incorporated in the work include; but are not limited to, the following:
 - 1. Steelcraft/Div. American Standard Co.
 - 2. Republic Builders Products Corp./Subs. Republic Steel.
 - 3. Curries Company, Mason City, Iowa
 - 4. Or approved equal.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A1008 and ASTM A 568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.
- D. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.
- F. Shop Applied Paint:
 - 1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, capable of passing a 100 hours salt spray and 250 hours humidity test in accordance with ASTM test methods B 117 and D 3322 and shall be suitable as a base for specified finish paints indicated in Section 09900.

2.3 ACCESSORIES

- A. Inserts: For required anchorage into concrete work, furnish inserts of cast iron, malleable iron or 12 gauge steel hot-dip galvanized after fabrication.
- B. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled in, expansion bolt anchors.

2.4 FABRICATION, GENERAL

- A. Fabricate frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- B. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).
- C. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- D. Finish Hardware Preparation: Prepare frames to receive finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.
- E. Reinforce frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- F. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

2.5 STANDARD STEEL FRAMES

- A. Provide metal frames for doors, sidelights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated.
 - 1. Fabricate frames of minimum 16-gauge cold-rolled furniture steel at interior locations and 14 gauge galvanized cold-rolled furniture steel at exterior locations.
 - a. **Frames for 90 minute fire-rated doors in Corridors shall be 14-gauge cold-rolled furniture steel.**
 - 2. Fabricate frames with mitered and welded corners.
- B. Hardware reinforcing shall be as follows:
 - 1. All frames are to be mortised reinforced, drilled and tapped in factory for all template mortise hardware, in accordance with "Approved" Finish Hardware Schedule and templates as provided by the Hardware Supplier. Where surface mounted hardware is to be applied, all frames shall have reinforcing plates.

2. Reinforcement plates shall be as follows:
 - a. Hinge Preps:
 - 1) Masonry: For "F" Series: 7 gauge, minimum.
 - b. Strike Preps:
 - 1) Masonry: For "F" Series: 12 gauge, minimum.
 - c. Closure Reinforcement: All Series - 12 gauge, minimum.
 - d. Surface mounted hardware: All Series - 12 gauge, minimum.
3. Base anchors for frames to be installed in masonry wall and partition assemblies, shall be adjustable type, shipped loose and to be 14 gauge, minimum.
4. Jamb Anchors:
 - a. For "F" Series frames in masonry walls provide adjustable wire type anchors (0.156" dia.), or strap type anchors (16 gauge), provide quantities as follows:
 - 1) Frames up to 7'-6" in height: 3 per jamb.
 - 2) and one (1) adjustable base anchor per jamb.
5. Reinforce heads and jambs where indicated on drawings with 10 gauge channel, continuously welded to frame.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install standard steel frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.
- C. **Place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position so that the head and jambs of the frame are square, plumb, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.**
- D. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
- E. Install fire-rated frames in accordance with NFPA Std. No. 80.

3.2 ADJUST AND CLEAN

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Check and re-adjust operating Finish Hardware items, without causing any damage to frames. Provide complete work for frames, leave clean and in proper operating conditions.

END OF SECTION 08110

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SECTION 08170 – INTEGRATED DOOR OPENING ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Integrated door opening assemblies including metal frame, integrated door system with operating hardware, and associated door hardware as specified in this section.
 - 2. Factory finishing of wood doors.
 - 3. Factory fitting and hardware preparation for doors and frames.
- B. Related Sections:
 - 1. Division 08 Section "Hollow Metal Frames" for integrated assembly doors installed in standard hollow metal frames.
 - 2. Division 08 Section "Finish Hardware".
 - 3. Division 08 Section "Glazing" for glass view panels in integrated assemblies.
 - 4. Division 09 Section "Interior Painting" for field painting integrated assembly doors and frames.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 1. ANSI A156.32 - Integrated Door Opening Assemblies.
 - 2. ANSI/SDI A250.4 - Test Procedures for and Acceptance Criteria for Physical Evidence for Steel Doors and Reinforcement.
 - 3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
 - 4. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
 - 5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
 - 6. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
 - 7. ICC/IBC - International Building Code.
 - 8. NFPA 70 - National Electrical Code.
 - 9. NFPA 80 - Fire Doors and Windows.
 - 10. NFPA 101 - Life Safety Code.
 - 11. NFPA 105 - Installation of Smoke Door Assemblies.
 - 12. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
 - 13. CARB – California Air Resources Board.
 - 14. State Building Codes, Local Amendments.
- D. Standards: All hardware specified herein to comply with the current version year of the following industry standards:

1. ANSI/BHMA Certified Product Standards, A156 Series.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including integrated opening assembly construction and installation details, material descriptions, core descriptions, hardware reinforcements, profiles, anchorage, fire resistance rating, operational descriptions and finishes.
- B. Door Hardware Schedule: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Include the following information:
 1. Type, style, function, size, label, hand, and finish of each door hardware item.
 2. Manufacturer of each item.
 3. Fastenings and other pertinent information.
 4. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 5. Explanation of abbreviations, symbols, and codes contained in schedule.
 6. Mounting locations for door hardware.
- C. Shop Drawings: Include the following:
 1. Elevations of each door design.
 2. Details of door and frames types including dimensioned profiles and metal thicknesses.
 3. Locations of reinforcement and preparations for hardware.
 4. Details of anchorages, joints, field splices, and connections.
 5. Details of accessories.
 6. Details of moldings, removable stops, and glazing.
 7. Details of conduit and preparations for power, signal, and control systems.
 8. Provide all dimensions necessary required to complete recessed pockets.
- D. Keying Schedule: Reference Division 08 Section "Door Hardware" for keying requirements.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete integrated assembly installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the installed assemblies and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

- A. Quality Standard: In addition to requirements specified, comply with ANSI A156.32, latest edition, "Integrated Door Opening Assemblies".
- B. Source Limitations: Obtain complete integrated opening assemblies, including metal frame and integrated door system with operating hardware, through one source and from a single manufacturer wherever possible.
- C. Supplier Qualifications: Factory authorized distributor of manufacturer(s) systems and products. Submit written documentation upon request.
- D. Installer Qualifications: Installers acceptable by the primary assembly manufacturer, with a recommended minimum 3 years documented experience installing both standard and electrified integrated door opening assemblies similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
 - 1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Thresholds: Not more than 1/2 inch high.
 - 3. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
 - a. Test Pressure: Positive pressure labeling.

- F. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing integrated door opening assemblies.
1. Prior to installation, arrange for manufacturers' representatives to hold a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project site under provisions Division 01 Section "Product Storage and Handling Requirements". Inspect doors, frames, and hardware with representatives of the supplier to verify shipment is complete and to rectify discrepancies promptly.
1. Integrated door assembly systems to be delivered to the job site complete with necessary screws, miscellaneous parts, instructions, and installation templates. Each package legibly and properly labeled to correspond to the approved Door Schedule.
- B. Furnish integrated door opening assemblies with operating hardware flush to door skin, using protective wrappings and spacers between projecting hardware. Maintain and protect door assemblies using cardboard spacers and protective edge guards along the door edges, to reduce exposure to marring or damage during storage.
- C. Store integrated door opening assemblies in dry and secure area. Do not store electronic access control software, credentials, or accessories at Project site without prior authorization.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Electrical Connections: Coordinate the layout and installation of scheduled electrified hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article will not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty Periods: Manufacturer's standard written form, with the exceptions noted below, warranting integrated door opening assemblies to be free of defect in material or workmanship under normal use for a period of **five (5) years**.
 - 1. Continuous Hinges: **Ten (10) years**.
 - 2. Door Closers: **Ten (10) years**.
- C. Warranty includes the manufacturer, at their sole option, agreeing to repair or replace products or parts found to be defective in material or workmanship according to details contained in the warranty certificate.

1.9 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of integrated door opening assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Adams Rite Manufacturing (RD) - The RITE Door.
 - 2. Total Door.
 - 3. Or approved Equal.
- B. Substitutions: Requests for substitutions and product approval for inclusive integrated door opening assembly systems in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 WOOD DOOR MATERIAL REQUIREMENTS

- A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Custom.
- B. Fire Rated Doors: Provide construction and core as needed to provide fire ratings indicated.

1. Category A Edge Construction: Provide fire rated door edge construction with intumescent seals concealed by outer stile (Category A) at 45, 60, and 90 minute rated doors. Comply with specified requirements for exposed edges.
2. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

C. Core Construction:

1. Engineered Composite Core Wood Doors:
 - a. Structural Composite Lumber: Engineered hardwood composite wood products tested in accordance with WDMA I.S.1A, Testing Cellulosic Composite Materials for Use in Fenestration Products containing no added Urea Formaldehyde. Comply with minimum performance levels below:
 - a) Screw Withdrawal, Face: 700 lbf (3100 N).
 - b) Screw Withdrawal, Edge: 550 lbf (2440 N).
 - b. Basis of Design: RITE Door EC.
2. Mineral Core Doors:
 - a. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
 - b. Blocking: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated as needed to eliminate through-bolting hardware.
 - c. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.
 - d. Basis of Design: RITE Door FD.

D. Veneered Doors for Transparent Finish:

1. Grade: Custom
2. Faces: Veneer grades as noted below; veneer minimum 1/50-inch (0.5mm) thickness at moisture content of 12% or less.
 - a) Plain Sliced Select White Maple, A grade faces.
3. Match between Veneer Leaves: Book match.
4. Assembly of Veneer Leaves on Door Faces:
 - a. Running Match.

5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 6. Transom Match: Continuous match.
 7. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.
 8. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
 9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
- E. High Pressure Decorative Laminate (HPDL) Faced Doors:
1. Plastic Laminate Faces: High pressure decorative laminates complying with NEMA LD 3, Grade HGS.
 2. Color or Wood Grain Pattern: As selected by architect from standard available range.
 3. Exposed Edges: Laminate applied to all four edges.
 4. Provide doors with pilot holes factory drilled for vertical edge hinges and lock sets.
 5. Construction: Stiles and rails are bonded to core, then entire unit abrasive planed before faces and crossbands are applied.
- F. Light Frames and Glazing:
1. Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish.
 2. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.
 - a. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.3 STEEL MATERIAL REQUIREMENTS

- A. General:
1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

2. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

B. Steel Frames:

Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for openings up to 48 inches in width: Minimum 16 gauge thick steel sheet.
4. Frames for openings 48 inches and wider in width: Minimum 14 gauge thick steel sheet.
5. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
6. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.
7. Provide suitable adjustable type anchors for wall condition, minimum 4 each per jamb.

2.4 DOOR HARDWARE MATERIAL REQUIREMENTS:

- A. Provide a complete integrated door opening assembly, including the installation and adjustment of the latching mechanism within the door construction.
- B. Door hardware to include the following minimum products for each integrated door opening assembly as specified in the Door Hardware Sets under Part 3.
 1. Hanging Device: Continuous Hinges (geared or pinned), Pocket Pivots, Offset/Intermediate Pivots, or Butt Hinges.
 2. Integrated Locking/Latching Hardware: Exit Devices, Lever Handle Trim, or Flush Push/Pulls.
- C. Integrated exit device hardware to be clean and unobtrusive in design with a minimal bar height of 2-7/16-inches. Push rails not exceed a projection of 1-1/8-inches when in the latched position and be made of heavy-duty aluminum extrusion, available in anodized and architectural finishes using metal cladding. Exit device end caps to be of metal construction, and should match the trim cover caps when available.
- D. Push and pull hardware to be clean and unobtrusive in design with a maximum projection of 1/4-inches on pull side and 5/8-inches on the push side. To be used on hollow metal doors only.

- E. Lever handles to be clean and unobtrusive in design with a maximum projection of 3-1/2-inches and match design of similar lever locking hardware furnished on project.
- F. Door hardware may include the following optional products for each integrated door opening assembly as specified in the Door Hardware Sets under Part 3:
 - 1. Door Closers: Surface Closer or Pocket Closer.
 - 2. Accessory Items: Magnetic Holders, Protection Plates, Edge Guards, Astragals, Smoke Seals.

2.5 FINISH REQUIREMENTS

A. Veneered Wood Finishes:

- 1. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - a. Finish veneer wrapped metal light kits to match door faces, if specified.
- 2. Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.
 - a. Grade: Premium.
 - b. Finish: Meet or exceed WDMA I.S. 1A TR6 Catalyzed Polyurethane finish performance requirements.
 - c. Staining: As selected by Architect from manufacturer's full range.
 - d. Sheen: Satin.

B. Steel Finishes:

- 1. Prime Finishes: Frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 - a. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.
- 2. HPDL Wrapped: Color and pattern as selected by the architect.
- 3. Embossed Wood Grain Pattern: Color and pattern as selected by the architect from the manufacturer's standard range.

C. Hardware Finishes: As specified in Hardware Sets.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify the accuracy of dimensions given to the integrated door opening assembly manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation indicates acceptance of the existing conditions.
- D. Verify power supplies, as required, are available to power electrically operated devices.

3.2 INSTALLATION

- A. General: Install integrated door opening assemblies plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; integrated locking/latching devices; closing devices; and seals.
- C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 3. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- D. Coordinate installation and interface wiring with fire alarm and smoke detection systems.
- E. Remove or protect furnished hardware accessories, prior to painting or finishing completed after the installation of the hardware accessories.

3.3 FIELD QUALITY CONTROL

- A. Field Inspection: Perform a final inspection of installed integrated door opening assemblies and state in report whether work complies with or deviates from specification requirements, including whether door hardware is properly installed, operating and adjusted.

3.4 ADJUSTMENT

- A. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Remove and replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.5 CLEANING AND PROTECTION

- A. Protect all door opening assemblies and hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install hardware at the latest possible time frame.
- B. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure integrated door and operating hardware is without damage or deterioration at time of owner occupancy.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer or finish paint.

3.6 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain integrated door opening assemblies and hardware.

3.7 HARDWARE SETS

- A. The integrated door opening hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

END OF SECTION 08170

SECTION 08211 - WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 01800 - Time of Completion and Liquidated Damages
 - 2. Section 04200 - Unit Masonry
 - 3. Section 08110 - Hollow Metalwork
 - 4. Section 08700 - Finish Hardware
 - 5. Section 08800 - Glass and Glazing
 - 6. Section 08870 - Security Window Film
 - 7. Section 08871 - Security Glazing (Alternate Bid)
 - 8. Section 09900 - Field Painting of metal lites

1.2 SUMMARY

- A. Extent and location of each type of flush wood door is indicated on drawings and in the door schedule.
- B. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive plained before veneering. Assembly of face veneer and crossband to core in accordance with WDMA.
 - 1. Solid core wood doors with solid hardwood edging.
 - 2. Mineral core 60, and 90 min. labeled flush wood doors with hardwood edging.
- C. Shop-priming of wood doors is included in this Section.
- D. Factory-finishing of wood doors is included in this Section.
- E. Factory-prefitting to frames and factory-premachining for hardware for wood doors is included in this Section.

1.3 QUALITY ASSURANCE

- A. Construction per WDMA I.S. 1A - 11.
- B. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM 2074-00 Fire Test (Category A Positive Pressure). For mineral core doors, provide composite blocking with improved screw holding capability as needed to eliminate through-bolting of hardware. They are to be labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction. Fire labels shall be affixed at the factory of the door manufacturer, and shall be from the Underwriter's or Warnock Hersey Testing Laboratories. Each label shall show the testing time of the label, and no approval will be given to "Construction Type" labels.

1. Temperature Rise Rating: At stairwell enclosures, provide doors which have temperature rise rating of 450°F maximum in 30 minutes of fire exposure.
 2. All "Category A" doors shall have concealed intumescent seals.
- C. Door Construction Field Examination: Upon direction of the Architect, the Contractor may be instructed to destroy a randomly selected wood door or panel by sawing it in half, vertically and horizontally, to verify conformance of the contract requirements. If the door(s) do not meet the specifications, all of the doors delivered for the project will be rejected, and the doors shall be replaced at the Contractor's expense. Further door inspection, to insure conformity to specifications, shall also be at the expense of the Contractor.
1. All such delays as a result of the fabrication and delivery of non-compliant doors which vary from the processed shop drawing submittal will be the responsibility of the Contractor (refer to Section 01800 for Liquidated Damages).

1.4 REFERENCE STANDARDS

- A. Comply with the applicable requirements of the following standards unless otherwise indicated.
1. Window & Door Manufacturers Association (WDMA)
 - a. I.S. 1A - 11 Architectural Wood Flush Doors (WDMA).
 - b. Standard Procedures and Recommendations for Factory Machining Flush Wood Doors for Hardware.
 2. American National Standards Institute
 - a. ANSI A115. W Series, Wood Door Hardware Standards.
 3. Underwriter's Laboratories, Inc. (UL)
 - a. UL 10C Fire Test
 4. American Society for Testing and Materials:
 - a. ASTM 2074-00 (Category A Positive Pressure) Fire Tests of Door Assemblies.

1.5 SUBMITTALS

- A. **The shop drawing submittal will not be reviewed by the Architect unless a complete shop drawing submittal (technical data, details of core and edge construction, location and extent of hardware blocking, fire ratings, factory finish samples, 8" x 10" minimum for finish and 4" x 5" minimum for construction assembly) are made as one complete submittal, by the Contractor, and will be returned to the Contractor if incomplete.**
1. **Subsequent delays as a result of an incomplete submittal will be the responsibility of the Contractor (refer to Section 01800 for Liquidated Damages).**
- B. Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings, and factory-finishing specifications.
1. Include certifications as may be required to show compliance with specifications.

2. **The door manufacturer's shop drawing literature which may include language for the substitution of door construction at the option of the manufacturer is not permitted. Doors which are switched will be rejected and all costs associated with the manufacturing of the door type(s) specified will be by the Contractor/Manufacturer.**
- C. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.
1. For factory-premachined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light openings.
- D. Samples: Submit samples, 8" x 10" minimum for finish and 4" x 5" minimum for construction assembly, for the following:
1. Doors for Transparent Finish: Flat samples illustrating finish and color of wood grain for each species of veneer and solid hardwood lumber required.
 2. Factory-Finished Doors: Each type of factory finish required.
 3. Metal Frames for Light Openings: Manufacturers product samples or product cut sheets for light frames and color selector guide for each material and finish required.
- E. Warranties and Certification Markings: Furnish with shop drawings:
1. Door supplier must attest, in writing addressed to Architect, that the order has been placed in conformance with specification requirements in all respects.
 2. All doors shall carry a "Lifetime" guarantee, including rehang and finish for all door(s) which do not comply with the manufacturer's warranty.
 3. Copy of Warranty shall be given to the Architect and Owner prior to the completion of the project.
 4. All doors shall be factory marked, on the top of the door, showing the order number, item number on the order, size of finished door, material, and core construction, for future information should replacement of the door be necessary.
- F. The Wood Door Supplier shall provide a letter indicating all of the following:
1. The wood door supplier has completely reviewed the contract documents (drawings, specifications and addenda) and has worked with the distributor in the preparation and submission of a complete shop drawing submittal to the Architect.
 2. The wood door supplier shall attest that the order has been placed in accordance with the contract document drawings, specifications and addenda,
 3. The wood doors ordered and delivered to the job site are in conformance with the requirements of the job and per the approved shop drawings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations in WDMA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.
- B. Protect all doors from damage and moisture under cover. Use wood blocking under horizontally stored doors. At no time will doors be allowed to come in contact with floor or water.
 - 1. The location where the doors are being stored on the job site shall be between 25 - 55% relative humidity. The Contractor shall forward independent certified testing that confirms compliance.
- C. All doors not finished at factory must be sealed on all surfaces within one (1) week after arrival at jobsite.
- D. Remove all damaged doors from jobsite prior to completion of project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Provide "Aspiro™ Series I Marshfield-Algoma™" wood doors as manufactured by Masonite Architectural, Tel.#877.332.4484, www.masonitearchitectural.com; or approved equal.
 - 1. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 - 2. Comparable products from other manufacturers will be considered if it can be clearly shown that their products are tested, equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect.
 - a. Eggers Industries; Architectural Flush Doors Division, Tel.# 920.722.6444, www.eggersindustries.com.
 - b. VT Industries, Architectural Wood Doors, Tel.# 800.827.1615, www.vtindustries.com/doors.
 - c. Graham Wood Doors, Tel.# 641.423.2444, www.grahamdoors.com.
 - d. Or approved equal.
 - 3. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.

4. **Substitutions: Substitution of products will only be considered when the Contractor/ Door Supplier have submitted, to the Architect, all appropriate documents and in the time frame as outlined in the requirements indicated in Specification Section 00800.**

2.2 MATERIALS AND COMPONENTS

- A. General: Provide wood doors complying with applicable requirements of referenced standards for kinds and types of doors indicated and as specified.
- B. Solid Core Doors for Transparent Finish: Comply with the following requirements:
1. Faces: Veneer leaves shall be Slip Match and veneers assembled in Running Match, Grade 'A', plain sliced red oak for transparent finish; CS-171, Type II.
 - a. **At existing buildings, provide veneer faces to match the species of the existing veneer or as directed by the Architect.**
 2. Construction: Premium Construction Grade, SCLC-5 Bonded (5-ply, with no added urea-formaldehyde glues).
- C. Edges
1. Vertical stiles of same species to the face veneer, with a minimum of 1/4 inch solid hardwood after trimming.
 - a. Manufacturers standard construction with hardwood outer.
- D. Core: Structural Composite Lumber Core consisting of an engineered wood product that is made by fusing a network of wood strands together with a water-resistant adhesive to produce a strong, solid and stable product that has true structural properties with excellent screw holding properties and very high split resistance.
1. Core Edge Interface: Vertical and horizontal edges of solid core doors must be securely bonded to the core with waterproof glue containing no added urea formaldehyde resin.
- E. Fire-Rated Solid Core Doors
1. Faces and WDMA Grade: Provide species and grade to match non-rated doors in same area of building, unless otherwise indicated.
 2. Core Construction
 - a. 60 and 90 Min. Doors: Mineral core composite, tested and approved by the Underwriter's or Warnock Hersey Testing Laboratories, for various levels of fire retardation within a total door assembly.
 3. Edge Construction
 - a. 60, and 90 Min. Doors: WDMA Extra Heavy Duty Construction. Stiles and rails to be made of special laminated material matching the face veneer, and tested for the following tests for performance.

- 1) Split Resistance: Not less than 950 load pounds when tested in accordance with ASTM D 143 test specimen, modified to having a 3/4 inch hole in center.
 - 2) Direct Screw Withdrawal: Not less than 650 load pounds when tested in accordance with ASTM 1037 modified to use a #12 x 1-3/4" steel screw threaded to head with wood threads.
 - 3) Cycle/Slam: 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with requirements of ANSI A 151.1, Section 2.5.
 - a) Stile Thickness: Hinge stile minimum 5/8". Lock stile minimum 3/4 inch.
 - b) Rail Thickness: Top: 1/4" (except where required for hardware; reinforcing then to be 5"). Bottom: 1-1/16" minimum.
 - c) Provide hardware reinforcing as needed and shall be indicated on the shop drawings to the attachment of surface applied hardware without thru bolts.
- b. All "Category A" doors shall have concealed intumescent seals.

F. Glazing of Wood Doors:

1. Glazing shall be by the wood door manufacturer.
2. Glass shall be in accordance with requirements of Section 08800.

2.3 LITE FRAMES

A. Metal Lite Frames:

1. Standard Metal Vision Frames:
 - a. Basis of Design: Model "LoPro™" as manufactured by Anemostat Door Products, San Antonio, TX; Tel.# 210.662.6300; or approved equal.
 - b. Material: 20 ga. (1mm) Cold Rolled Steel.
 - c. Finish: Grey Primer, Beige or Bronze Baked Enamel.
 - d. Glazing: Should be 1/4" (6mm), 3/16" (5mm) or 5/16" (8mm) fire and/or safety rated with U.L. and/or W.H.I classification markings. Nominal glazing space of 3/8" (10mm) allows for glazing tape to be used on both sides of the glass.
 - e. Fire Ratings with U.L. & W.H.I Classification markings:
 - 1) 60* Minute: Approved listing at 2772 sq.in. visible lite, max. width 36", max. height 77".
 - 2) 90* Minute: Approved listing at 1296 sq.in. visible lite, max. width 36", max. height 54".

Note: *Must be used with Firelite Plus or NT and fire listed glazing tape, or another manufacturer's equivalent product. Glazing combination must be used in appropriately tested door assembly.

- f. **Refer to Section 08870 - Security Window Film pertaining to the application of the film on the glazing and lite frame.**
- g. **Refer to Section 08871 - Security Glazing (Alternate Bid).**

2.4 GENERAL FABRICATION REQUIREMENTS

- A. Fabricate wood doors to produce doors complying with following requirements:
- B. In sizes indicated for job-site fitting.
- C. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:
 - 1. Comply with tolerance requirements of WDMA for prefitting. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
 - 2. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory premachining.
 - 3. Pre-fit and pre-machine wood doors at factory. Machining shall be in accordance with necessary templates supplied by the Builders Hardware supplier, in accordance with the approved Finish Hardware Schedule for this project. Each door shall be machined for all necessary mortise hardware (ie, locks, hinges, closers, etc.) but face or thru bolt holes shall be done in the field, if such machining is not called for on templates, or is not normally machined at factory. No field preparation will be allowed.
 - 4. Sizing of single doors to be undersized for nominal 1/4 inch, with edges beveled on two edges, as required by the frame manufacturer. Pairs of doors will be undersized 3/16 inch to permit no more than 1/8 inch gap between door leaves. Beveling same as single doors. Door edges beveled 1/8 inch in 2 inch thickness of door.
 - 5. Door clearances are to be 1/8 inch at top and the bottom shall be a maximum of 1/2 inch, or as required by job condition or labeling requirements.
- D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.
- E. Factory Finish and Uniform Range of Veneers
 - 1. Prefinish wood doors at factory only.
 - 2. All face veneer shall have uniform range of colors, as specified by Architect, in selection of the range of color of the veneer.
 - 3. Pairs of doors are to have matching grain pattern and color.
 - 4. Comply with recommendations of WDMA for factory finishing of doors, including final sanding, immediately before application of finishing materials.
 - 5. Provide finish WDMA, #TR-6, transparent water-based stain and ultraviolet (UV) cured water based polyurethane sealer and topcoat material, color as selected by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors using finish hardware in accordance with approved hardware schedule. Protect doors from damage until completion of Project. Except where through bolting is required to meet Code for "A" or "B" label doors, install surface applied hardware on metal or wood doors using all thread screws inserted in pilot drilled holes filled with white acrylic glue.
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's printed instructions and of referenced WDMA standard and indicated in the printed instructions provided by the manufacturer.
- C. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.
- D. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors.
 - 1. Machine doors for hardware. Seal cut surfaces after fitting and machining.
- E. Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs of doors; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.
- F. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
 - 1. Bevel non-rated doors 1/8" in 2" at lock and hinge edges.
 - 2. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.
 - 3. Prefit Doors: Fit to frames for uniform clearance at each edge.
- G. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.
- H. Manufacturer of wood doors shall install glass in wood doors.

3.2 ADJUSTING AND PROTECTION

- A. Operation: Rehang or replace doors which do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
 - 1. Protect doors, as recommended by door manufacturer, to ensure that wood doors will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 08211

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SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Wall access doors.
 - 2. Fire-rated wall access doors.
 - 3. Ceiling access doors.
 - 4. Fire-rated ceiling access doors.
 - 5. Floor access doors.
- B. Types of construction in which access doors are installed include:
 - 1. Concrete.
 - 2. Masonry.
 - 3. Gypsum board.
- C. Exact locations and sizes of access doors may not be indicated on the drawings. Obtain specific locations and sizes for access doors from trades requiring access to concealed equipment.
- D. Products Furnished and Installed under This Section:
 - 1. Installation of anchors for access doors placed in masonry: Division 4.
- E. Related Sections:
 - 1. Painting of access doors: Division 9.
 - 2. General requirements for access doors: Division 15.
 - 3. General requirements for access doors: Division 16.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.
 - 1. Include complete schedule, including types, general locations, sizes, wall, floor and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
- B. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.

- C. Special Size Access Doors: Use where required or requested; indicate on schedule.
- D. Shop Drawings: Submit shop drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.
- E. Samples: 3" x 5" minimum size, of each panel face material showing factory-finished color and texture.

1.4 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters Laboratories, Inc.; "Building Materials Directory" for rating shown.
 - 1. Attach UL Label on each fire-rated access door.
 - 2. For fire-rated ceiling access doors, provide door assembly from manufacturer whose products have been tested by independent testing agency acceptable to the building official and have been found acceptable for fire ratings indicated.
 - a. Provide testing agency label on each fire-rated access door.
- B. Test Reports: Submit manufacturer's test reports which demonstrate that products comply with required fire ratings.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which are different than actual opening size necessary for access.
- D. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors which may be incorporated in the work include, but are not limited to, the following:
 - 1. Bilco Company.
 - 2. J. L. Industries.
 - 3. Milcor/Lima Register.
 - 4. Bar-Co., Inc.
 - 5. Syracuse Castings Sales Corp., (for Access Door Assembly #1 only).
 - 6. Or approved equal.

2.2 MANUFACTURED UNITS

A. Access Door Assembly 2:

1. Location: Wall.
2. Type: Flush door panel with exposed frame.
3. Substrate: Masonry.
4. Fire rating: 1-1/2 HR (B).
5. Frame: 16 gauge steel.
6. Door: 20 gauge steel flush panel.
7. Hinge: Continuous type hinge with stainless steel pin.
8. Locking device: Keyed cylinder lock.
9. Finish: Baked-on rust-inhibitive prime coat.

B. Access Door Assembly 3:

1. Location: Wall.
2. Type: Flush door panel with exposed frame.
3. Substrate: Masonry.
4. Frame: 16 gauge steel.
5. Doors: 14 gauge steel flush panel.
6. Hinge: Continuous type hinge with stainless steel pin.
7. Locking Device: Keyed cylinder lock.
8. Finish: Baked-on rust-inhibitive prime coat.

C. Access Door Assembly 4:

1. Location: Wall.
2. Type: Flush door panel with concealed frame.
3. Substrate: Gypsum board.
4. Frame: 16 gage steel.
5. Door: 14 gage steel flush panel.
6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
7. Locking device: Keyed cylinder lock.
8. Finish: Baked-on rust-inhibitive prime coat.

D. Access Door Assembly 5:

1. Location: Ceiling.
2. Type: Flush door panel with concealed frame.
3. Substrate: Gypsum board.
4. Fire rating: 1 HR (B).
5. Frame: 16 gauge steel.
6. Door: 18 gauge steel recessed panel.
7. Hinge: Continuous type hinge with stainless steel pin.
8. Locking device: Keyed cylinder lock.

- E. Access Door Assembly 6:
1. Location: Ceiling.
 2. Type: Flush door panel with concealed frame.
 3. Substrate: Gypsum board.
 4. Frame: 16 gauge steel.
 5. Door: 14 gauge steel flush panel.
 6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
 7. Locking device: Keyed cylinder lock.
 8. Finish: Baked-on rust-inhibitive prime coat.
- F. Access Door Assembly 7:
1. Location: Floor.
 2. Type: Recess door panel to receive vinyl enhanced resilient tile finish, (Custom Size: 7'-0" x 6'-0").
 3. Substrate: Concrete.
 4. Frame : 1/4" extruded aluminum.
 5. Door: 1/4" aluminum plate.
 6. Locking Device: Snap lock with removable handle.
 7. Hinge: Continuous stainless steel hinges with compression spring operation.

2.3 ACCESSORIES

- A. Locking Devices:
1. Where locking devices are indicated, provide one lock per access door.
 2. Supply four (4) keys with each lock.
 3. Key access door locks alike.

2.4 MATERIALS AND FABRICATION

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
- C. Frames: Fabricate from 16 gauge steel.
- D. Fabricate frame with exposed flange nominal 1" wide around perimeter of frame for units installed in the following construction:
1. Exposed masonry.
 2. Exposed concrete.
 3. Drywall finish.
 4. Ceramic tile finish.

- E. For gypsum drywall or gypsum plaster, furnish perforated frames with drywall bead.
- F. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
- G. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.
- H. Flush Panel Doors: Fabricate from not less than 14 gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.
- I. Flush Panel Doors: Fabricate from not less than 14 gauge stainless steel sheet, with concealed spring hinges or concealed piano hinge set to open 175 degrees. Buff exposed surfaces to #4 satin finish.
- J. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.
- K. Recessed Panel Doors: Fabricate from not less than 18 gauge sheet steel with face of panel formed to provide recess below surface of applied finish. Reinforce panel as required to prevent buckling. Finish with manufacturer's factory-applied prime paint.
- L. Furnish recessed panels for concealed installation in acoustic tile ceiling systems.
- M. Furnish recessed panels and frames with expanded metal lath for concealed installation in plaster.
- N. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.
- O. Provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise scheduled.
- P. Where shown or scheduled, provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise indicated.
- Q. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.
- C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

3.2 ADJUST AND CLEAN

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

END OF SECTION 08305

SECTION 08410 - ALUMINUM / FRP DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. The contractor shall furnish all labor, tools, equipment, and services required to remove existing frames, doors and hardware as required to install new frames, doors, hardware, glazing, etc. In general, the work under this section includes the following:
 - 1. The removal of all necessary portions of existing frames, doors, hardware and related entrance material to permit the installation of new material as specified hereafter. Material removed shall be disposed of by contractor or salvaged as directed by the architect and/or owner.
 - 2. New masonry opening construction will not require removal of existing doors and frames
 - 3. The furnishing and installation of doors, hardware, glazing and caulking, as required, for a complete installation including all necessary cleaning and adjustments.
- B. The following types of doors, and accessories are required:
 - 1. Fiberglass Reinforced Polyester (FRP) Doors.
 - 2. Glazing.
 - 3. Hardware.
 - 4. Sealants.
- C. Related Sections
 - 1. Section 01030 - Alternate Bids.
 - 2. Section 04200 - Unit Masonry.
 - 3. Section 08415 - Aluminum - Framed Entrances and Storefront System
 - 4. Section 08700 - Finish Hardware.
 - 5. Section 08800 - Glass and Glazing.
 - 6. Section 08870 - Security Window Film.
 - 7. Section 08871 - Security Glazing (Alternate Bid).
 - 8. Section 08900 - Glazed Curtain Wall.

1.3 REFERENCES

- A. Fiberglass Reinforced Polyester (FRP) Flush Doors and (Aluminum) Monumental Stile and Rail Doors:
 - 1. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 - 2. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
 - 3. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
 - 4. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 5. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

6. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
7. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.
8. ASTM D 570 - Water Absorption of Plastics.
9. ASTM D 638 - Tensile Properties of Plastics.
10. ASTM D 790 - Flexural Properties of Non-reinforced and Reinforced Plastics and Electrical Insulating Materials.
11. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
12. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
13. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
14. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
15. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
16. ASTM D 5420 - Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.
17. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
18. ASTM E 84 - Surface Burning Characteristics of Building Materials.
19. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
20. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
21. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
22. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
23. ASTM F 476 - Security of Swinging Door Assemblies.
24. ASTM F 1642-04 - Standard Test Method for Glazing Systems Subject to Air blast loading.
25. NWWDA T.M. 7-90 - Cycle Slam Test Method
26. SFBC PA 201 - Impact Test Procedures.
27. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
28. SFBC 3603.2 (b) (5) - Forced Entry Resistance Test.
29. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls and Doors, and Storm Shutters Impacted by Missile(s) and exposed to Cyclic Pressure Differentials. (Monumental Stile and Rail Doors only).

1.4 PERFORMANCE REQUIREMENTS

A. Fiberglass Reinforced Polyester (FRP) Flush Doors

1. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
2. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
3. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
4. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
5. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
6. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
7. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
8. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
9. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
10. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Maximum of R-Value 3.4 Minimum of 55 CRF value.
11. Surface Burning Characteristics, FRP Doors, ASTM E 84:
 - a. Flame Spread: Maximum of 200. (Class C).
 - b. Smoke Developed: Maximum of 450. (Class C).
12. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
 - a. Flame Spread: Maximum of 25.
 - b. Smoke Developed: Maximum of 450.
13. Impact Strength, FRP Doors, Nominal Value, ASTM D 256: 15.0 foot-lbs per inch of notch.
14. Tensile Strength, FRP Doors, Nominal Value, ASTM D 638: 14,000 psi.
15. Flexural Strength, FRP Doors, Nominal Value, ASTM D 790: 21,000 psi.
16. Water Absorption, FRP Doors, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
17. Indentation Hardness, FRP Doors, Nominal Value, ASTM D 2583: 55.
18. Gardner Impact Strength, FRP Doors, Nominal Value, ASTM D 5420: 120 in-lb.
19. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.

20. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
 21. Chemical Resistance, ASTM D 543. Excellent rating.
 - a. Acetic acid, Concentrated.
 - b. Ammonium Hydroxide, Concentrated.
 - c. Citric Acid, 10%.
 - d. Formaldehyde.
 - e. Hydrochloric Acid, 10%
 - f. Sodium hypochlorite, 4 to 6 percent solution.
 22. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
 23. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
 24. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
 25. Thermal and Humid Aging, Foam Core, Nominal Value, 158°F and 100 % Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.
 26. Compliance with the International Building Code® (IBC), latest NJ Edition.
- B. Monumental Stile and Rail Doors
1. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
 2. Air Infiltration: For a single door, test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf. Door shall not exceed 0.01 cfm per square foot.
 3. Uniform Structural Load: For a single door, test specimen shall be tested in accordance with ASTM E 330. Plus or minus 67.5 pounds per square foot.
 4. Water Resistance: For a single door, test specimen shall be tested in accordance with ASTM E 331 at a pressure differential of 3.75 psf. No leakage.
 5. Large Missile Impact: Single impact. Pass.
 6. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.

1.5 SUBMITTALS

- A. Comply with AIA A201 and Section 00800 - Submittal Procedures.
- B. Product Data: Submit door manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- C. Submit six sets of factory shop drawings for the fabrication and installation of the Fiberglass Reinforced Polyester (FRP) Doors, Aluminum Doors, and associated components of the work. Include wall elevations at 1/2" scale, and half-sized detail sections of every typical composite member. Show anchors, joint system, expansion provisions, and other components not included in the manufacturer's standard data. Include field-verified dimensions and glazing details, and include Catalog cuts for all Finish Hardware.

D. Samples:

1. FRP Door: Submit corner samples of manufacturer's door showing face sheets, core, internal framing, finish, glazing, hardware, options, and accessories.
 - a. The Architect reserves the right to require samples of typical fabricated sections, showing joints, exposing fastenings, (if any) quality of workmanship, hardware and accessory items, before fabrication of the work proceeds.
 2. Stile and Rail Door: Submit manufacturer's sample of doors showing, rails, hardware, glazing and finish.
 3. Color: Submit manufacturer's color chip samples of Standard of Classic FRP Door and Panel Skins and Standard Anodized finish at the Door Stiles and Rails, Door Perimeter.
- E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- H. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Standards: Comply with the requirements and recommendations in applicable specifications and standards by NAAMM, AAMA and AA, including the terminology definitions and specifically including the "Entrance Manual" by NAAMM, except to the extent more stringent requirements are indicated.
- B. Code Compliance and Regulations: All materials supplied shall be in accordance with the International Building Code, State of New Jersey "Barrier-Free" Subcode, and all applicable State or Local Codes.
- C. Manufacturer shall have produced Fiberglass Reinforced Polyester (FRP) Doors, and Aluminum Doors for a recommended ten (10) years, and shall have completed projects similar to this building in type and size.
1. Door components from same manufacturer.
- D. Bidders are expected to visit the jobsite to make a complete survey of project requirements prior to bid. All dimensions, quantities and conditions relating to the installation shall be fully understood. Failure to visit the site will not relieve the successful bidder from the responsibility of furnishing all materials and services required to comply with the true intent and meaning of the specifications without any additional costs to the Owner.
- E. Instructions: The manufacturer or representatives will be available for consultation to all parties engaged in the project, including instruction to installation personnel.
- F. An examination of product will include cutting and/or disassembly of the entrance to reveal the construction of the particular component. If the door or component fails, replacement of the project's material will be required. This process will assure the owner of proper adherence to the bid documents.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All materials supplied shall be delivered to the jobsite in their original, unopened packages, with labels intact. Materials shall be inspected for damage, and the manufacturer shall be advised immediately of any discrepancies. Unsatisfactory materials are not to be used.
- B. All materials supplied shall be packaged in individual corrugated cartons. Doors and panels shall be "floated" within cartons, with no portion of the door having contact with the outer shell of the container.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.8 SPECIAL PROJECT WARRANTY

- A. Provide a written warranty, signed by Manufacturer, Installer and Contractor, agreeing to replace, at no cost to the Owner, any doors, or panels that fail in materials or workmanship, within the time period of acceptance, as indicated below.
 - 1. Failure of materials or workmanship includes excessive deflection, faulty operation of entrances, deterioration of finish, or construction, in excess of normal weathering and defects in hardware, weather-stripping and other components of the work.
- B. Warranty Period: **Ten (10) years** from approved date of Substantial Completion as determined by the Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **FRP Doors:** Basis-of-Design: Special-Lite Inc., Tel.# 800.821.6531, www.special-lite.com; or approved equal.
 - 1. Subject to compliance with requirements, provide either the named product or product by one of the following manufacturers:
 - a. Kawneer Co.
 - b. FRP Architectural Doors Inc.
 - d. Or approved equal.
- B. **Aluminum Doors:** Basis-of-Design: Special-Lite Inc., Tel.# 800.821.6531, www.special-lite.com; or approved equal.
 - 1. Subject to compliance with requirements, provide either the named product or product by one of the following manufacturers:
 - a. Kawneer Co.
 - b. Oldcastle Building Envelope.
 - c. US Aluminum
 - d. FRP Architectural Doors Inc.
 - e. Or approved equal.

2.2 FIBERGLASS REINFORCED POLYESTER (FRP) FLUSH DOORS

- A. Model: **SL-17** Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Door Opening Size: As indicated on the drawings.
- C. Door Construction:
 - 1. Doors are to be 1-3/4" thick Special-Lite, Series SL-17. (FRP).

2. Stiles and Rails: Constructed of aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, minimum/maximum 2-5/16-inch depth, joined with steel tie rods.
3. Stiles to be tubular shape to accept hardware as specified.
4. Top and bottom rails to be extruded with legs for interlocking "rigidity weather bar."
5. Corners: Mitered or butted mortise and tenon joints.
6. Joinery to be 3/8" tie rods, top and bottom, bolted through an extruded spline, in both top and bottom rails with 3/16" mechanically fastened (screwed) reinforcing angles, and secured with hex type nuts. Welds, glue, or other methods are not acceptable.
7. All doors shall be pre-machined in accordance with templates from the hardware manufacturer. For surface applied hardware, doors shall have necessary reinforcement, including the attachment of RIVNUT blind bolt fasteners. With the exception of door closers and holders, which require field applications, doors are to be shipped with hardware attached.
8. Vision Lites: Provide glazed openings in doors as indicated, with manufacturer's standard aluminum moldings and stops, with removable stops on inside only. Glass to be "factory installed" for warranty purposes. Refer to Section 08800 - Glass and Glazing for type.
9. Face sheets to be locked in with extruded interlocking edges, which are the integral reglets of the Vertical and Horizontal rails permitting a flush appearance.
10. Core is to be of **foamed in place Urethane foam** minimum of 5 lbs. per cubic foot density. **Minimum R Value of 9.**
 - a. All doors are to be properly reinforced for hardware prior to urethane core foaming in door.
11. Face sheets for Fiberglass Reinforced Polyester (FRP) Doors are to be Kemlite SpecLite3®, 120" thick (pebble like texture) with color throughout. Color: Standard and or Classic as approved by the Architect.

2.3 MONUMENTAL STILE AND RAIL DOORS

- A. Model: SL-15 wide stile monumental aluminum stile and rail doors.
- B. Door Opening Size: As indicated on the Drawings.
- C. Door Thickness: 1-3/4 inches.
- D. Stiles and Rails:
 1. Material: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, 0.125-inch minimum wall thickness, 1-piece.
 2. Stile Width: SL-15 doors = 4-1/2 inches.
 3. Rail Width:
 - a. Top: 6-1/2 inches.
 - b. Bottom: 10 inches.

- E. Corners:
 - 1. True mortise and tenon joints.
 - 2. Full-width 3/8-inch diameter galvanized steel tie rods secured with locking hex nuts.
- F. Welding of Joints: Not permitted.
- G. Mid Panel:
 - 1. Model: SL-484.
 - 2. Height: 12 inches.
 - 3. Frame: Aluminum extrusions with extruded spline and interlocking edges to secure face sheets.
 - 4. Core: Poured-in-place urethane, minimum 5 pounds per cubic foot density.
 - 5. Fasten with mortise and tenon joints and two 3/8-inch diameter galvanized steel tie rods with locking hex nuts.
 - 6. Face Sheet: Anodized Aluminum: Smooth.

2.4 MATERIALS AND ACCESSORIES - Fiberglass Reinforced Polyester (FRP) Flush Doors

- A. Aluminum Members: Provide alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate, with a minimum wall thickness of 0.125"
- B. All materials shall be of the same manufacturer. No splitting of Door, or components will be permitted.
- C. Fasteners: Provide aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, stops, panels, hardware, anchors, and other items being fastened. For exposed fastener (if any), provide Vandal-proof flat head screws with finish matching the item to be fastened.
 - 1. Do not use exposed fasteners, except where unavoidable for the assembly of units, or unavoidable for the fastening of hardware. Provide only concealed screws in glazing stops.
- D. Reinforcement and Brackets: Manufacturer's standard formed or fabricated steel units, of shapes, plates, or bars, with 2.0 ounce hot-dip zinc coating, complying with ASTM A 123, applied after fabrication.
- E. Expansion Anchor Devices: Lead shield or toothed steel, drill-in, expansion bolt anchors.
- F. Bituminous Coating: Cold applied asphalt mastic complying with SPC-PS 12, compounded for 30-mil thickness per coat.
- G. Sealants and Gaskets: Provide sealants and gaskets in the fabrication, assembly and installation of the work, which are recommended by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof.
- H. Glazing Gaskets: For glazing factory-installed glass, and for gaskets, which are factory-installed in "captive" assembly of glazing stops, provide manufacturer's standard stripping of molded neoprene, complying with ASTM D 2000 (Designation 2BC415 to 3 BC620), or molded PVC complying with ASTM C 509, Grade 4.

2.5 FABRICATION

- A. Sizes and Profiles: The required sizes for door and frame units, and profiles requirements are to be "field verified".

- B. Co-ordination of Fabrication: Check the actual frame or door openings in the construction work by accurate field measurements before fabrication, and show recorded measurements on final shop drawings.
- C. Assembly:
 - 1. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to the cleaning, finishing, treatment and application for coatings.
 - 2. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- D. Welding: No Welding of any Door joints will be accepted.
- E. Fasteners: Conceal fasteners, wherever possible, except as otherwise noted.
- F. Fit:
 - 1. Maintain continuity of line and accurate relation of planes and angles.
 - 2. Provide secure attachments and support at mechanical joints, with hairline fit at contacting members.
- G. Reinforce the work as necessary for performance requirements and as required for support to the structure. Separate dissimilar metals and bituminous paint or performed separators, which will prevent corrosion. Separate metal surfaces at moving joints with non-metallic separators to prevent "freeze-up" of joints.

2.6 HARDWARE

- A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
- B. Hardware Schedule: As indicated on the drawings and as specified in Section 08700.

2.7 GLAZING AND VISION LITES

- A. Provide glazing system for doors to receive lites. Design system for replacement of glass, but for non-removal of glass from the exterior.
 - 1. All glass in doors is to be factory installed.
 - 2. Glass for interior, and exterior doors to be as detailed on the drawings. Refer to Section 08800.
- B. Factory Glazing:
 - 1. Interior Doors: 1/4-inch glass.
 - 2. Exterior Doors: 1-inch glass insulating units.
- C. Lites in Exterior Doors: Allow for thermal expansion.
- D. Rectangular Lites:
 - 1. Size: As indicated on drawings.
 - 2. Factory glazed with screw-applied aluminum stops anodized to match perimeter door stile and rails.

2.8 ALUMINUM FINISH

- A. Anodized Finish: **Dark Bronze**, AA- M10C12C22A44, Class I, 0.7 mils thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION (Fiberglass Reinforced Polyester (FRP), Monumental Stile and Rail Doors)

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- D. Install exterior doors to be weathertight in closed position.
- E. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- F. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.4 ADJUSTING

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.5 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish or glazing.

3.6 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, door systems will be without damage or deterioration at time of substantial completion.

END OF SECTION 08410

SECTION 08415 - ALUMINUM – FRAMED ENTRANCES AND STOREFRONT SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes pre-engineered, thermally broken center glazed aluminum screw spline storefront and related accessories.

1.3 RELATED SECTIONS

- A. Section 01030 – Alternate Bids
- B. Section 07900 – Joint Sealer Assemblies
- C. Section 08871 – Security Glazing
- D. Section 08872 – Security Window Film

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design:
 - 1. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. Designated Design includes, but is not limited to:
 - a. Aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a qualified professional engineer responsible for their preparation in the State of New Jersey.
 - 2. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.
 - a. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

- B. Testing Agency Qualifications: Demonstrate to Architect's satisfaction, based on Architect's evaluation of criteria conforming to ASTM E 699, that the independent testing agency has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- C. Source Limitations: Obtain each type of entrance and storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of entrance and storefront systems and are based on the specific systems indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."
 - 1. Do not modify intended aesthetic effect, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Preconstruction Sealant Testing: Perform sealant manufacturers' standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by system.
 - 1. Test a minimum of 8 samples of each metal, glazing, and other material.
 - 2. Prepare samples using techniques and primers required for installed systems.
 - 3. Perform tests under environmental conditions that duplicate those under which systems will be installed.
 - 4. For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.
- F. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code–Aluminum."
- G. Mockups: Before installing entrance and storefront systems, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
 - 1. Locate mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect 7 calendar days in advance of the dates and times when mockups will be constructed.

3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before proceeding with installation of systems.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. When directed, demolish and remove mockups from Project site.
 - b. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of providing aluminum framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements". Do not modify size and dimensional requirements.
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.7 SUBMITTALS

- A. Contractor shall submit shop drawings; finish samples, test reports, and warranties.
 - 1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.
- B. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

1.8 WARRANTIES

- A. Total Storefront Installation
 - 1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total storefront installation. This includes the glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.
 - 2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.
- B. Window Material and Workmanship
 - 1. Provide written guarantee against defects in material and workmanship for **three (3) years** from the date of final shipment.
- C. Glass
 - 1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
 - 2. Warranty period shall be for ten (10) years.
- D. Finish
 - 1. Warranty period shall be for **twenty (20) years** from the date of final shipment.
 - 2. Provide organic finish warranty based on AAMA standard 2605.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: "System 403 Thermal Flush-Glazed Screw Spline Storefront System" as manufactured by EFCO Corp.
- B. Subject to compliance with requirements, manufacturers of products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Kawneer Company, Inc.,
 - 2. Architectural Window Manufacturing Corporation,
 - 3. Oldcastle Building Envelope,
 - 4. Tubelite,
 - 5. Or approved equal.

2.2 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- G. Thermal Barrier
 - 1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite

action between the exterior and interior extrusions.

2. Barrier material shall be poured-in-place, two-part polyurethane. A nonstructural thermal barrier is unacceptable.

2.2 FABRICATION

A. General

1. All aluminum frame extrusions shall have a minimum wall thickness of .080" (2 mm).
2. All exposed work shall be carefully matched to produce continuity of line and design with all joints. System design shall be such that raw edges will not be visible at joints.

B. Frame

1. Depth of frame shall not be less than 4-1/2" (114 mm).
2. Face dimension shall not be less than 2" (50 mm).
3. Frame components shall be screw spline construction.

C. Glazing:

1. All units shall be "dry glazed" with gaskets on both exterior and interior of the glass.

D. Finish:

<u>AA Description</u>	<u>Description</u>	<u>AAMA Guide Spec.</u>
AA-M12-C42-R1X	70% PVDF Ultrapon™	2605-98

PART 3 - EXECUTION

3.1 INSPECTION

A. Job Conditions

1. All openings shall be prepared by others to the proper size and shall be plumb, level and in the proper location and alignment as shown on the architect's drawings.

3.2 INSTALLATION

- A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.
- B. Storefront system shall be erected plumb and true, in proper alignment and relation to established lines and grades.
- C. Entrance doors shall be securely anchored in place to a straight, plumb and level condition, without distortion. Weather stripping contact and hardware movement shall be checked and final adjustments made for proper operation and performance of units.

- D. Furnish and apply sealing materials to provide a weather tight installation at all joints and intersections and at opening perimeters.
- E. Sealing materials specified shall be used in strict accordance with the manufacturer's printed instructions, and shall be applied only by mechanics specially trained or experienced in their use. All surfaces must be clean and free of foreign matter before applying sealing materials. Sealing compounds shall be tooled to fill the joint and provide a smooth finished surface.

3.3 ANCHORAGE

- A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

3.4 PROTECTION AND CLEANING

- A. The general contractor shall protect the aluminum materials and finish against damage from construction activities and harmful substances. The general contractor shall remove any protective coatings as directed by the architect, and shall clean the aluminum surfaces as recommended for the type of finish applied.

END OF SECTION 08415

SECTION 08520 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of each type, grade and performance class of aluminum window units required is indicated on the drawings and schedules.
 - 1. Aluminum window units required are heavy commercial and architectural window grades of the performance class indicated.
- B. Types of aluminum window units required include the following:
 - 1. Aluminum Horizontal Sliding Type Windows.
 - 2. Aluminum Projected Type Windows.
 - 3. Aluminum Fixed Type Windows.
 - 4. Exterior and interior aluminum trim, closures, angles, etc.
 - 5. All hardware and weatherstripping for windows.
 - 6. Anchors, supports, weeps, brackets and similar elements.
 - 7. All metal to metal sealants.
 - 8. Metal Screens.
 - 9. Integral blinds.
- C. Work of this section shall include field verification of existing dimensions, conditions and installation of windows.
- D. Related Sections:
 - 1. Section 04200 - Unit Masonry.
 - 2. Section 07900 - Joint Sealer Assemblies.
 - 3. Section 08800 - Glass and Glazing.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Comply with air infiltration, water penetration and structural performance requirements indicated in AAMA/WDMA/CSA 101/I.S.2/A440-08 for the type, grade and performance class of window units required.
- B. Testing Requirements: Meet or exceed performance requirements for specified window classification as described in AAMA/WDMA/CSA 101/I.S.2/A440-08 and at the following minimum test sizes and without the use of any applied parts intended to enhance performance (Tests performed at smaller sizes than listed below shall not be acceptable):
 - 1. Horizontal Sliding- Single Slider: 8'0" x 6'8"
 - 2. Fixed: 5'0" x 8'3"
 - 3. Projected: 5'0" x 12'0" (Configuration "C")

- C. Uniform Structural Performance: Provide window units which have been tested in accordance with ASTM E330, with no failure or permanent deflection for a positive (inward) and negative (outward) test pressure as follows:
1. Horizontal Siding- Single Slider: 75 lbs./sq.ft.
 2. Fixed: 150 lbs./sq.ft.
 3. Projected: 90 lbs./sq.ft.
- D. Uniform Load Deflection: No more than L/175 when tested per ASTM E 330-90 at:
1. Horizontal Sliding - Single Slider: 75 lbs./sq.ft.
 2. Fixed: 100 lbs./sq.ft.
 3. Projected: 60 lbs./sq.ft.
- E. Air Infiltration: Provide units with an air infiltration rate and inward test pressure indicated when tested in accordance with ASTM E283:
1. Air infiltration not more than 0.30 cfm / ft. of perimeter crack length with unit closed and locked. Test unit at a static air pressure difference of 6.24 lb./sq.ft.
- F. Water Penetration: Provide window units which have been tested in accordance with ASTM E331/ASTM E547 at a static air pressure difference of 12 lbs./sq.ft. With ventilator closed and locked.
1. There shall be no uncontrolled water leakage.
- G. Condensation Resistance: Provide window units which have been tested in accordance with AAMA 1503-1-88 at the prescribed test size and shall meet or exceed the following requirements:
1. CRF factor shall be a minimum of 50 for all window types.
 2. Conductive Thermal Transmittance (U-Value) shall not be more than the following at 15 mph. Perpendicular dynamic wind.
 - a. Horizontal Sliding -Single Sliders: .62 Btu/sq.ft.x h x deg F.
 - b. Fixed: .55 Btu/sq.ft.x h x deg F.
 - c. Projected: .55 Btu/sq.ft.x h x deg F.

1.4 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for each type of window including information not fully detailed in the manufacturer's standard product data and the following:
1. Submit four copies of shop drawings for the assembly and erection of the window system.
 2. Indicate clearly on all shop drawings any deviations from the Contract Drawings.
 3. Include wall elevations at 1/4" scale, typical unit elevations at 1" scale and full size detail sections of every typical composite member.

4. Show anchors, elements not included in manufacturer's standard data, including glazing details.
 5. It is understood that the dimensions of all materials shall be the Contractor's responsibility. Neither the Owner nor any representative thereof will be in any way responsible for the sizes shown nor will any such sizes be approved before production.
 6. The materials shown are expected to fit the job conditions, and the Contractor shall be fully responsible.
- B. Product Data: Submit manufacturer's product specifications, technical product data, recommendations and standard details for each type of aluminum window unit required.
1. Test Reports indicating compliance with ANSI/AAMA performance and thermal test requirements for type, grade and glazing requirements listed in specifications.
- C. Samples: Submit samples of the specified finish on 12" lengths of window members to the Architect for his approval. Such sample window shall be submitted within ten (10) days of the Architect's request.
1. The Architect reserves the right to require additional samples, which show fabrication techniques and workmanship, and design of hardware and accessories.
- D. Certification: Provide certification by the manufacturer showing that each type, grade and size of window unit complies with requirements where the manufacturer's standard window units have been tested in accordance with specified tests and meet performance requirements specified.
1. Where such testing has not been accomplished, perform required tests through a recognized testing laboratory or agency and provide certified test results.
 2. Certificates of Conformance: Submit written certification forms signed and notarized by authorized representatives of the Contractor / Installer / Manufacturer of the window system attesting that:
 - a. The referenced window systems have been furnished, inspected, and installed for this project in complete conformance with requirements of the Contract Documents,
 - b. The referenced window systems, covered under the work of this Contract, meet or exceed the requirements of the "Basis of Design", Project Specification requirements, without any reduction in the quality and performance
- E. Warranty:
1. Submit two (2) copies of written guarantee, signed by the Contractor, Installer and Manufacturer, agreeing to replace window work which fails in materials or workmanship within **ten (10) years** of the date of acceptance. Failure of materials or workmanship shall include but not be limited to excess air infiltration, excessive deflections, delamination of panels, deterioration of finish of metal in excess of normal weathering and defects in accessories, weatherstripping and other components of the work.

1.5 QUALITY ASSURANCE

- A. Standards: Requirements for aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA/WDMA/CSA 101/I.S.2/A440-05 and applicable general recommendation published by AAMA.
- B. Single Source Responsibility: Provide aluminum windows produced by a single manufacturer capable of showing prior production of units similar to those required. The firm engaged must be able to show successful experience in window work including a recommended ten years experience in the fabrication and erection of systems of scope and type similar to the required work.
- C. For the actual fabrication and installation of the windows, use only mechanics who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturer's recommended methods of installation plus the requirements of this work.
- D. Engineering: Provide all materials fully processed, prefitted, prepunched, etc. and assure that the unit, when assembled, shall fit the openings so as not to require a cutting, ripping, or fitting on job site by the installing crews.
- E. Special Project Warrantees: Provide special project warrantees and written guarantees, signed by the Contractor, Installer and Manufacturer, agreeing to replace window work which fails in materials or workmanship within **ten (10) years** of the date of acceptance.
 - 1. Failure of materials or workmanship shall include but not be limited to excess air infiltration, excessive deflections, delamination of panels, deterioration of finish of metal in excess of normal weathering and defects in accessories, weatherstripping and other components of the work.

1.6 PRODUCT HANDLING

- A. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.7 STANDARDS

- A. Comply with the applicable standards and recommendations published by NAAMM, AAMA and AA, including definitions of terms and designations not otherwise defined herein. For aluminum windows, comply with specifications and recommendations in ANSI A 302.9, unless more stringent requirements are listed in the following specifications.
- B. All tests referred to in these specifications shall be conducted by the recognized independent testing laboratory as approved by Architectural Aluminum Manufacturers Association.
 - 1. All tests must meet or exceed the values as set by the Architectural Aluminum Manufacturers Association, or contained herein, whichever standard is higher.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Provide windows as manufactured by Architectural Window Manufacturing Corporation; or approved equal as follows:
1. Horizontal Sliding - Single Slider: Series 6000i (HS-AW75)
 2. Fixed: Series 2250i (F-AW100)
 3. Projected: Series 2542i (AP-AW65)
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
1. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other products by other manufacturer's or which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect/Owner:
1. EFCO Corporation.
 2. Graham Corporation
 3. Or approved equal.

2.2 MATERIALS

- A. Frame Depths: All windows shall have minimum frame depth as shown on drawings and in accordance with Basis of Design window units indicated in Paragraph 2.1 above.
- B. Aluminum Extrusions: Provide alloy and temper recommended by the window manufacturer for the strength, corrosion-resistance, and application of required finish, but not less than 22,000 psi ultimate tensile strength, a yield of 16000 psi in compliance with ASTM B 221, and not less than 0.080" thickness at any location for main frame and sash members, and not less than .0125" for aluminum frame sills (except projected windows which shall be .125" for all frame and sash members).
- C. Fasteners: Provide aluminum, non-magnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.
1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125" thick, reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splined grommet nuts.

2. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.
- D. Anchors, Clips and Window Accessories: Fabricate anchors, clips and window accessories of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with the requirements of ASTM A 386; provide sufficient strength to withstand design pressure indicated.
- E. Compression Type Glazing Strips and Weatherstripping: Unless otherwise indicated, and at the manufacturer's option, provide compressible stripping for glazing and weatherstripping such as molded EPDM or neoprene gaskets complying with AAMA SG-1 or with ASTM D 2000 Designation 2BC415 to 3BC620, or molded PVC gaskets complying with ASTM D 2287, or molded expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.
- F. Sliding Type Weatherstripping: Provide woven pile weatherstripping of wool, polypropylene or nylon pile and resin-impregnated backing fabric, and aluminum backing strip. Comply with AAMA 701.2.
1. Provide stripping with integral center-line barrier fin of semi-rigid plastic sheet of polypropylene.
- G. Sealant: For sealants required within fabricated window units, provide type recommended by the manufacturer for joint size and movement. Sealant shall remain permanently elastic, non-shrinking, and non-migrating. Comply with Division-7 "Joint Sealants" section of these specifications for selection and installation of sealants.
- H. Insect Screens: Provide insect screen units for each operable exterior sash or vent. Provide half screens for horizontal sliding window units only.
1. Fabricate screen frames of extruded aluminum tubular-shaped members of 0.050" minimum wall thickness, with mitered or coped joints and concealed mechanical fasteners. Provide removable PVC spline-anchor concealing the edge of the screen frame. Finish frames to match window units, unless otherwise indicated.
 2. Wire Fabric Insect Screen: Provide 18 x 18, 18 x 16, or 18 x 14 mesh of 0.013" diameter coated aluminum wire, complying with FS RR-W-365, Type VII. Color of aluminum wire to match aluminum framing.
- I. Blinds: Provide manufacture's standard tilt control type with miniature removable key operator, (#5144 set screwless), and shall be in finish and color as selected by the Architect from manufacturer's available finishes and colors.
1. Windows shall be dual glazed with 5/8" integral blinds provided between glazing surfaces. Glazing composition shall be as indicated in Section 08800.
 2. Sash depth shall be a minimum of 2" and allow for a minimum air space of 7/8" between the glazing surfaces. All exterior glazing shall be bead glazed.
 3. All secondary (interior) glazing shall be marine glazed.

2.3 WINDOW GRADES AND PERFORMANCE CLASSIFICATION

- A. Architectural Windows: Provide window units complying with requirements of AAMA Grade and Performance Class indicated for each window type, as indicated in Paragraph 2.1 above.

2.4 WINDOW TYPES

- A. General: The following paragraphs define the operating arrangement for the types of sash required in window units and specify minimum provisions for each type. Unless otherwise noted, the drawings indicate which panels of each window unit are operable sash and which are fixed.
 - 1. Where 2 or more types of operating sash are included in the same window unit, the operation of each is indicated, and the unit is considered a "Combination Aluminum Window."
- B. Horizontal-sliding windows are window units containing at least two horizontally-operable sash in a weathering frame. Provide window units with sash that can be removed from the inside for cleaning.
- C. Fixed windows are window units containing at least one fixed lite of glass in a weathering frame.
- D. Projected windows are window units containing at least one sash hinged at the top or bottom which project outward or inward from the plane of the window, with or without fixed lites of glass.

2.5 HARDWARE

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.
- B. Window Types:
 - 1. Horizontal-Sliding Windows: Two roller assemblies with stainless steel ball bearings; roller assemblies ride on stainless steel track covers for maximum durability and smooth operation; one black zinc die cast automatic plunger lock with black anodized aluminum keeper at meeting stiles plus one aluminum snap lock at end jamb of the exterior sash.
 - 2. Fixed Windows: Not Applicable.
 - 3. Projected / Casements: One white bronze cam operated lock (two over 42" vent width); Windows with locking hardware greater than 72" above finished floor shall utilize a pole operated white bronze spring catch in lieu of the cam lock; 4-bar stainless steel hinges with integral limit stop.

2.6 ACCESSORIES

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard accessories that comply with indicated standards.
- B. Weatherstripping: Provide sliding-type weatherstripping at locations where sash rails slide horizontally or vertically along the unit frame. Unless otherwise indicated, provide double compression-type weatherstripping at the perimeter of each operating sash where sliding-type weatherstripping is not appropriate.
 - 1. Provide weatherstripping locked-in to extruded grooves in the sash.
- C. Poles: Provide one extruded aluminum window pole and hanger at every room receiving new windows with pole-operated hardware.
- D. Glazing Stops: Aluminum to match windows, screwed or snapped on.
- E. Window Sills: New aluminum window sills shall be minimum 0.125" extruded aluminum profile as indicated on drawings or as selected by the Architect from manufacturer's available profiles to suit existing conditions. Drip leg shall lap down over masonry and upper leg shall project up behind window frame leg for watertight assembly without the need for caulk or sealant. Window sills shall be one piece and continuous without piecing. With Architects approval extensive lengths will be allowed to have joints accomplished with under sill splice minimum of 4" with same profile as sill with all required sealants to achieve watertight seal. No over top sill splices will be allowed.

2.7 FABRICATION

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide manufacturer's standard fabrication that complies with indicated standards and that produces units that are reglazable without dismantling sash framing. Include a complete system for assembly of components and anchorage of window units, and prepare sash for glazing except where preglazing at the factory is indicated.
- B. Sizes and Profiles: Required sizes for window units and profile requirements are indicated on the drawings. Variable dimensions are indicated along with maximum and minimum dimensions as required to achieve design requirements and coordination with other work.
 - 1. Details shown are based upon standard details by one or more manufacturers. Similar details by other manufacturers will be acceptable, provided they comply with size requirements, minimum/maximum profile requirements, and performance standards as indicated or specified.
- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed (products with exposed thermal barriers will not be acceptable), conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
 - 1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.

2. No thermal short circuits shall occur between the exterior and interior.
 3. The thermal barrier shall be Ensigner's INSULBAR or approved equal, and consist of two glass reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions.
 4. Poured and debridged urethane thermal barriers shall not be permitted.
- D. Provide weepholes and internal water passages to conduct infiltrating water to the exterior.
- E. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- F. Provide subframes, receptors, with anchors for window units of extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units.
- G. Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, in the manner indicated.
- H. Glazing Stops: Provide snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish glazing stops to match window units. Marine glazed windows will not be accepted.
- I. Preglazed Fabrication: Preglaze window units at the factory where possible and practical for applications indicated. Comply with glass and glazing requirements of the "Glass and Glazing" sections of these specifications, and AAMA standards.
- J. Glazing: Windows shall be glazed with glazing types and systems as shown on drawings and in accordance with Section 08800.
- K. Insect Screens:
1. Locate screen units on either the inside or outside of the sash.
 2. Where possible, design window units and hardware to accommodate screens in a tight-fitting removable arrangement, with a minimum of exposed fasteners and latches.
 3. Provide color to match window framing.

2.9 FINISHES AND COLORS

- A. Fluoropolymer Coating Complying with AAMA 2604-98: Full strength "Kynar 500/Hylar 5000" coating baked on for 15 minutes at 450°F in a dry film thickness of 1.0 mil, 30% reflective gloss (ASTM D 523), over minimum 0.2 mil baked on modified epoxy primer.
1. Durability: Provide coating which has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake,

chip, crack or check in finish, and without chalking in excess of 8 (ASTM D 659), and without fading in excess of 5 NBS units.

2. Color: As selected by the Architect from manufacturer's available full range of colors including custom colors.
- B. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
 - C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
 - D. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
 - E. Preparation: Prior to fabrication of doors and frames, prepare the aluminum surfaces for finishing in accordance with the aluminum producer's recommendations and the standards of the finisher or processor. Process all components of each assembly simultaneously to attain complete uniformity of color.
 - F. Where indicated provide the following finishes:
 1. Interior Finish - Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - a. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603.
 - b. Color and Gloss: Match existing.
 2. Exterior Finish - High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Color and Gloss: Match existing.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level.

- B. Masonry surfaces shall be visibly dry and free of excess mortar, sand and other construction debris.
- C. Metal surfaces shall be dry, clean, free of grease, oil, dirt, rust and corrosion, and welding slag, without sharp edges or offsets at joints.
- D. Inspect windows furnished by the manufacturer, verify existing dimensions and conditions, and provide all required additional aluminum trim and accessories to complete the installation.

3.2 INSTALLATION

- A. Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the work.
- B. Set units plumb, level and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.
- C. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101-85.
- D. Set sill members and other members in a bed of compound or with joint fillers or gaskets, as shown, to provide weathertight construction. Refer to the "Joint Sealer" sections of Division-7 for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the work.
- E. Compounds, joint fillers and gaskets to be installed after installation of window units are specified as work in another section in Division-7.

3.3 ADJUSTING

- A. Adjust operating sash and hardware to provide a tight fit at contact points and at weatherstripping, for smooth operation and a weathertight closure.

3.4 CLEANING

- A. Clean aluminum surfaces promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt and other substances. Lubricate hardware and other moving parts.
- B. Clean glass of pre-glazed units promptly after installation of windows; comply with requirements of the "Glass and Glazing" section for cleaning and maintenance.

3.5 PROTECTION

- A. Initiate and maintain protection and other precautions required through the remainder of the construction period, to ensure that, except for normal weathering, window units will be free of damage or deterioration at the time of substantial completion.

END OF SECTION 08520

FVHD-5063M

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SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section

1.2 DESCRIPTION OF WORK

- A. The work in this section includes providing all labor, materials, appliances, and services required to completely furnish and deliver all finish hardware and related work, complete in accordance with the Architect's drawings and specifications, including, but not limited to the following:
 - 1. All finish hardware for aluminum/FRP, and wood doors in aluminum and hollow metal frames.
 - 2. All keying and cylinders.
 - 3. Furnish all finish hardware necessary to complete the project, whether particularly mentioned or not, and match in quality and finish the materials specified.

1.3 WORK NOT INCLUDED

- A. Furnish finish hardware, except for certain noted items, under other sections for the following items:
 - 1. Toilet partitions
 - 2. Windows
 - 3. Washroom accessories
 - 4. Millwork
 - 5. Factory fabricated mechanical or electrical equipment.

1.4 RELATED WORK IN OTHER SECTIONS

- A. Refer to the following sections for these related items:
 - 1. Wood Doors - Section 08211
 - 2. Hollow Metalwork - Section 08110
 - 3. Aluminum/FRP Doors and Frames - Section 08410
 - 4. Integrated Door Opening Assemblies - Section 08170
 - 5. Electrical Work - Section 16000

1.5 QUALITY ASSURANCE

- A. Manufacturer: Obtain each kind of material (latch and locksets, hinges, closers, etc.) from only one manufacturer of the respective item, although several may be indicated as offering products complying with requirements.
- B. Supplier: A recognized supplier, who has been furnishing Builders Hardware, in the project's vicinity, for a recommended period of not less than 3 years, and who is, or employs an

experienced Architectural Hardware Consultant who is a recognized member of the Door and Hardware Institute, available at reasonable times during the course of the work, for consultation about the project's material requirements to the Owner, Architect, and Contractor. All hardware is to be supplied by one dealer.

- C. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA 80. Provide only material which has been tested and listed by Underwriter's Laboratories, or other approved Testing Laboratories, for the types and sizes of doors required, and complies with requirements of Door and Frame labels.
- D. Where applicable, all hardware shall be in conformance with the State of New Jersey "Barrier-Free" sub code and ICC - ANSI A117.1

1.6 SUBMITTALS

- A. Submittals shall conform to the requirements specified in Part 1.
- B. The hardware dealer shall submit to the Architect and/or Owner, at least six (6) copies of a detailed Hardware Schedule and Catalog Cut Sheets. These schedules shall be complete and describe in detail the finish hardware for all door openings, or occurrences of finish hardware. These schedules are to be checked and approved by the Contractor and Architect. No hardware is to be ordered nor templates issued, prior to the receipt, by the Hardware Dealer, of these approved schedules. Upon approval of the schedules, the Contractor shall supply the Architect with six (6) final copies.
- C. The finish hardware schedules submitted shall include information as indicated below. These schedules are intended for coordination of the work.
- D. Final finish hardware content: Based on materials indicated, organize schedule into "Hardware Sets", indicating complete destinations of every item required for each door or opening. Include the following information:
 - 1. Type, style, function, size and finish of each item.
 - 2. Name and manufacturer of each item including catalog cuts of each item.
 - 3. Fastenings and other pertinent information.
 - 4. Location of Hardware Set, cross-referenced to indications on drawings, both on floor plan and in door and frame schedule.
 - 5. Explanation of all abbreviations, symbols, codes, etc., contained in the schedule.
 - 6. Mounting locations for hardware.
 - 7. Wiring diagrams and electrical data.
- E. Submittal Sequence: Submit detailed finish hardware scheduled within 30 days of award of contract.

1.7 DELIVERY AND PACKAGING

- A. All items of finish hardware shall be delivered to the project site or applicable fabricators of doors and frames.

- B. Package each item of hardware and each lockset, separately in individual containers, complete with necessary screws, keys, instructions, and installation template for spotting mortising tools. Mark each container with item number corresponding to the number shown on the hardware schedule.
- C. Furnish wrapping for all knobs, handles, and pulls for protection during construction.

1.8 WARRANTY

- A. Guarantee workmanship and material provided against defective manufacture. Repair or replace defective workmanship and material appearing within period of **one (1) year** after substantial completion.
- B. Provide **twenty-five (25) year** factory warranty on door closers against defects in material and workmanship from date of occupancy of project.
- C. Provide **five (5) year** factory warranty on exit devices, locksets and overhead stops against defects in material and workmanship from date of occupancy of project.
- D. Provide **ten (10) year** factory warranty on locksets against defects in material and workmanship from date of occupancy of project.

1.9 JOB CONDITIONS

- A. Field Service: Hardware Supplier: Assign a competent representative, acceptable to the Architect to be at the jobsite each time a major shipment of finish hardware is received. Such representative shall assist in "checking in" these shipments and shall secure a receipt covering the contents of each shipment. In addition, such representative shall be available for immediate call to the jobsite when, in the opinion of the Architect, their presence is necessary.
- B. Templates: Following approval of the Hardware Schedule by the Architect, furnish and deliver template information to the fabricators of items to which finish hardware is to be applied in ample time to avoid delays in such work of said fabricators. Provide drawings, schedules and detailed information to other trades as necessary for them to accommodate and prepare their work to receive the finish hardware.
- C. Cooperation and Coordination:
 - 1. Cooperate and coordinate work with that of other trades supplying materials or performing work in contact with, connecting to, underlying, or overlaying the work of this Section.
 - 2. Provide complete data of requirements for work of this Section to those other trades whose work is affected by or dependent upon the work of this Section.
 - 3. Furnish all items to be built into other work in ample time to avoid delaying the progress of such work.
 - 4. Examine all drawings covering the work of this Section and refer to all other drawings, including mechanical and electrical drawings, which may affect the work of this Section or require coordination by this trade.

- D. Existing Conditions: Hardware supplier: Verify all existing conditions in the field to ensure compatibility with finish hardware specified in Hardware Sets herein, prior to submission. Any discrepancies between the existing field conditions and finish hardware specified shall be brought to the attention of the Architect immediately. Hardware supplier shall not order any finish hardware until all discrepancies are rectified and the Architect grants written approval.

1.10 GENERAL

- A. The material called for under this section shall provide for all of the hardware required, whether the same is particularly specified or not. If the hardware for any particular location is not described herein, it should be provided and shall be like that specified for similar locations so far as practicable. If no similar locations are specified, such hardware must be of a suitable type approved by the Architect.
- B. Provide screws of proper type and compatible material, with shields, anchors, plugs, toggle nuts, etc., as required for the attachment of all items of hardware herein specified. All exposed screws shall have flat head, Phillips-type heads and shall be finished to match the item of hardware for which it is intended.

1.11 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final **hardware and keying** schedule.

1.12 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1. SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2. HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

- a. Two Hinges: For doors with heights up to 60 inches.
- b. Three Hinges: For doors with heights 61 to 90 inches.
- c. Four Hinges: For doors with heights 91 to 120 inches.
- d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

- a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
- b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
- b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

- a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. Bommer Industries (BO).
- b. Hager Companies (HA).
- c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Bommer Industries (BO).
- b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

- c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3. POWER TRANSFER DEVICES

- A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
 1. Manufacturers:
 - a. Hager Companies (HA) - ETW-QC (# wires) Option.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC (# wires) Option.
- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
 1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
 2. Manufacturers:
 - a. Hager Companies (HA) - Quick Connect.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC-C Series.

2.4. DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Manufacturers:
 - a. Door Controls International (DC).

- b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).
- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
 - 1. Manufacturers:
 - a. Door Controls International (DC).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 - 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 - 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 - 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 - 5. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.5. CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

5. Keyway: Match Facility Standard - Best
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 1. Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Key locks to Owner's existing system.
- F. Key Quantity: Provide the following minimum number of keys:
 1. Change Keys per Cylinder: Three (3).
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
 4. Construction Control Keys (where required): Two (2).
 5. Permanent Control Keys (where required): Two (2).
- G. Construction Keying: Provide temporary keyed construction cores.
- H. Key Registration List (Bitting List):
 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.
- I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
 1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).
- J. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.6. MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
 1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

2. Locks are to be non-handed and fully field reversible.
3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 2 million cycles.
4. Manufacturers:
 - a. Stanley Best (BE) - 9K
 - b. Corbin Russwin Hardware (RU) – CL3300 Series.
 - c. Sargent Manufacturing (SA) – 10 Line.

2.7. LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.8. CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with key cylinder dogging device to hold the pushbar and latch in a retracted position.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Von Duprin (VD) - 35A/98 XP Series.
- C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
1. Provide keyed removable feature where specified in the Hardware Sets.
 2. Provide stabilizers and mounting brackets as required.
 3. Provide electrical quick connection wiring options as specified in the hardware sets.
 4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - 700/900 Series.
 - b. Sargent Manufacturing (SA) - 980S Series.
 - c. Von Duprin (VD) - 9954 Series.

2.9. INTEGRATED WIEGAND OUTPUT ACCESS CONTROL EXIT DEVICES

- A. Wiegand Output Integrated Card Reader Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated proximity card reader, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
 2. Reader supports either HID 125 kHz proximity (up to 39 bits, including Corporate 1000) or 13.56 MHz (2K-32K) iClass® credentials.
 3. 12VDC external power supply required for reader, with optional 24VDC operation available with iClass® reader (125 kHz reader is always 12VDC). 24VDC required for solenoid operated exit trim (12VDC if applicable). Fail safe or fail secure options.
 4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
- B. Integrated Wiegand Output, Wireless, and IP-Enabled access control products are required to be supplied and installed only through designated ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) accounts.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - Access 600 - ED5000 RNE1 Series.
 - b. Sargent Manufacturing (SA) - Harmony - H1/H2 80 Series.

2.10. DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC8000 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.
 - c. Norton Door Controls (NO) - 7500 Series.

2.11. SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
1. Manufacturers:
 - a. LCN Door Closers (LC) - SEM7800 Series.
 - b. Rixson (RF) - 980/990 Series.
 - c. Sargent Manufacturing (SA) - 1560 Series.

2.12. DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

- 1. Manufacturers:

- a. Rixson Door Controls (RF).
- b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- c. Sargent Manufacturing (SA).

2.13. ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

- 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

- 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

- F. Manufacturers:

- 1. National Guard Products (NG).
- 2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
- 3. Reese Enterprises, Inc. (RE).

2.14. ELECTRONIC ACCESSORIES

- A. Switching Power Supplies: Provide switching power supplies that are dual voltage, UL listed, supervised units. Units shall be field selectable with a dedicated battery

charging circuit that provide 4 Amp at 12VDC or 24VDC continuous, with up to 16 independently controlled power limited outputs. Units shall tolerate brownout or overvoltage input $\pm 15\%$ of nominal voltage and have thermal shutdown protection with auto restart. Circuit breaker shall protect against overcurrent and reverse battery faults and units shall be available with a single relay fire trigger or individually triggered relayed outputs. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Manufacturers:
 - a. Securitron (SU) - AQ Series.

2.15. FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16. FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.17. HARDWARE SUPPLIER'S RESPONSIBILITY

- A. The finish hardware listed herein shall in no way be construed as a complete hardware schedule and shall be considered as an indication of the finish hardware requirements desired by the Owner. It shall be the finish hardware supplier's responsibility to examine the drawings and door schedule, and provide all necessary or additional hardware as required, but not specified herein. Such items of finish hardware shall be of the same type, quality, and quantity as that scheduled for similar doors used for similar purposes in other parts of the building. A schedule of fabrication and delivery shall be executed to avoid any delay of the entire project.

2.18. HARDWARE SUPPLIER'S RESPONSIBILITY

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Products listed in the Door Hardware Sets must meet the requirements described in the specification sections noted.
 - 1. Section 08700 – Finish Hardware.
 - 2. Section 16000 – Electrical Work.
- D. Integrated Wiegand Output access control products are required to be supplied and installed only through designated ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) accounts.
- E. Manufacturer's Abbreviations:
 - 1. MK - McKinney
 - 2. RI - RITE Door
 - 3. RO - Rockwood
 - 4. SA - SARGENT
 - 5. BE - dormakaba Best
 - 6. RF - Rixson
 - 7. NO - Norton
 - 8. PE - Pemko
 - 9. SU - Securitron
 - 10. OT - OTHER

Hardware Sets

Set: 1.0

Description: Exterior FRP Pair - Card Access

2 Continuous Hinge	MCK-12HD EPT	CL	MK
1 Removable Mullion	L980	PC	SA
1 Access Control Rim Exit	16 70 56-H2-8804 (Div 16)	US32D	SA
1 Exit Device (exit only)	16 55 70 8810	US32D	SA
1 Mullion Cylinder	70 980C1	US26D	SA
2 Door Pull	BF157 12HD	US32D	RO
2 Surface Closer	UNI7500	689	NO
1 Threshold	2005AT FHSL14SS		PE
1 Mullion Gasketing	5110BL		PE
2 eLynx Frame Harness	QC-C-P Series		MK
2 eLynx Door Harness	QC-C Series		MK
1 Wiring Diagrams	Elevation and Point to Point		SA
2 Electric Power Transfer	EL-CEPT		SU
2 Position Switch	DPS-M-BK		SU
1 Power Supply	AQD6-8F8R		SU
1 Battery Backup	B-12 / 24-5 (as required)		SU
1 Weather Seals	Supplied with door/frame assembly		

Notes:

Operation: Doors are normally closed and locked. Valid card at reader retracts latch for momentary

access. Monitoring by door position switches. During a loss of power, the door will default to secure. Free egress at all times. Lock status will not change when the fire detection/suppression systems are activated. Depressing pushrail will activate request to exit switch for appropriate monitor by EAC systems. Outside key override.

Set: 2.0

Description: Exterior FRP Pair

2	Continuous Hinge	MCK-12HD	CL	MK
1	Removable Mullion	L980	PC	SA
1	Exit Device (exit only)	16 70 8810	US32D	SA
1	Exit Device (nightlatch)	16 70 8804	US32D	SA
2	Door Pull	BF157 12HD	US32D	RO
2	Surface Closer	UNI7500	689	NO
1	Threshold	2005AT FHSL14SS		PE
1	Mullion Gasketing	5110BL		PE
2	Position Switch	DPS-M-BK		SU
1	Weather Seals	Supplied with door/frame assembly		

Set: 3.0

Description: Exterior FRP Pair - Courtyard

2	Continuous Hinge	MCK-12HD	CL	MK
1	Removable Mullion	L980	PC	SA
2	Exit Device (classroom)	16 70 8813 ETL	US32D	SA
2	Conc Overhead Stop	1-X36	630	RF
2	Door Closer	(PR)7500 (Reg or P/A)	689	NO
1	Threshold	271A FHSL14SS		PE
1	Mullion Gasketing	5110BL		PE
2	Sweep	3452APK		PE
2	Position Switch	DPS-M-BK		SU
1	Weather Seals	Supplied with door/frame assembly		

Set: 4.0

Description: Vestibule Pair

2	Continuous Hinge	MCK-12HD	CL	MK
1	Removable Mullion	L980	PC	SA
1	Exit Device (exit only)	16 70 8810	US32D	SA
1	Exit Device (nightlatch)	16 70 8804	US32D	SA
1	Mullion Cylinder	70 980C1	US26D	SA
2	Door Pull	BF157 12HD	US32D	RO
2	Surface Closer	UNI7500	689	NO
1	Threshold	271A FHSL14SS		PE
1	Mullion Gasketing	5110BL		PE
1	Weather Seals	Supplied with door/frame assembly		

Set: 5.0

Description: Vestibule Pair - Push-Pull

2	Continuous Hinge	MCK-12HD	CL	MK
2	Push Bar	8893	US32D	SA
2	Door Pull	BF157 12HD	US32D	RO
2	Door Closer	(PR)7500 (Reg or P/A)	689	NO

2 Kick Plate	K1050 10" B4E	US32D	RO
2 Wall Stop	400	US26D	RO
2 Silencer	608		RO

Set: 6.0

Description: Stair Pair

6 Hinge (heavy weight)	T4A3786	US26D	MK
2 Exit Device (passage)	12 NB8715 ETL	US32D	SA
2 Door Closer	(PR)7500 (Reg or P/A)	689	NO
2 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
1 Gasketing	S88D (Head & Jambs)		PE
1 Astragal	S771C x Door Height		PE

Set: 7.0

Description: Classroom

3 Hinge (heavy weight)	T4A3786	US26D	MK
1 Cylindrical Lock (intruder)	9K37IN 15D S3	626	BE
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
1 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
1 Gasketing	S88D (Head & Jambs)		PE

Set: 8.0

Description: Classroom - Panic

3 Hinge (heavy weight)	T4A3786	US26D	MK
1 Exit Device	LD 49 70 8816 ETL	US32D	SA
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
1 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
1 Gasketing	S88D (Head & Jambs)		PE

Set: 9.0

Description: Classroom Prep

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (classroom)	9K37R 15D S3	626	BE
1 Wall Stop	400	US26D	RO
3 Silencer	608		RO

Set: 10.0

Description: Elec; Mech; Storage

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (storeroom)	9K37D 15D S3	626	BE
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
1 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
3 Silencer	608		RO

Set: 11.0

Description: IDF - Card Access

3 Hinge (heavy weight)	T4A3786	US26D	MK
1 Integrated Card Reader Lock	70 H2-10G271 LL (Div 16)	US26D	SA
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
1 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
1 Gasketing	S88D (Head & Jambs)		PE
1 eLynx Frame Harness	QC-C-P Series		MK
1 eLynx Door Harness	QC-C Series		MK
1 Wiring Diagrams	Elevation and Point to Point		SA
1 Electric Power Transfer	EL-CEPT		SU
1 Power Supply	AQD6-8F8R		SU
1 Battery Backup	B-12 / 24-5 (as required)		SU

Notes:

Operation: Door is normally closed and locked. Valid card at reader unlocks outside lever for momentary access. Monitoring by door position switch. During a loss of power, the door will default to secure. Free egress at all times. Lock status will not change when the fire detection/suppression systems are activated. Rotating inside lever will activate request to exit switch for appropriate monitor by EAC systems. Outside key override.

Set: 12.0

Description: Jan Cl; Storage Pair

6 Hinge	TA2714	US26D	MK
2 Flush Bolt	555	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Cylindrical Lock (storeroom)	9K37D 15D S3	626	BE
2 Surf Overhead Stop	9-X36	630	RF
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
2 Kick Plate	K1050 10" B4E	US32D	RO
2 Silencer	608		RO

Set: 13.0

Description: Gang Restroom

3 Hinge (heavy weight)	T4A3786	US26D	MK
1 Cylindrical Lock (classroom)	9K37R 15D S3	626	BE
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
1 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
3 Silencer	608		RO

Set: 14.0

Description: Faculty Toilet

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (staff toil)	9K37H 15D S3	626	BE
1 Door Closer	(PR)7500 (Reg or P/A)	689	NO
1 Kick Plate	K1050 10" B4E	US32D	RO
1 Wall Stop	400	US26D	RO
3 Silencer	608		RO

Set: 15.0

Description: Corridor Pair - Integrated Assembly - 100/100 deg

2 Continuous Hinge	D309 (Section 08170)	630	RI
2 Recessed Panic (LBR)	D3676 MEC (08170)	US32D	RI
2 Lever Trim (passage)	D3080 x matching lever (08170)	US32D	RI
2 Closer (track, pull side)	D-DCN-7500ST (Section 08170)	689	RI
2 Electromagnetic Holder	D-MDH-310 (or to suit pocket depth, 08170)	689	RI
1 Head; Jamb; Mtg Stile Seal Kit	D-SS-STK-DBZ (Section 08170)	Dark Bronze	RI

Notes: Interface with building fire alarm system to release doors from hold-open.

Set: 16.0

Description: Corridor Pair - Integrated Assembly - 100/110 deg

2 Continuous Hinge	D309 (Section 08170)	630	RI
2 Recessed Panic (LBR)	D3676 MEC (08170)	US32D	RI
2 Lever Trim (passage)	D3080 x matching lever (08170)	US32D	RI
1 Closer (track, pull side)	D-DCN-7500ST (Section 08170)	689	RI
1 Electromechanical Closer	7705PTO	689	NO
1 Electromagnetic Holder	D-MDH-310 (or to suit pocket depth, 08170)	689	RI
1 Head; Jamb; Mtg Stile Seal Kit	D-SS-STK-DBZ (Section 08170)	Dark Bronze	RI

Notes: Interface with building fire alarm system to release doors from hold-open.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Mount Hardware units at heights indicated in “recommended locations for Builders Hardware for Standard Steel Doors and Frames”, by the Door and Hardware Institute, except as specifically indicated, required to comply with governing regulations, or may be otherwise directed by the Architect.
- B. Install each hardware item in compliance with the manufacturer’s instruction and recommendations. Wherever cutting and fitting is required to install finish hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

3.2 ADJUST AND CLEAN

- A. Adjust and check each operating item of finish hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Final adjustment: Wherever finish hardware installation is made more than one month prior to acceptance of occupancy of a space or area, return to the work site during the week prior to acceptance or occupancy, and make final check and

adjustment of all finish hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of finish hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- C. Instruct Owner's personnel in proper adjustment and maintenance of finish hardware finishes during the final adjustment of finish hardware.
- D. Continued Maintenance Service: Approximately six months after the acceptance of finish hardware in each area, the installer, accompanied by the representative of the lock and latch manufacturer shall return to the project and re-adjust every item of finish hardware to restore proper function of doors and finish hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace finish hardware items that have deteriorated or failed due to faulty design, materials or installation of finish hardware units.

END OF SECTION 08700

SECTION 08740 – ACCESS CONTROL HARDWARE

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Integrator Qualifications (Access Control Door Hardware): Systems Integrators, verifiably factory trained and certified by the primary product manufacturers, with a recommended minimum of 3 years documented experience installing complete access control systems hardware similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record of successful in-service performance. Qualifications include, but are not necessarily limited, to the following:
1. References: Provide a list of references for similar projects including contact name, phone number, name and type of project.
 2. Professional Staffing: Firms to have a dedicated access control systems integration department with full time, experienced professionals on staff experienced in providing on site consulting services for both electrified door hardware and integrated access control systems installations.
 3. Factory Training: Installation and service technicians are to be competent factory trained and certified personnel capable of maintaining the system.
 4. Service Center: Firms to have a service center capable of providing training, in-stock parts, and emergency maintenance and repairs at the Project site with 24-hour/7-days a week maximum response time.
- B. Supplier Qualifications: Supplier, verifiably authorized and in good standing with the primary product manufacturers, with a recommended minimum 3 years' experience supplying integrated access control systems similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record of successful in-service performance.
- C. Integrated Wiegand Output, Wireless, and IP-Enabled access control products are required to be supplied and installed only through designated ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) accounts.

1.2 WARRANTY

- A. Special Warranty Periods:
1. **Two (2) years** for electromechanical and integrated access control door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide integrated access control door hardware and accessories for each designated opening to comply with requirements in this Section and with the Access Control Hardware Sets listed in Specification Section 08700 – Finish Hardware.
 - 1. Access Control Hardware Sets: Requirements for quantity, item, model, design, grade, finish, size, and other distinctive qualities of each type of integrated door and access control hardware are indicated in the Access Control Hardware Sets at the end of Part 3 in Section 08170.
- B. Substitutions: Requests for substitution and product approval for inclusive mechanical and electrified access control door hardware, in compliance with specifications, must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01 "Substitution Procedures". Approval of requests is at the discretion of the architect, owner, and their designated consultants.
- C. The electrified access control door hardware contained in this Section represents a complete engineered system. If alternate products are submitted, it is the responsibility of the Supplier to provide an acceptable complete and working system layout, including re-engineering of elevation and wiring diagrams, as applicable. Complete systems to include at a minimum the required power supplies, power transfers, and electrified and integrated locking hardware and accessories.

END OF SECTION 08740

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 01030 - Alternate Bids
 - 2. Section 08110 - Hollow Metalwork
 - 3. Section 08211 - Wood Doors
 - 4. Section 08415 - Aluminum Storefront
 - 5. Section 08520 - Aluminum Windows
 - 6. Section 08522 - Aluminum Transaction Window
 - 7. Section 08870 - Security Window Film
 - 8. Section 08871 - Security Glazing (Alternate Bid)

1.2 SUMMARY

- A. Extent of glass and glazing work is indicated on drawings and schedules.
- B. Extent of application of security window film is indicated on drawings and schedules.
- C. Types of work or locations requiring glass and glazing include, but are not limited to, glass types scheduled herein and on the drawings.
 - 1. Windows.
 - 2. Doors and side lites.
 - 3. Storefronts.
 - 4. Glazed curtain walls.

1.3 QUALITY ASSURANCE

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- C. Safety Glass: Categories I and II materials complying with testing requirements in CPSC 16CFR1201 and permanently marked with label of:
 - 1. Safety Glazing Certification Council (SGCC).

- D. Insulating Glass Seal Standard: Comply with ASTM E 774, Class C.
 - 1. Comply with International Building Code for insulated tempered glass.
 - 2. Label each unit permanently on spacer or on one pane.
 - 3. Certification agency:
 - a. Insulating Glass Certification Council (IGCC).
 - b. Associated Laboratories, Inc. (ALI).
- E. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator with a recommended 5 years of successful experience in the production of each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.
- F. Installer (Glazier): A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program
 - 1. Firm with a recommended 5 years of successful experience in glazing work similar to required work.
- G. All glass shall bear the Label of the manufacturer.
- H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with an appropriate certification label of IGCC.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including documentation of compliance with requirements and instructions for handling, storing, installing, cleaning and protecting each type of glass and glazing material, and installation and maintenance instructions.
- B. Before any glass is delivered to the job site, submit sections and details of glass installation at framing members.
- C. Samples: Submit for verification purposes, 12" square samples of each type of glass indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative of adjoining framing system in color.
 - 1. Submit insulating glass samples with completed edge-seal construction, but hermetic seal need not be maintained.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.6 PROJECT CONDITIONS

- A. Examine framing and substrate work to receive glass and glazing materials, and condition under which glass is to be installed. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- B. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.
 - 1. Install liquid sealants at ambient and substrate temperatures above 40°F.

1.7 WARRANTY

- A. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: **Ten (10) years** from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: **Ten (10) years** from date of Substantial Completion.
- C. Manufacturer's Limited Warranty on Fire-Rated / Impact Gazing: Written warranty, made out to the Owner and signed by manufacturer, warrants only that the product will be free of manufacturing defects resulting in material obstruction through the glass area and/or edge separation and changes in properties of the interlayer for a period of **five (5) years** from the date of purchase, provided the Products have been properly shipped, stored, handled, installed and maintained.
 - 1. Limitation of Remedy - Inspection: The remedy for product proved to be defective under the terms of this warranty is limited to shipment of replacement product. With respect to all claims under this warranty, the Manufacturer shall have the right to inspect any and all products alleged to be defective.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:
 - 1. Standard Glass, Insulating Glass and Dual Glazing Products:
 - a. Pilkington, Libbey-Owens-Ford, (LOF)
 - b. Vitro Architectural Glass (formally PPG Glass)

- c. Guardian Industries Corp.
 - d. Or approved equal
2. Fire Rated Glass Assemblies:
- a. Firelite Plus by TGP Technical Glass Products
 - b. SuperLite II-XL by Safli First, a Division of O'Keeffe's Inc.
 - c. Keralite L by Vetrotech Saint-Gobain North America
 - d. Pyran® Platinum by Schott Glass Products
 - e. Or approved equal.

2.2 PRIMARY GLASS PRODUCTS

- A. Clear Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class 1 (clear), Quality-Q3 (glazing select).
- B. Heat Treated Float Glass (Tempered Glass): ASTM C 1048; Type I; Quality-Q3; Class I (clear)
 - 1. Provide prime glass of color and type indicated, which has been heat treated to strengthen glass in bending to not less than 4.5 times annealed strength.
- C. Uncoated Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality-Q3 (glazing select), and as follows:
 - 1. Manufacturer's standard **bronze** tint, with visible light transmittance of 38% and shading coefficient of 0.31 for 1/4" thick glass.
 - 2. Manufacturer's standard **clear**, with visible light transmittance of 70% and shading coefficient of 0.44 for 1/4" thick glass.
- D. Energy Advantage Low-E Glass: Manufacturer's standard clear color Low-E glass, coated on third surface with light transmittance:
 - 1. Bronze Tint: 38% and shading coefficient of .33 for 1/4" thick glass.

2.3 INSULATING GLAZING

- A. Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
- B. Provide insulating glass for applications in exterior doors, side lites, storefront units, curtain wall systems, aluminum windows and as follows:
 - 1. Exterior pane shall 1/4-inch thick tinted glass to meet indicated requirements.
 - 2. Interior pane shall be 1/4-inch thick "Low-E" coating on the third surface.
 - 3. Units shall be tempered where within 6 feet of a door or where "tempered" or "safety" glass is required by Code.

4. Double Glass Performance Data:

- a. Clear:
- 1) Visible light transmittance of 70%,
 - 2) Solar Energy Transmittance of 33%,
 - 3) U-Factor: Summer (Air) of 0.27,
 - 4) U-Factor: Winter (Air) of 0.29,
 - 5) Solar Heat Gain Coefficient of 0.38,
 - 6) Shading coefficient of 0.44.
- b. Bronze Tint (3rd surface):
- 1) Visible light transmittance of 38%,
 - 2) Solar Energy Transmittance of 14%,
 - 3) U-Factor: Summer (Air) of 0.27,
 - 4) U-Factor: Winter (Air) of 0.28,
 - 5) Solar Heat Gain Coefficient of 0.27,
 - 6) Shading coefficient of 0.31.

2.4 DUAL GLAZING

- A. Provide dual glazing for applications in aluminum windows which include integral blinds between panes and as follows:
1. Exterior pane shall 1/4-inch thick dark bronze tinted glass to meet indicated requirements.
 2. Interior pane shall be 1/4-inch thick "Low-E" float.
 3. Exterior and interior panes shall be tempered where within 6 feet of a door or where "tempered" or "safety" glass is required by Code.

2.5 FIRE-RATED / IMPACT GLAZING AND FRAMING ASSEMBLIES

- A. Fire protection rated and impact safety rated glazing material with a thickness of approximately 3/8" (9mm), made from laminated glass ceramic with a transparent appearance.
1. Units are tested listed and labeled by Underwriters Laboratories Inc., UL., for the following applications and comply with the following Agencies:
 - a. Classified and labeled by Underwriters Laboratories, Inc.®. Test report number for labeled fire-rated assemblies is UL File No. R22036.
 - b. All above tests performed in accordance with UL 9, UL 10B, UL 10C, NFPA 257, NFPA 80, ASTM E2010-01, ASTM E2074-00.
 - c. This product is not considered a barrier to radiant heat and has not met the ASTM E-119 or UL 263 test standards.
 - d. Fire rated for up to 90 minutes with required hose-stream test.

- e. Fire-rated for up to 180 minutes in doors with required hose-stream test.
 - f. Withstands thermal shock.
3. Impact rating: ANSI Z97.1 (Class A) and CPSC 16CFR1201 (Cat. I and II).
 4. Passes positive pressure test standard UL 10C.
 5. Laminated floated glass-ceramic.
 6. Clear and colorless without the distracting amber tint associated with competitive glass-ceramics. Microfloat process allows for smooth surface and distortion-free mirror finish.
 7. Approved for use with any fire-rated frame.
 8. Sound Transmission Class (STC): 36
 9. The panel must be placed on calcium silicate or hardwood setting blocks and glazed using PYRAN® Platinum classified glazing tape, such as closed cell PVC, Fiberfrax tape or Pemko FG3000S90.
- B. Subject to compliance with requirements, provide the following:
1. FRIG -1: Fire-Rated / Impact Glazing; Provide “**Pyran® Platinum L**”, as manufactured by Schott Glass Products; or approved equal.
 - a. Door lites, transoms or sidelites, and windows with fire rating requirements up to 90 minutes.
 - b. Doors up to 3 hours.

2.6 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for category II materials, for kinds of laminated glass indicated and other requirements specified as following:
1. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - a. Interlayer Material: Polyvinyl butyral sheets.
 2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
 - a. Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.
 3. Inner Lite: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select).

- a. Class 2 (tinted).
- b. Thickness: 1/4"
- 4. Outer Lite: Tempered glass type.
 - a. Thickness: 1/4".
- 5. Plastic Interlayer: 0.060 inch thick.

2.8 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES

- A. General: Provide color of exposed glazing sealant compound as selected by Architect from manufacturer's standard colors, or black if no color is so selected. Comply with manufacturer's recommendations for selection of hardness, depending upon the location of each application, conditions at time of installation, and performance requirements as indicated. Select materials, and variations or modifications, carefully for compatibility with surfaces contacted in the installation.
- B. 1 Part Silicone Rubber Glazing Sealant: Elastomeric silicone sealant complying with FS TT-D-001543, Class A, non-sag. Provide acid type recommended by manufacturer where only non-porous bond surfaces are contacted; provide non-acid type recommended by manufacturer where one or more porous bond surfaces are contacted.
- C. Butyl Rubber Glazing Tape: Partly-vulcanized, self-adhesive, non-staining, elastomeric butyl rubber tape. 98% solids, intended for 35% compression, no appreciable deterioration for 3000 hour test in Atlas Weatherometer; either plain or pre-shimmed as required for proper installation of glass.

2.9 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
 - 1. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
 - a. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.10 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- C. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.

- D. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- E. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.2 STANDARDS AND PERFORMANCE

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Inspect each piece of glass immediately before installation, and discard pieces which have significant edge damage or face imperfections.
- F. Unify appearance of each series of lites by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other piece.
- G. Install insulating glass units to comply with recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.

3.3 PREPARATION FOR GLAZING

- A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
- B. Apply primer or sealer to joint surfaces where recommended by sealant manufacturer.

3.4 GLAZING

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- H. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- I. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.5 PROTECTION AND CLEANING

- A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

- B. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- D. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to deterioration of glazing materials and other work. Comply with manufacturer's instructions.
- E. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Comply with glass manufacturer's recommendations for final cleaning.

END OF SECTION 08800

SECTION 08870 - SECURITY WINDOW FILM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Field applied security film and rigid pvc cap system applied to glazed surfaces and glazing framing systems.

1.3 RELATED SECTIONS

- A. Section 01030 - Alternate Bids
- B. Section 08110 - Hollow Metal Door Frames
- C. Section 08211 - Wood Doors
- D. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems
- E. Section 08415 - Aluminum Storefronts
- F. Section 08800 - Glass and Glazing
- G. Section 08900 - Glazed Curtain Wall

1.4 REFERENCES

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.
- B. ASTM International (ASTM):
 - 1. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - 2. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
 - 3. ASTM D 1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
 - 4. ASTM D 2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
 - 5. ASTM D 4830 - Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.

6. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
 7. ASTM E 308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
 8. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
 9. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 10. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- C. Window 5.2 - A Computer Tool for Analyzing Window Thermal Performance; Lawrence Berkeley Laboratory.
 - D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
 - E. Consumer Products Safety Commission 16 CFR, Part 1201 - Safety Standard for Architectural Glazing Materials.
 - F. GSA Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.
 - G. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.
 - H. Underwriters Laboratories Inc. (UL): UL 972 - Burglary Resisting Glazing Material.

1.5 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84:
 1. Flame Spread: 25, maximum.
 2. Smoke Developed: 450, maximum.
- B. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than 5 percent increase of transmitted light haze will result in accordance with ASTM D 1044 using 50 cycles, 500 grams weight, and the CS10F Calbrase Wheel.

1.6 SUBMITTALS

- A. Submit under provisions of AIA A201 and Section 00800.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Selection Samples: For each film specified, submit film samples representing manufacturer's film type for the project.
- D. Verification Samples: For each film specified, two samples representing film color and pattern.
- E. Performance Submittals: Provide laboratory data of emissivity and calculated window U-Factors for various outdoor temperatures based upon established calculation procedure defined by the ASHRAE Handbook of Fundamentals, Chapter 29, or Lawrence Berkeley Laboratory Window 5.2 Computer Program.
- F. **Letter from the manufacturer of the security film that the contractor is a certified installer.**
- G. **Shop drawings from the installer / manufacturer of the security window film illustrating all conditions of the Impact Protection Adhesive (IPA) overlap distance onto the adjacent glazing framing system.**

Note: Installation of the security window film shall not proceed until the submittals of all conditions are submitted.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
1. **Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.**
 2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
 - a. Name of building.
 - b. The name and telephone number of a management contact.
 - c. Type of glass.
 - d. Type of film.
 - e. Amount of film installed.
 - f. Date of completion.
 3. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
 4. Provide an application analysis to determine available energy cost reduction and savings.

- C. **Window Security Film Pre-Installation Meeting:** Prior to installation of the Security Window Film, there shall be a Pre-Installation Meeting with the General Contractor, Window Security Film Subcontractor, and the Architect. At this meeting, products and installation requirements and shall be reviewed.
- D. Mock-Up: Provide a mock-up for evaluation and approval by the Architect of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
- B. Basis of Design Manufacturer and the Authorized Window Film Dealer (collectively referred to as "Seller") warrant for **twelve (12) years** from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the Safety & Security Window Film will:
 - 1. Maintain Adhesion Properties without blistering, bubbling, or delaminating from the glass,
 - 2. Maintain Appearance without discoloration,
 - 3. Maintain Strength, Tear, and Penetration Resistant Properties as defined in product literature.

Warranty Applicable with additional purchase & installation of Impact Protection System Adhesive or Profile:

- 4. With the purchase of Impact Protection Profile or Impact Protection Adhesive on all four (4) sides of the window, for the entire project, Manufacturer and the Authorized Window Film Dealer agree to extend the terms of this warranty an **additional two (2) years**, for a total of a **fourteen (14) year** warranty. This includes the film, attachment system, and labor. No changes are made to the glass breakage warranty.

5. The Impact Protection System Adhesive or Profile warranty applies to new Safety & Security Window Film installations. The adhesive or profile Product will meet Product specifications in effect at time of installation. The warranty period is **twelve (12) years** from the date of installation for a two sided application, and **fourteen (14) years** for a 4 sided application. This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminants, tampering or other modifications applied after installation.
 - a. Film warranty is void if the attachment system is removed for reasons other than to replace product found defective under this warranty. Application of Non-System Manufacturer wet glaze attachment system voids the Safety & Security Film Warranty. If the product does not conform to this warranty, the sole and exclusive remedy is:
 - 1) Replacement of the quantity of film proved to be defective; and,
 - 2) Provide removal and reapplication labor of like quality product free of charge.
6. Seller also warrants against glass failure due to thermal shock fracture, (maximum value of \$500 per window) caused only as a direct result of the application of Safety & Security Window Film provided the film is applied to recommended types of glass and the glass failure is reported to the Seller within the specified time (listed below) from the start of the installation. Glass breakage coverage is only valid for Safety & Security Window Films.
 - a. **Sixty (60) months** coverage against thermal shock fracture,
 - b. Any glass failure covered by this warranty must be reviewed by Seller prior to repair, and only covers film and glass replacement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: "Ultra S140 Safety and Security Window Film" by 3M Window Film, Tel: #800.480.1704/651.733.2222; Web: www.3m.com/windowfilm; or approved equal.
 1. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
 - a. Equivalent by Saint-Gobain Solar Gard, Tel. # 877.273.4364/858-576-0200; www.solargard.com.
 - b. Or approved equal.
 2. Requests for substitutions will be considered in accordance with provisions of AIA A232 and Section 00800.
- B. Basis of Design: "BondKap Attachment System" as manufactured by FilmFastener LLC, Odessa, FL, Tel: # 813.926.8721; www.filmfastener.com / www.bondkap.com; or approved equal.

2.2 CLEAR MICROLAYERED SAFETY AND SECURITY WINDOW FILM

- A. Clear Microlayered Safety and Security Window Film: 3M Ultra S600 Safety and Security Window Film.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 14.0 mils (0.36 mm), comprised three laminated layers of optically clear polyester and contain a durable abrasion resistant coating over one surface.
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882) 25,000 psi (350 lbs. Per inch width)
 - e. Percent Elongation at Break (ASTM D 882): >125%
 - f. Percent Elongation at Yield (ASTM D882): greater than 100%.
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission Across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6.4 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 85 percent.
 - b. Visible Reflection (ASTM E 903): Not more than 10 percent.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.
 - d. Solar Heat Gain Coefficient (ASTM E 903): 0.78.
 6. Impact Resistance for Safety Glazing: Tested on window glass.
 - a. Shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited).
 7. Bomb Blast Mitigation:
 - a. GSA Rating of "3B" (Low Hazard) with minimum blast load of 10 psi overpressure and 89 psi*msec blast impulse.
 8. Impact Protection per ASTM's E1888 / E1996:
 - a. Film shall pass impact of Medium Large Missile "C" and withstand subsequent pressure cycling at 50 psf Design pressure with use of 3M Impact Protection Adhesive attachment system.
 9. Impact Protection Adhesive: Structural "wet glaze" film attachment system. Weatherable UV resistant polymer, moisture curable. Low VOC content and low odor.
 - a. Properties, as supplied:
 - 1) Color to closely match the existing glazing framing system:
 - a) Black
 - b) White

- 2) Typical Cure Time: 3 – 7 days (25°C, 50% RH)
- 3) Full Adhesion: 7 – 14 days
- 4) Tack-Free Time (ASTM D 5895): 21 minutes (25°C, 50% RH)
- 5) Flow, Sag or Slump (ASTM D 2202): 0 inches
- 6) Specific Gravity: 1.4
- 7) Working Time: 10 – 20 minutes (25°C, 50% RH)
- 8) VOC Content: 16 g/L

- b. Uniformity: Product shall have uniform consistency and appearance, with no clumping.
 - 1) Contractor shall use “painters type” tape to maintain a uniform installation of IPA on the glazing metal frame.
- c. Identification: Labeled as to Manufacturer as listed in this Section.
- D. On various installation conditions, the glazing stop can have various profile(s). The contractor shall ensure that the IPA is installed a minimum dimension as indicated above and in accordance with the manufacturer’s printed instructions.

2.3 BONDKAP ATTACHMENT SYSTEM

- A. BondKap Attachment System: Weatherable Rigid PVC secured using approved structural silicones such as Dow Corning 995 or GE SCS2000 "Wet Glaze" type attachment. BondKap aids in the integrity of the silicone to maintain proper alignment and increases the tensile/tear strength of the silicone, while provided and aesthetic cover to an unsightly large bead of silicone.
 1. BondKap, BK 2001.
 - a. Width: 1.516 inches.
 - b. Typically used for commercial storefront applications where added protection is necessary such as high profile faculities.
 2. BondKap, BK 2004.
 - a. Width: 1.30 inches.
 - b. Typically used for commercial storefront applications.
 3. BondKap, BK2005.
 - a. Width: 2.588 inches.
 - b. Typically used for commercial storefront doors.
 4. BondKap, BK 2006.
 - a. Width: 1.78 inches.
 - b. Typically used for commercial storefront doors.
 5. Material properties.
 - a. Full cure of silicone 30 to 60 days depending on BondKap profile.
 - b. Strength and elongation dependent upon silicone used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. If preparation of glass surfaces is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
 - 1. Glass surfaces receiving new film should first be examined to verify that they are free from defects and imperfections, which will affect the final appearance:
- B. Do not proceed with installation until glass surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
- C. At the request of the specifying authority, an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long bead, approximately 0.5 - 1 inch in width, masking one side of the frame surface underneath the strip with tape. Allow the Impact Protection Adhesive to cure for 7 days and test adhesion by pulling up on the masked end and a 90 degree angle. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is not recommended.
- D. Commencement of installation constitutes acceptance of conditions.
- E. BondKap Examination.
 - 1. Assure the BondKap is the correct length, color and profile for the installation.
 - 2. Assure the BondKap has not been subject to direct sunlight and has warped. If damage has occurred replace as necessary. BondKap will not warp once properly installed and has full adhesion with the structural silicone.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Pre-cut the BondKap strips as directed from the manufacturer.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions (See attached 3M Impact Protection Adhesive Attachment System document).
 - 1. Install film on surface 2 (single pane glass).
- B. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.

- C. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
- D. Apply film to glass and lightly spray film with slip solution.
- E. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
- F. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
- G. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
- H. Recommended minimum bead overlap for blast mitigation is 0.5 inch on both film and frame surfaces (excluding the glazing stops or compression gaskets).
- I. To ensure a straight and consistent bead width is achieved, masking tape may be applied to film and frame surfaces before application of 3M Impact Protection Adhesive.
- J. Dispense Impact Protection Adhesive with a caulk gun and nozzle having an opening cut to approximate size of desired bead width.
 - a. Install as specified by silicone manufacturer and BondKap manufacturer.
 - b. Cut the tip of the silicone the appropriate size for the BondKap in use.
 - c. Apply the silicone to the frame and glass or on the BondKap depending on which profile is in use.
 - d. Place the BondKap on the silicone at the specified angle to achieve maximum contact with silicone frame and glass.
 - 1) If alternative BondKap selection is used and silicone has been applied to the BondKap, press the silicone BondKap combination to the desired position on the glass and frame.
 - e. Apply sufficient pressure to assure silicone is mated to BondKap, glass and frame. You should be able to perceive the silicone under the BondKap. If not lift the BondKap and apply more silicone. If an excess of silicone is protruding past the BondKap see cleaning and protection.

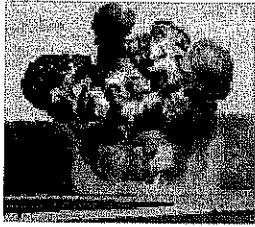
3.4 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

- C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.
- D. Common window cleaning solutions may be used 30 days after installation.

END OF SECTION 08870

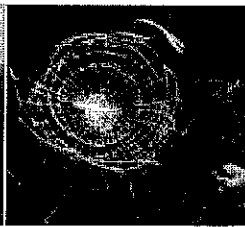
3M™ Impact Protection Adhesive Attachment System Installation Instructions



Bomb Blast



Windstorm

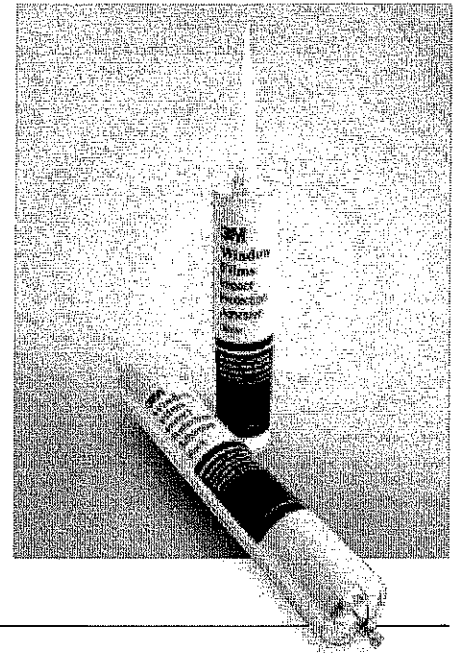


Forced Entry/Smash and Grab

3M™ Impact Protection Adhesive improves the overall performance of 3M™ Safety and Security Window Films. This unique window protection system combines the toughness of 3M's patented micro-layer safety film with 3M's world-class expertise in adhesives to help shield against impact energy from severe weather*, earthquakes, bomb blasts or forced entry events. The 3M Impact Protection System also helps protect against personal injury from flying glass.

3M Impact Protection Adhesive:

- Commercial and Residential Applications
- Bomb Blast and Windstorm Testing results available upon request



The following procedure describes the materials and steps that are necessary to install the 3M™ Impact Protection Adhesive attachment system.

Recommended Products:

- 3M™ Citrus Base Cleaner
- 3M™ Adhesive Remover, Citrus Base
- 3M™ Foaming Glass Cleaner
- 3M™ Super Fine Synthetic Steel Wool Pad
- 3M™ Scotch™ Safe Release™ Masking Tape
- 3M™ Scotch™ Long Mask™ Masking Tape
- 3M™ Impact Protection Adhesive
- 3M™ 94 Tape Primer

Window Preparation

Glass panel shall be uniform in appearance. No fractures, holes or what is considered contaminated glass, or damaged glass, to be present.

Window frame to be uniform in appearance and free from dents, holes and cracks within two inches of the glass.

A thorough cleaning of the glazing and frame systems before applying film and attachment is required to remove all foreign matter and contaminants such as adhesives, grease, oil, dust, water, surface dirt, old sealant or glazing compounds by using 3M Citrus Base Cleaner, alcohol or commercial cleaning solution.

Detergent or soap and water treatments are not recommended for this step.

1. IPA does not require the glazing stop to be trimmed. **Note: If the glazing stop overlaps frame, trimming the glazing stop is optional (Reference Detail 1 on back).**
2. Spray the glazing bead, glass and frame surface with an appropriate cleaning product and remove with a lint free cloth. Repeat if necessary to remove all foreign materials from the glass and inside window frame surfaces. If the area is particularly dirty, a light scrub with a 3M 0000 Super Fine Synthetic Steel Wool Pad is recommended to loosen contaminants. Finish with a final cleaning if needed.
3. Spray the glass with 3M Foaming Glass Cleaner or a soap and water solution. Flush the glazing bead to glass area starting at the top and working down to drain or remove any remaining contaminant from the area. Scrape the glass with a razor to remove all foreign matter. Thoroughly clean the glass a final time with soapy water and a window cleaning squeegee. Wipe around the glazing bead and frame area one final time to remove all of the soap and water solution.

Film Installation

1. Apply the 3M™ Ultra Safety & Security Window Film to the glass, making sure that the film is installed as far into the glazing channel as possible. Cut film as you normally would around the remaining glazing bead. **Remember to leave enough spacing between film and glazing bead to facilitate the removal of the slip solution.**
2. Squeegee the film to the glass by pressing firmly to remove as much of the slip solution as possible, especially at the edges of the film. **Two "edge-drying" methods can be used before applying the Impact Protection attachment system.**
 - A. The panels can be left for a few weeks to ensure proper drying of the film before the IPA system is applied.

— OR —

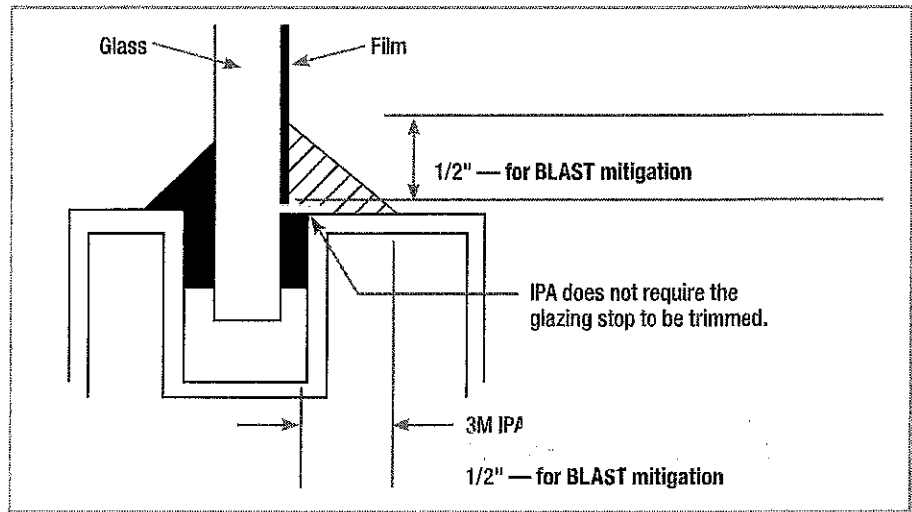
 - B. Using a hair dryer, gently heat and bump the edges of the film to hasten the removal and drying of the water from the edges. **Make sure that all of the soap and water solution has been removed from the film/glass/glazing channel before applying the IPA attachment system.**

3M

Impact Protection Adhesive Installation

1. Clean and prime window frame prior to installing the 3M™ Impact Protection Adhesive (IPA). To clean the frame, wipe area using a cloth dampened with a citrus-based cleaner. Then clean same area using a cloth dampened with an ammonia-based glass cleaner. Allow at least 5 minutes before applying the 3M IPA. If window frame is painted (latex, oil, polished or powder coated), 3M™ 94 Tape Primer is required in the area that IPA will be applied.
2. Apply a 1" (25mm) strip of 3M™ Scotch™ Safe Release™ White Masking Tape to the ultra film surface 3/8" (9mm) in from the edge of the film to all four sides. **Note:** This dimension will depend on application—1/2"
3. Apply a 1" (25mm) strip of 3M Safe Release Blue Masking Tape to the window frame 3/8" (9mm) from the edge of the trimmed gasket. This will form a parallel sealant channel that will allow a uniform sealant bead to be applied to the glass/frame interface. **Note:** Use a clean drop cloth before proceeding to Step 3.
4. Apply a triangular bead of IPA Impact Protection Adhesive, and tool as needed to form an acceptable finish. Refer to Figure 1. **Read and follow all product information and installation instructions provided by 3M Company.** We recommend you start in a corner and apply the sealant bead out approximately 6". Then turn the gun and push the sealant bead to the next corner where the same method is repeated. **Pushing the sealant bead will insure proper penetration and minimize the chances of air gaps in the bead.** Pulling the gun can also be done if confident no air gaps are formed.

Detail 1. 3M™ IPA System Typical Configuration



5. Smooth the sealant bead with an appropriate tool, if necessary, to give a finished look. Tooling should be completed in one continuous stroke immediately after adhesive application and before a skin forms.
6. Carefully remove the two masking strips from the glass/frame immediately after tooling. Do not allow the excess adhesive to contact the film, frame or flooring surfaces. A light colored drop cloth is needed to protect the work area. **Be careful not to step on adhesive and transfer it to surrounding surfaces.**

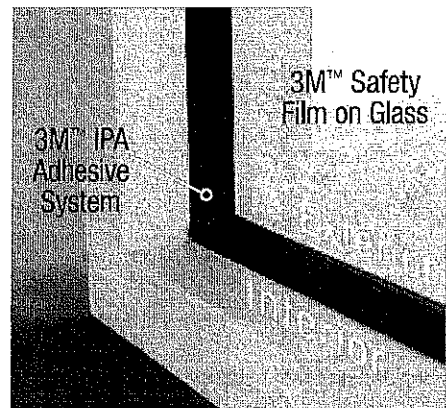
Note: Should you get some of the adhesive on the surrounding surfaces, an application and gentle wipe with a 3M Citrus Based Cleaner is recommended.

Curing time for the IPA will vary depending on temperature and relative humidity. It is not recommended to clean the film/IPA system for at least 36 hours following the installation. Full curing adhesion can take up to 7 days, depending on conditions.

Table 1

Property	Test Method Used	Units	3M IPA
Curing Time (25°C (77°F), 50% RH)		days	3-7
Full Adhesion		days	7-14
Tack-Free Time (25°C (77°F), 50% RH)	ASTM D5895	minutes	21
Flow, Sag or Slump		inches	0
Working Time (25°C (77°F), 50% RH)		minutes	10-20
Specific Gravity		n/a	1.403
VOC content		g/L	16
As Cured—After 21 Days at 25°C (77°F), 50% RH			
Ultimate Tensile Strength	ASTM D0412	psi (Mpa)	380 (2.62)
Ultimate Elongation	ASTM D0412	%	640
Durometer Hardness, Shore A	ASTM D2240	points	38-39
Tear Strength, Die B	ASTM D0624	ppi	72

Bomb Blast and Windstorm Testing results available upon request.



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IMPORTANT NOTICE: This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

For more information, please call 1-800-480-1704 or visit us at www.3M.com/windowfilm

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SECTION 08871 - SECURITY GLAZING (ALTERNATE BID)

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following where security glazing will be installed in lieu of security window film where indicated on the drawings:
 - 1. Laminated Security Glazing
 - 2. Insulated Security Glass Units
- B. Related Sections:
 - 1. Section 01030 - Alternate Bids.
 - 2. Section 08110 – Hollow Metalwork
 - 3. Section 08211 – Wood Doors
 - 4. Section 08410 – Aluminum/FRP Doors and Aluminum Framing Systems
 - 5. Section 08415 – Aluminum Storefronts
 - 6. Section 08900 – Glazed Curtain Wall

1.03 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Provide glazing systems produced by a manufacturer with a recommended 5-years successful experience in the fabrication of assemblies of the type and quality required.
- B. Installer’s Qualifications: Glazed systems shall be installed by a firm with a recommended 5-years successful experience in the installation of systems like those required.

1.04 ACTION SUBMITTALS

- A. Samples: Submit 12 inch square samples of each glass product. Submit 6-inch-long samples of glazing sealant and glazing tape, for color review.
- B. Manufacturer’s Data: Submit manufacturers’ technical data and instructions for installing and maintaining each glazing material

1.05 EXTENDED WARRANTIES

- A. General: Submit warranties provided by the manufacturer agreeing to repair or replace defective material or workmanship within the specified warranty periods, starting from the date of substantial completion.
 - 1. Laminated Security Glazing: Submit a **ten (10) year** warranty against delamination.

2. Insulated Security Glass Units: Submit a **ten (10) year** warranty against defects including loss of seal, interior clouding, and discoloration.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Security Glazing Manufacturers and Fabricators: Subject to compliance with requirements, firms producing glass products which may be incorporated into the work include the following:

1. Armoured One LLC: www.ArmouredOne.com; or approved equal.

a. Products:

- 1) AOTSG416L – 1/4-inch Laminated Security Glass
- 2 AOTSG1IGU – 1-inch Insulated Security Glass Unit

2.02 AOTSG416L - LAMINATED SECURITY GLAZING

- A. Thickness: 1/4-inch Clear
- B. ASTM C1172 – Standard Specification for Laminated Architectural Flat Glass
- C. WEY-SA-C1 – Standard for shooter/attack certification and forced entry class 1.
- D. GSA Level C – General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.
- E. ASTM F1642 – Standard Test Method for Glazing and Glazing Systems Subject to Air blast Loadings.
- F. UL972 – Standard for Burglary Resisting Glazing.
- G. EN356 P4 – Testing and Classification of Resistance Against Manual Attack.
- H. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- I. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Consumer Products Safety Commission; current edition.
- J. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.

2.03 AOTSG1IGU - INSULATED SECURITY GLASS UNITS

- A. Thickness: 1-inch Clear
- B. ASTM C1172 – Standard Specification for Laminated Architectural Flat Glass
- C. WEY-SA-C3 – Standard for shooter/attack certification and forced entry class 3.
- D. GSA Level C – General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.
- E. ASTM F1642 – Standard Test Method for Glazing and Glazing Systems Subject to Air blast Loadings.
- F. UL972 – Standard for Burglary Resisting Glazing.
- G. EN356 P4 – Testing and Classification of Resistance Against Manual Attack.
- H. ASTM E330 – Standard Test Method for Structural Performance of Exterior

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Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

- I. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Consumer Products Safety Commission; current edition.
- J. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.

2.04 GLAZING MATERIALS

- A. General: Provide standard color of glazing materials as selected by Architect. Comply with manufacturer's recommendations for applications and conditions at time of installation.
- B. Polyurethane Glazing Gasket: Polyurethane gasket or stick tape, color to be selected by Architect, thickness and size as shown on drawings.
- C. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- D. Setting Blocks: Neoprene, silicone or EPDM, 70-90 durometer hardness, with proven compatibility with glazing materials used.
- E. Spacers: Neoprene, silicone or EPDM, 40-50 durometer hardness with proven compatibility with glazing materials used.
- F. Compressible Fillers: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 5-10 psi compression strength for 25% deflection.
- G. Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.
- H Dowsil 995 – Dow Corning Corp. (Applied to interior of vision kit to adhere security glazing to the interior or the frame.); or approved equal.

PART 3 – EXECUTION

3.01 GENERAL

- A. Each glazing installation must withstand normal temperature changes, and impact loading without failure of glass, failure of sealants or gaskets, deterioration of glazing materials and other defects in the work.
- B. Protect glass from damage during handling and installation, and subsequent operation of glazed components of the work. Discard units with edge damage or other imperfections.
- C. Glazing channel dimensions are intended to provide for necessary bite on glass, minimum edge clearance, and adequate tape or sealant thicknesses, with reasonable tolerances.
- D. Comply with recommendations by manufacturers of glass and glazing products, except where more stringent requirements are indicated, including those of referenced glazing standards.

3.02 PREPARATION

- A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate.
- B. Where sealants are used, apply primer or sealant to joint surfaces where recommended by sealant manufacturer.

3.03 GLAZING

- A. Where indicated, provide spacers for size and spacing required for glass sizes larger than 50 united inches, except where gaskets or pre-shimmed tapes are used for glazing. Provide 1/4-inch minimum bite of spacer on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- B. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- C. Where sealants are used at butt joints, apply sealant in thin continuous clear bead. Tool sealant to a uniform, continuous, even profile.
- D. Using DOW 995 structural sealant, bond the security glazing to interior of frame, by adding a bead of sealant to the edges of glazing and the framing on both sides of glazing.
- E. Apply glazing stops and clean up any excess structural sealants from finished surfaces.

3.04 PROTECTION AND CLEANING

- A. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- B. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish Date of Substantial Completion in each area of project. Comply with glass manufacturer's recommendations for final cleaning.

END OF SECTION 08871

SECTION 08900 - GLAZED CURTAIN WALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 04200 - Unit Masonry,
 - 2. Section 07900 - Joint Sealer Assemblies,
 - 3. Section 08410 - Aluminum/FRP Doors,
 - 4. Section 08800 - Glass and Glazing,
 - 5. Section 08871 - Security Window Film,
 - 6. Section 08872 - Security Glazing (Alternate Bid).

1.2 DESCRIPTION OF WORK:

- A. The extent of glazed curtain wall work is indicated on the drawings and schedules.
- B. Type of glazed curtain walls required include metal stick-framed systems with interior and exterior exposed metal framing.
- C. Primary System Expanse: Single and Multi-story and multi-bay.
- D. Primary components of glazed curtain wall work include the following, including work cross-referenced to other specification sections for requirements:
 - 1. Aluminum curtain wall framing system.
 - 2. Anchorages, shims, fasteners, accessories and support brackets for components of the curtain wall system.

1.3 SYSTEM DESCRIPTION

- A. General: Provide glazed aluminum curtain wall system that has the following capabilities based on testing manufacturer's standard units in assemblies similar to those indicated for this Project:
 - 1. Withstands loads and thermal and structural movement requirements indicated without failure. Failure includes the following:
 - a. Air infiltration and water penetration exceeding specified limits.
 - b. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.
- B. Glazing is physically and thermally isolated from framing members.
- C. System is pressure equalized at its interior face.

- D. System is reglazable from the interior.
- E. Wind Loads: Provide glazed aluminum curtain wall system, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.
 - 1. Provide the manufacturer's stock system, adapted to the application indicated, which has been tested in accordance with ASTM E 330 to withstand at least a uniform pressure of 25 psf inward and 20 psf outward.
- F. Deflections and Thermal Movements: Provide manufacturer's stock products and system which are capable of withstanding building movements and weather exposures including wind loading, and which are capable of performing within the following limitations:
 - 1. Normal-to-wall deflection not exceeding 1/200 of the span, except 1/300 for glass supporting members.
 - 2. Parallel-to-wall deflections not exceeding 75 percent of glass edge clearances.
 - 3. Thermal movements resulting from an ambient temperature range of 120°F (67°C), which may cause curtain wall framing range of 180°F (100°C).
- G. Leakage Resistance, Water and Air: Provide the manufacturer's standard curtain wall system that has been tested to demonstrate permanent resistance to leakages as follows with a test pressure differential of 20 percent of design loading (excluding operable window or door edge joints, if any):
- H. Air Leakage: Not more than 0.06 cfm per sq. ft. at 6.24 psf of wall area when tested in accordance with ASTM E 283.
- I. Water Penetration: Provide glazed aluminum curtain wall system that does not evidence water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 15 lbf/sq. ft.
 - 1. Uncontrolled water infiltrating system or appearing on system's normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
- J. Condensation Requirements: Provide the manufacturer's standard or improved thermal-break construction which has been tested and certified by the manufacturer, in accordance with AAMA 1503, with 0°F (-18°C) outside and 25% relative humidity inside, to provide a condensation resistance factor (CRF) of at least 79 for framing system.
- K. Thermal Transmittance: Provide window units which have a "U"-value maximum of 0.64 BTU/hour/sq. ft./deg. F at 15 mph exterior wind velocity.

- L. Thermal Movements: Provide glazed aluminum curtain wall system, including anchorage, that accommodates thermal movements of system and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, noise or vibration, and other detrimental effects.
 - 1. Test High Exterior Ambient Air Temperature: That which produces an exterior metal surface temperature of 180°F.
 - 2. Test Low Exterior Ambient Air Temperature: That which produces an exterior metal surface temperature of 0°F.
 - 3. Test Interior Ambient Air Temperature: That which produces an exterior metal surface temperature of 75°F.
- M. Structural Support Movement: Provide glazed aluminum curtain wall system that accommodates structural movements including, but not limited to, sway, twist, column shortening, long-term creep, and deflection.
- N. Dimensional Tolerances: Provide glazed aluminum curtain wall system, including anchorage, that accommodates dimensional tolerances of building frame and other adjacent construction.

1.4 QUALITY ASSURANCE

- A. Delegated Design:
 - 1. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of glazed aluminum curtain wall systems that are similar to those indicated for this Project in material, design, and extent.
 - a. Glazed aluminum curtain walls and associated components indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a qualified professional engineer responsible for their preparation in the State of New Jersey.
 - 2. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing glazed aluminum curtain wall systems similar to those required for this Project and who is acceptable to manufacturer.
 - a. Engineering Responsibility: Prepare data for glazed aluminum curtain wall systems, including drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Source Limitations: Obtain each type of glazed aluminum curtain wall system from one source and by a single manufacturer.

- C. Testing Agency Qualifications: Demonstrate to Architect's satisfaction, based on Architect's evaluation of criteria conforming to ASTM E 699, that the independent testing agency has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sight lines and relationships to one another and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, or in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code–Aluminum."
 - 1. Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and who are currently certified for these processes.
- F. Mockups: Prior to installing glazed aluminum curtain wall system, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.
 - 1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before start of Work.
 - 5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. When directed, demolish and remove mockups from Project site.
- G. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Review methods and procedures related to glazed aluminum curtain wall system including, but not limited to, the following:

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
2. Review structural loading limitations.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.

1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings showing adaptation of the manufacturer's standard system to the project; include typical unit elevations at 1/2" scale and details at 3" scale, to show dimensioning, member profiles, anchorage system, interface with building construction, and glazing. Indicate the section module of wind-load-bearing members, and calculations of stresses and deflections for performance under design loading. Show clearly where and how the manufacturer's system deviates from contract drawings and these specifications.
 1. Drawings and structural calculations shall be prepared, signed and sealed by a structural engineer licensed in the State of this project and shall be for all indicated systems including solar shading devices.
 - a. Engineering Responsibility: Manufacturer's fabrication and shop drawings, design calculations and other structural data shall be prepared, signed and sealed by a qualified structural engineer licensed in the State of this project.
- B. Product Data: Submit manufacturer's specifications for materials and fabrication of curtain wall, and instructions and recommendations for installation and maintenance. Include certified test reports showing compliance with requirements where a test method is indicated.
- C. Samples: Submit samples of each type and color of aluminum finish, on 12" long sections of extrusions or formed shapes and on 6" squares of sheet or plate. Include 2 or more samples in each set, showing near-limits of variations, if any, in color and texture of finish.
 1. Provide manufacturer's full size sample for sun screen system.
- D. The Architect reserves the right to require fabrication samples showing the following:
 - Prime members.
 - Joinery.
 - Anchorage.
 - Expansion provisions.
 - Glazing and similar details.
 - Profiles.
 - Intersections.
- E. Test Reports: Submit certified copies of previous test reports which have been performed by Independent Laboratory substantiating performance of the system and indicating compliance with requirements of the Contract Documents.

- F. Certificates of Conformance: Submit Manufacturer/Installer/Contractor certificates indicating conformance with specified system. Certificates shall be signed and notarized by an authorized officers and representatives.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Noise or vibration caused by thermal movements.
 - 3. Failure of system to meet performance requirements.
 - 4. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 5. Failure of operating components to function normally.
 - 6. Water leakage.
 - 7. Glazing breakage.
- C. Warranty Period: **Five (5) years** from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: "Series 5600" as manufactured by EFCO Corporation; or approved equal.
- B. Subject to compliance with requirements, manufacturers of products which may be incorporated in the work include but not limited to the following:
 - 1. 1600 Wall Series - IsoStut Thermal Break System"; Kawneer Company Inc.
 - 1. Architectural Window.
 - 2. Vistawall, Architectural Products.
 - 3. Or approved equal.

2.2 MATERIALS AND COMPONENTS

- A. Aluminum Members: Provide members such as extrusions, formed members, sheet and plate, of the alloy, temper and thickness recommended by the manufacturer to comply with the requirements of ASTM B 221 for extrusions, and ASTM B 209 for sheet or plate.

- B. Window units are specified in "Window" section; match finish of the curtain wall framing.
- C. Glazing Gaskets: Provide manufacturer's standard sealed-corner pressure-glazing or wedge-lock dry glazing system of black, resilient elastomeric glazing gaskets, setting blocks and shims or spacers as required; hardness as selected by curtain wall manufacturer.
- D. Gasket Material: Provide extruded or molded EPDM synthetic rubber gaskets, compound as recommended by the curtain wall manufacturer.
- E. Glass is specified in "Glass and Glazing" section .
- F. Framing System Gaskets and Joint Fillers: Provide the curtain wall manufacturer's standard permanent type framing system gaskets and joint fillers, depending on joint movement and sealing requirements, such as sliding joints, compression joint translation, or non-moving joints.
- G. Sealants and joint fillers are specified in "Joint Sealers" section, both for joints within the curtain wall construction and for joints at the interface of curtain wall construction and other work.
- H. Brackets and Reinforcements: Where feasible, provide the manufacturer's standard high-strength aluminum units; otherwise provide non-magnetic stainless steel. At the fabricator's option, brackets not exposed to weather or abrasion may be hot-dip galvanized steel complying with requirements of ASTM A 386. Provide non-staining, non-ferrous shims for installation and alignment of curtain wall work.
- I. Concealed Flashing: Provide dead-soft 26-gauge stainless steel concealed flashing, of type selected for compatibility by the manufacturer.
- J. Fasteners and Accessories: Provide the manufacturer's standard non-corrosive fasteners and accessories that are compatible with materials used in the framing system and with exposed portions that match finish of the curtain wall system. Where movement should be expected, provide slip-joint linings of sheets, pads, shims, or washers of fluorocarbon resin or a similar material recommended by the manufacturer.
- K. Where fasteners anchor into aluminum less than 0.125" thick, provide non-corrosive pressed-in splined grommet nuts or other type reinforcement to receive fastener threads.
- L. Concrete or Masonry Inserts: Provide cast-iron, malleable iron or hot-dip galvanized steel inserts complying with requirements of ASTM A 386.

2.3 FABRICATION

- A. General: Fabricate curtain wall system at the manufacturer's shop to the fullest extent possible, and prior to application of finishes. Unless otherwise indicated provide concealed fasteners. Make provisions to weep penetrating water and condensation to the exterior.
- B. Where feasible, install nonglazed panels in prefabricated frames at the manufacturer's shop.

- C. Aluminum stick-type system is an individual-member erection system with deep vertical exterior mullions. Glazing shall be from the inside. Fabricate the system with an integrally concealed resilient thermal break, so that exterior-exposed aluminum does not contact interior exposed aluminum or other work, and with no metal fasteners or accessories bridging the break.

2.4 FINISHES

- A. Aluminum Finishes and Colors:
 - 1. Preparation: Prior to fabrication of doors and frames, prepare the aluminum surfaces for finishing in accordance with the aluminum producer's recommendations and the standards of the finisher or processor. Process all components of each assembly simultaneously to attain complete uniformity of color.
 - 2. Anodized Finishes: Class 1 Clear Color Anodized Finish - AA-M12C22A41 (minimum thickness 0.7 mils) integral color, medium matte finish. Color shall be **Dark Bronze** anodized aluminum.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Furnish inserts at proper times for setting in concrete formwork, masonry, and similar work indicated to support curtain wall work.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions for protection, handling and installation of fabricated curtain wall components, with particular care and attention to preservation of applied finishes. Discard or remove and replace damaged members.
- B. Anchor components securely in place in the manner indicated, shimming and allowing for movement resulting from changes in thermal conditions. Provide separators and isolators to prevent corrosion and electrolytic deterioration and to prevent "freeze-up" of moving joints.
- C. Glazing is specified in "Glass and Glazing" section.
- D. Sealants and joint fillers are specified in "Joint Sealer Assemblies" section.
- E. Erection Tolerances: Install curtain wall components plumb, level, accurately aligned and accurately located in reference to column lines and floor levels. Adjust work to conform to the following tolerances:
 - 1. Plumb: 1/8" in 10'; 1/4" in 40'.
 - 2. Level: 1/8" in 20'; 1/4" in 40'.
 - 3. Alignment: Limit offset of member alignment to 1/16" where surfaces are flush or less than 1/2" out of flush, and separated by less than 2" by a reveal or protruding work; otherwise limit offsets to 1/8".

4. Location: 3/8" maximum deviation from the measured theoretical location of any member at any location.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing agency to perform field quality-control testing indicated.
- B. Structural-Silicone-Sealant Adhesion Test: Test installed structural silicone sealant according to field adhesion test method described in AAMA CW #13, "Structural Sealant Glazing Systems (A Design Guide)."
 1. Test a minimum of 2 areas.
- C. Water Spray Test: After completing the installation of test areas indicated, test storefront system for water penetration according to AAMA 501.2 requirements.
- D. Repair or remove and replace Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

3.4 CLEANING

- A. Clean the completed system, inside and out, promptly after erection and installation of glass and sealants, allowing for nominal curing of liquid sealants. The curtain wall installer shall advise the Contractor of proper and adequate procedures for protection and cleaning during the remainder of the construction period, so that the system will be without damage and deterioration at the time of acceptance.
- B. At the time of substantial completion, clean curtain wall system thoroughly and polish glass. Demonstrate proper cleaning methods and materials to the Owner's maintenance personnel.

END OF SECTION 08900

SECTION 09250 - GYPSUM DRYWALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of each type of gypsum drywall construction required is indicated on the drawings.
- B. This Section includes the following types of gypsum board construction:
 - 1. Gypsum drywall including screw-type metal support system.
 - 2. Water-resistant / impact resistance gypsum wallboard.
 - 3. Sound Insulation.
 - 4. Drywall finishing (joint tape and compound treatment).
 - 5. Vinyl trim and accessories.
 - 6. Fire Protection Board.
- C. Related Sections:
 - 1. Section 09510 - Suspended Acoustical Tile Ceilings,
 - 2. Section 09900 - Painting,
 - 3. Section 10650 - Operable Partitions (Electric).

1.3 QUALITY ASSURANCE

- A. Manufacturer: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.
- B. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
 - 1. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in U.L. "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.
- C. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- D. Structural Performance Characteristics for drywall shaft system: Provide drywall shaft systems designed and tested by manufacturer to withstand the following lateral design loadings (air pressures), applied transiently and cyclically, for maximum heights of partitions required, within the following deflection limits:
 - 1. Lateral Loading: 5 psf.
 - 2. Deflection Limit: 1/240 of partition height.

- E. Fireblocking and Draftstopping: Comply with the International Building Code requirements for installation of fireblocking and / or draftstopping, to prevent the fire passage of flame and product of combustion through concealed spaces or openings in gypsum board systems, in the event of fire.
- F. Provide self extinguishing vinyl trim accessories which do not support combustion once flame source is removed.

1.4 REFERENCES

- A. ANSI/ASTM C 840 Gypsum Board Standard - Comply with applicable requirements for application and finishing of gypsum board, unless otherwise indicated.
- B. ASTM C 1396 Gypsum Wallboard Standard:
- C. ASTM C 754 Steel Framing Standard - Comply with applicable requirements for installation of steel framing for gypsum board.
- D. ASTM C11: Gypsum Board Terminology Standard:
- E. ASTM C 1278 Impact Resistance Gypsum Wallboard:
- F. ASTM D 1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds
- G. ASTM D 3678 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions.
- H. Application and Finishing of Gypsum Panel Products: GA-216.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with these specifications.
 - 1. Provide product data for impact resistance gypsum wallboard system.
- B. Shop drawings: Submit shop drawings for wall metal stud framing for structural heavy gauge wall studs supporting other equipment, items, cabinets, etc.
 - 1. Show layout, spacings, sizes, thicknesses, and types of metal framing, fabrication, fastening and anchorage details, including mechanical fasteners.
 - 2. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachments to other units of Work.
 - 3. Indicate manufacturer's design thickness to meet structural performance requirements for each wall mounted item, equipment, cabinet, etc.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
 1. Minimum Room Temperatures: When ambient outdoor temperatures are below 55°F maintain continuous, comfortable building working temperature of not less than 55°F for 48 hours prior to application and continuously thereafter until drying is complete.
 2. Ventilate building spaces as required to remove water in excess of that required for drying joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.
 3. The gypsum drywall shall be installed only when the exterior walls have been erected, windows installed and the permanent roof is installed and in watertight condition to prevent the growth of mold. The contractor shall not install gypsum drywall panels that are wet, have the indication of mold, including but not limited to: fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
- B. Metal Support Systems:
 1. Allied Structural Industries
 2. Clark-Dietrich Building Systems
 3. National Gypsum Company
 4. Marino\WARE; a Div. of WARE Industries, Inc.

5. United States Gypsum Co. (USG)
 6. Or approved equal
- C. Gypsum Boards and Related Products:
1. CertainTeed Gypsum.
 2. Georgia-Pacific Corp.
 3. Gold Bond Building Products Div., National Gypsum Co.
 4. United States Gypsum Co.
 5. Continental Building Products
 6. Or approved equal
- D. Impact Resistance Gypsum Wallboard:
1. United States Gypsum Co. (USG)
 2. National Gypsum Co.
 3. Georgia-Pacific Gypsum, LLC
 4. Continental Building Products
 5. CertainTeed Gypsum.
 6. Or approved equal
- E. Vinyl Trim
1. Trim-Tex,
 2. Or approved equal.

2.2 METAL SUPPORT MATERIALS

- A. General: Provide components which comply with ASTM C754 for materials and sizes, unless otherwise indicated.
- B. Ceiling Support Materials and Systems
1. General: Size ceiling support components to comply with ASTM C754 unless otherwise indicated.
 2. Main Runners: Steel channels with rust inhibitive paint finish, hot or cold-rolled.
 3. Hanger Wire: ASTM CA641, soft, Class 1 galvanized.
 4. Hanger Anchorage Devices: Devices applicable to the indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data. Size devices for 3x calculated load supported.
 5. Furring Member: ASTM C645; 0.0179" minimum thickness of base metal, hat-shaped.
 6. Furring Anchorages: 16 gauge galvanized wire ties, manufacturer's standard wire type clips, bolts, nails or screws as recommended by furring manufacturer and complying with C754.
 7. Direct Suspension Systems: Manufacturer's standard zinc coated or painted steel system of furring runners, furring tees, and accessories designed for concealed support of gypsum drywall ceilings, of proper type for use intended.

C. Wall/Partition Support Materials

1. Studs ASTM C645, 25 gauge unless otherwise indicated. 20 gauge minimum at door jambs and wherever structural or other gauge studs are called for, for use with impact resistant type gypsum wallboard, and to comply with applicable published instructions and recommendations of gypsum board manufacturer or, if not available, of "Gypsum Construction Handbook" published by United States Gypsum Company.
 - a. Depth of Section: 3-5/8 inch, unless indicated otherwise.
 - b. Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.
 - c. Provide structural heavy gauge studs and bracing to support loads of wall mounted items, equipment, cabinets, etc. coordinate with other trades for weight requirements and mounting locations.
2. Furring Members: ASTM C645, 25 gauge hat-shaped.
3. Fasteners for Stud Members: Provide fasteners of type, material, size, recommended by furring manufacturer for the substrate and application indicated.

2.3 GYPSUM BOARD

- A. General: ASTM C1396, in maximum lengths available to minimize end to end joints.
1. Type: Regular, unless otherwise indicated. Type X for fire resistance rated assemblies and where indicated.
 2. Edges: Tapered.
 3. Thickness: 5/8 inch, unless otherwise indicated.
- B. Impact Resistance Gypsum Wallboard: ASTM C1629 level 3 (highest) for hard- and soft-body impact, and tested in accordance with ASTM C473 for moisture and mold resistance and ASTM D3273 for resistance to growth of mold on the surface of interior coatings. Mold Defense per ASTM D3273. Provide Type X; tapered edge, 5/8 inch thick, unless otherwise indicated.
1. Basis of Design: "Mold Tough VHI Firecode Core" High-Impact-Resistant Panels with Moisture and Mold Resistance; United States Gypsum Co.; or approved equal.
 2. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
 - a. "Hi-Impact XP", by National Gypsum.
 - b. "Extreme Impact Resistant Gypsum Drywall, by CertainTeed Gypsum.
 - c. Or approved equal.

2.4 GYPSUM BOARD CEILING SUSPENSION SYSTEM

- A. Heavy-Duty Drywall Furring Tee's: Provide heavy-duty furring system which comply with ASTM C645 and has G40 minimum protective for hot-dipped galvanized process and .0179 steel thickness before application of protective coating.
1. Structural Classification: Comply with ASTM C635 for heavy-duty system.
 2. Provide manufacturer's standard suspension system accessories required for each condition indicated on the contract documents.
- B. The following system indicated, is the "Basis of Design", other manufacturer's will be considered for substitution, provided they comply with the contract documents and are submitted as per the requirements of Section 00800;
1. "Perimeter Solutions"; Armstrong World Industries, Inc.; "Drywall Suspension System"; USG Corp.; or approved equal.
 2. Main Beam: Double-web steel construction, hot dipped galvanized, 1-1/2" web height with rectangular top bulb, and prefinished 1-1/2" flange; (Item No. HD8906). For fire rated ceilings provide main beam formed to include integral splice for expansion relief. Web is to be formed to receive override cross tee.
 3. Primary Furring Cross Tees: Double-web, hot-dipped galvanized steel, 1-1/2" web height with rectangular bulb and hot-dipped 1-1/2" knurled flange.
 4. Secondary Framing Cross Tees: Double-web, hot-dipped galvanized steel, 1-1/2" web height with rectangular bulb and hot-dipped 15/16" flange.
 5. Wall Moldings: Manufacturer's standard hot-dipped galvanized steel angles or channels as selected by the Architect.
 6. Hanger Wire: Hot dipped galvanized steel, 12 gauge, tested to exceed 500 lbs. pull out force.
 7. Accessories: Manufacturer's standard angle clips, direct ceiling clips, acoustical transition clips and other accessories required to allow for use of complete grid system at indicated transitions for walls and ceilings.

2.5 TRIM ACCESSORIES

- A. General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim beads, J-type edge trim beads, special L-kerf type edge trim beads, and one-piece control joint beads.
- B. Semi-Finishing Type: Manufacturer's standard trim units which are not to be finished with joint compound (non-beaded), where indicated.

2.6 JOINT TREATMENT MATERIALS (GYPSUM BOARD APPLICATION)

- A. General: Provide materials complying with ASTM C475, ASTM C840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape: Manufacturer's recommended types for indicated applications. Use types compatible with joint compounds.
- C. Joint Compounds: Provide manufacturer's recommended types for indicated applications.
 - 1. For interior repair and patching work, provide chemical-hardening-type for bedding and filling, ready-mixed vinyl type or vinyl type powder type for topping.

2.7 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
- B. Gypsum Board Screws: ASTM C954 or ASTM C1002.
- C. Acoustical Sealant: Water base type, non-drying, non-bleeding, non-staining type; permanently elastic, as recommended by gypsum board manufacturer.
 - 1. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, [with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
 - 2. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.8 SOUND ATTENUATION BLANKETS

- A. Products shall be in accordance with ASTM C665-84, Type I semi-rigid unfaced mineral fiber blanket, Class 25 flame spread, thickness as indicated, and/or to achieve a minimum of STC 50 rating for indicated assemblies.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION OF METAL SUPPORT SYSTEMS

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.
 - 1. Furnish concrete inserts and other devices indicated, to other trades for installation well in advance of time needed for coordination with other construction.

3.3 INSTALLATION OF METAL SUPPORT SYSTEMS

- A. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.
- B. Provide furring and shims as required to install new work over existing substrates so that new work will be installed plumb, level and true.
- C. Ceiling Support Suspension Systems
 - 1. Secure hangers to structural support by anchorage devices or fasteners.
 - 2. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
 - 3. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
 - 4. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
 - 5. Direct-hung Metal Support System: Attach perimeter wall track or angle wherever support system meets vertical surfaces. Mechanically join support members to each other and butt-cut to fit into wall track.
 - 6. Space furring member 16" o.c. except as otherwise indicated.
 - 7. Install auxiliary framing at termination of drywall work, and at openings for light fixtures and similar work, as required for support of both the drywall construction and other work indicated for support thereon.
- D. Wall-Partition Support Systems:
 - 1. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, furnishings, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer or, if not available, of "Gypsum Construction Handbook" published by United States Gypsum Company.

2. Isolate non-load bearing steel stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
 - a. Install single deep-leg deflection tracks and anchor to building structure.
 - b. Connect drift clips to cold-formed metal framing and anchor to building structure.
3. Install runners tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated. Ramset to precast plank.
4. Extend partition stud system through acoustical ceilings and elsewhere as indicated to the structural support and substrate above the ceiling.
5. Frame door openings with vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on door frame; install runner track sections (for jack studs) at head and secure to jamb studs.
6. Space studs 16 inches o.c. except as otherwise indicated.
7. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
8. Frame openings other than door openings in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
9. Provide runner tracks of same gauge as jamb studs. Space jack studs same as partition studs.
10. Cut studs 1/2" short of full height to provide perimeter relief.
11. Do not fasten studs to top track to allow independent movement of studs and track.
12. Door jambs:
 - a. Install double 20 gauge studs at each jamb for all doors.
 - b. Space wall furring members 16 inches o.c. except as otherwise indicated.

3.4 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL

- A. Pre-Installation Conference: Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed.
- B. Install sound attenuation blankets at all partitions prior to gypsum board unless readily installed after board has been installed.

- C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- D. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.
- E. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.
- F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- G. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- H. Attach gypsum board to framing and blocking provided for additional support at openings and cutouts.
- I. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.)
- J. Form control joints and expansion joints at locations indicated (@ 30'-0" o.c. or 900 sf), with space between edges of boards, prepared to receive trim accessories.
- K. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
- L. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum board over wood framing, with "floating" internal corner construction.
- M. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.5 METHODS OF GYPSUM BOARD APPLICATION

- A. Single-Layer Application: Install gypsum wallboard as follows:
 1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
 2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

3.6 INSTALLATION OF DRYWALL TRIM ACCESSORIES

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound. Install "L" type trim where drywall construction is tightly abutted to other construction and install special kerfed type where other work is kerfed to receive long leg of "L" type trim. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
 - 1. Install J-type semi-finishing trim where indicated, and where exterior gypsum board edges are not covered by applied moldings.
- D. Install metal control joint (beaded type) where indicated or required.

3.7 FINISHING OF DRYWALL

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Apply joint compounds in 3 coats (not including prefill of openings in base), and sand between last 2 coats and after last coat.
- E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840 and GA-214-07:
 - 1. **Level 1** In plenum areas above the ceiling, attics, areas concealed in the building (does not typically meet fire-resistant assembly requirements).
 - 2. **Level 5** Finish where areas that are to receive gloss, semi-gloss, enamel or non-textured flat paints.

3.8 IMPACT RESISTANCE GYPSUM WALLBOARD INSTALLATION

- A. General: Install fiber reinforced gypsum wallboard according to manufacturer's instructions and GA-216 "Application and Finishing of Gypsum Board."
 - 1. Nails and Screws: Corrosion resistant; ASTM C 840.
 - 2. Adhesives: Manufacturer's approved adhesive types.

3. Accessories: Similar to indicated gypsum wallboard application.
4. Joint Tape, Taping Compound and Finishing Compound: Comply with ASTM C 475.

3.9 CLEANING AND PROTECTION

- A. Remove temporary coverings used to protect other work.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

END OF SECTION 09250

SECTION 09290 - ARCHITECTURAL COLUMN COVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Section(s):
 - 1. Division 5 - Structural and Miscellaneous Steel.
 - 2. Section 07900 - Joint Sealer Assemblies.
 - 3. Section 09900 - Painting.

1.2 SUMMARY

- A. Section Includes:
 - 1. Prefabricated structural column enclosures, and steel support subframing assemblies include the following:
 - a. Glass Fiber Reinforced Gypsum (GRG) - interior applications.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, installation instructions, and general recommendations. Include data substantiating that products to be furnished comply with requirements of the contract documents.
- B. Shop Drawings: Submit complete shop drawings for fabrication and erection, including plans, elevations, and large scale details of typical sections and connections.
 - 1. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures.
 - 2. Provide location and details of anchorage devices to be embedded in or fastened to other construction. Furnish templates if required for accurate placement.
 - 3. Include schedule and erection procedure for proper installation.
 - 4. Include Manufacturer's and Installer Warranty.
- C. Verification Samples: To verify compliance with requirements of contract documents, submit complete sets of samples, illustrating full range of color and texture to be expected in the completed work. Provide samples of minimum size as follows:
 - 1. 24 inches in length.
- D. Certificates: Submit manufacturer's certification that products comply with requirements of the contract documents.

- E. Maintenance Data: Submit manufacturer's instructions for proper maintenance materials and procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain required products from a single manufacturer.
- B. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for not less than the recommended 5 years.
 - 1. Accessories: Provide accessory items only as produced or recommended by manufacturer of primary products.
- C. Fabricator Qualifications: Provide products fabricated by a company which has successfully specialized in production of this type of work for not less than a recommended 10 years.
- D. Erector Qualifications: Install products of this section by a company with the following minimum requirements:
 - 1. Erector to be preauthorized by the manufacturer of the column enclosures.
- E. Mock-up: Prior to installation of work of this section, erect sample at location directed by or acceptable to the Architect, using specified materials and illustrating range of color, texture, and workmanship to be expected in the completed work. Once mock-up has been approved by the Architect, retain until the work has been completed and accepted.
 - 1. Configuration: Approximately 4 feet long.
 - 2. Mock-up may be incorporated into the final work; demolish and remove from site when directed by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Pack and otherwise protect each unit to avoid damage during shipping, handling and storage.
- B. Delivery and Storage: Store materials on project site to maintain proper separation and grading integrity. Protect and cover materials to prevent excessive accumulation of moisture and exposure to heavy impact.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Do not proceed with installation until existing and forecasted weather conditions are favorable and will allow work to proceed in accordance with manufacturer's recommendations.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate work of this section with installation of steel framing assemblies.

1.8 WARRANTY

- A. Special Project Warranty: Submit a written warranty signed by the manufacturer, the Contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
 - 1. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
 - a. Warranty period: **Two (2) years** after date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURES

- A. Basis of Design: Prefabricated Glass Reinforced Gypsum (GRG) units as manufactured by Custom Casting Northeast, Inc., Tel. # 610.358.2646, attn. Mr. Kevin Mckinney or #814.234.8612; or approved equal.
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 - 1. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other products by other manufacturer's or which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed in this specification and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect/Owner:
 - 1. Plastrglas Inc.; Tel.# (215) 968-5255.
 - 2. Formglas Inc.; Tel. # (1800) 777-0220.
 - 3. Or approved equal.

2.2 MIXES

- A. (GRG) Glass Fiber Reinforced Gypsum Mix: Manufacturer's standard.

2.3 FABRICATION

- A. (GRG): (Custom Mold Fabrication) Molds: Fabricate molds to achieve proper size, shape and texture for GRG members as shown on approved shop drawings and samples.

1. Material Characteristics:
 - a. Shell Thickness: 3/16 inch minimum for field area and 1/2" at attachment points.
 - b. Weight: 1.5 lb/sq.ft.; (based on 1/8" thickness).
 - c. Flexural strength: 3600 psi, plus or minus 10%. (Based on 1/8" thickness), in accordance with ASTM C947.
 - d. Tensile Strength: 1450 psi., plus or minus 10%. (Based on 1/8" thickness).
 - e. Compressive strength: 10,000 psi, plus or minus 10%. (Based on 1/8" thickness), in accordance with ASTM C109-87).
 - f. Impact : 13 lb/sq.in., with no penetration, in accordance with ASTM D 256-87.
 - g. Density: 103-110 lbs./ cu.ft, plus or minus 10%. (Based on 1/8" thickness).
 - h. Barcol Hardness: 84, (ASTM D2583-87).
 - i. Rockwell Hardness: 95, (ASTM D785)
 - j. Flammability: Flame spread: - 0. Smoke developed: - 0. Class I ASTM E84.
 - k. Humidified deflection: 1/16" (ASTM C-473)
 - l. Thermal expansion: 1.17x 10/F (ASTM D696)
2.11x 10/G (ASTM D696)
2. Tolerances: Fabricate to within the following tolerances:
 - a. Dimensional : All directions, Plus or minus 1/8 inch.
 - b. Thickness: Plus or minus 1/16 inch.
3. Warpage or bowing: plus or minus 1/16 inch per foot across the diagonal.

2.4 RELATED MATERIALS

- A. Steel Framing: Material and workmanship conform with the requirements of AISC, AISI, and Metal Lath Steel Framing Association for light gauge steel frame members.
 1. Steel frame members shall be as specified by the manufacturer.
- B. Joint Treatment materials:
 1. All hidden exterior joints to be reinforced with fiberglass perforated joint tape.
 2. Bedding material shall include bonding agent and grout mix as recommended by manufacturer. Grout materials shall be applied, as recommended by manufacturer and /or bonding agent manufacturer.
- C. Miscellaneous Materials:
 1. General: Provide auxiliary materials of types and grades recommended by manufacturer for work included in this section.
 2. Adhesive: Manufacturer's recommended adhesive; Dow Corning 795; Liquid Nails, by PPG Architectural Coatings Co.; Loctite - PL400 or PL Premium; or approved equal.
 - a. Class A, conforming to specifications #TT-S-00230C.

3. Fasteners: All fasteners will be galvanized or plated finish. Stainless steel fasteners will be used at any exposed face penetrations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect substrates and conditions under which the work of this section will be performed, and verify that installation properly may commence. Do not proceed with the work until unsatisfactory conditions have been resolved fully.

3.2 PREPARATION

- A. Clean substrate, removing projections and substances detrimental to the work; comply with recommendations of manufacturer of products to be installed for proper preparation procedures.

3.3 ERECTION

- A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
 1. Erection of supplementary framing and bracing: Install Supplementary Framing and Bracing members specified by manufacturer, follow manufacturer's standard printed instructions for this type of application.
 2. All members to be installed level, plumb, square and with all proper spacing and allowable tolerances.
 3. Tolerances: Install products of this section to within the following tolerances:
 - a. Face width of joint: plus or minus 1/4 inch.
 - b. Out of plane : (unit to unit) , plus or minus 3/16 inch.
 - c. Warpage or bowing: plus or minus 1/8 inch.
 - d. All joints will be properly aligned with uniform joint width, in accordance with provisions shown on shop drawings and with allowance made to prevent overall dimensional error.
 - e. Adjustment or changes effecting allowance for panel expansion and contraction shall not be permitted without approval by the manufacturer.
- B. Curing: GRG members and units will be stored under controlled conditions for sufficient period of time to insure product stability before shipment.

3.4 PROTECTION

- A. General: Institute protective procedures and install protective materials as required to ensure that work of this section will be without damage or deterioration at substantial completion.

3.5 ADJUSTMENT, CLEANING AND FINISHING

- A. Remove and replace any defective prefabricated units.
- B. Clean exposed unit surfaces and adjacent surfaces soiled or damaged during installation.
- C. Clean up all debris caused by the work of this section and keep the project site and buildings clean and neat at all times.
- D. Apply finish coating in accordance with requirements of section 09900. All finish coating shall be compatible with materials specified or furnished under the work of this section.

END OF SECTION 09290

SECTION 09300 - TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Definition: Tile includes ceramic surfacing units made from clay or other ceramic materials.
- B. Extent of tile work is indicated on the drawings and schedules.
- C. Type of tile work in this section includes the following:
 - 1. Porcelain Tile.
 - 2. Marble thresholds.
- D. Related Work:
 - 1. Section 01455 - Concrete In-Situ Relative Humidity and pH Testing
 - 2. Section 03300 - Concrete Work (preparation for concrete slabs and slab depressions)
 - 3. Section 04200 - Unit Masonry
 - 4. Section 07900 - Joint Sealer Assemblies

1.3 QUALITY ASSURANCE

- A. Tile manufacturing standard: ANSI 137.1. Furnish tile complying with Standard Grade requirements unless indicated otherwise.
- B. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.
- C. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.
- D. Flooring shall comply with ANSI A137.1 American National Standard Specifications for Ceramic Tile, current edition.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required, except bulk materials.
- B. Samples for Initial Selection Purposes: Submit manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.

- C. Samples for Verification Purposes: Submit the following:
 - 1. Samples for each type of tile and for each color and texture required, not less than 12" square, on plywood or hardboard backing and grouted.
 - 2. Full size samples for each type of trim, accessory and for each color.
 - 3. 6" long samples of stone thresholds.
 - 4. Samples of metal edge strip.
- D. Certification: Furnish Master Grade Certificates for each shipment and type of tile, signed by manufacturer.
- E. Slip-Resistant Tile:
 - 1. ASTM E303, Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester, and has been endorsed by the Ceramic Tile Institute of America (CTIOA) for all types of flooring since 2001.
 - 2. Submit manufacturer's test data for slip-resistant tile. Tests shall be in conformance with indicated applicable codes and regulations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Maintain temperatures at not less than 50°F (10°C) in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.7 MAINTENANCE MATERIALS

- A. Furnish extra materials that match and are from the same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3% of amount installed for each type, composition, color, pattern and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3% of amount installed for each type, composition, color indicated.

1.8 WARRANTY

A. Limited Warranty:

1. Manufacturer warrants that manufactured products will be free from defect for a period of **one (1) year** from date of purchase.
 - a. Defect is defined as a shortfall in the product to perform to manufacturer's specifications as disclosed in product literature, within industry allowable tolerances as set forth in standard, national industry protocols.
 - b. Manufacturer provides detailed information in its product literature regarding appropriate tile and stone applications. Failure to comply with recommended applications voids this warranty.
 - c. This one-year express warranty is the sole warranty extended and replaces any statutory warranties to the maximum extent allowable by law.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 1. Manufacturers of Porcelain Tile:
 - a. Crossville, Inc.
 - b. Revigres.
 - c. Or approved equal.

2.2 TILE PRODUCTS

A. Porcelain Tile:

1. Basis of Design: Provide "Color Blox and Argent" from the entire line, including 20% Accent Colors as manufactured by Crossville Inc.; or approved equal, comply with following:
 - a. Provide nominal facial dimensions: **Wall and Floor: 6" x 6", 6" x 24" and 12" x 24"** or a combination thereof, or patterns as indicated or selected from manufacturers current publications. Allow for any pattern as selected by the Architect, unless pattern is indicated on the drawings.
 - b. Nominal Thickness: 3/8" inch.
 - c. Provide 6" high x 12" base, unless otherwise indicated.
 - d. Finish/Color: To be selected from all available colors and UPS finish. Allow for three colors to be used from the manufacturer's lines.

- B. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile.
 2. Provide trim shapes at head, jamb and sills of openings of same material and finish as field tile, and as follows:
 - a. Base: Sanitary cove units.

2.3 THRESHOLDS

- A. Stone Thresholds: Provide sound Group "A" marble threshold of profile indicated with an abrasive hardness of not less than 10.0 when tested in accordance with ASTM C 241. Maximum height ½" above finished floor. Furnish white marble for thresholds, unless otherwise indicated.

2.4 COLOR AND PATTERN

- A. As selected by Architect from manufacturer's full color line (including premium colors - Groups 2 through 5) and patterns of each type tile specified. Patterns shall be defined as using not more than 3 different colors of tile in any given area, applied in stripes, diagonals, checkerboard pattern or 45 degree layouts and other designs as determined by the Architect. All selections shall be made from manufacturer's full product lines (including premium colors).

2.5 SETTING AND GROUTING MATERIALS

- A. Portland Cement Mortar Installation Materials: Provide materials to comply with ANSI Standards as required for installation method designated, unless otherwise indicated.
- B. Latex-Portland Cement Grout: Proprietary compound composed of portland cement with latex additive for a more flexible and less permeable grout. Color as selected by Architect from manufacturer's standard.
1. Provide product with latex additive which is compatible with latex additive in latex Portland cement mortar.
 2. Products offered by manufacturers to comply with requirements include the following:
 - a. Latex Modified Floor Grout: Mapei Corporation.
 - b. Laticrete Dry Bond: Laticrete International, Inc.
 - c. Or approved equal.
 3. Basis of Design: "255 Multimax™" thinset for porcelain tile as manufactured by Laticrete International, Inc.; or approved equal.
- C. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212°F (60 and 100°C), respectively, and certified by manufacturer for intended use.

- a. Ardex Americas.
- b. Mapei Corporation.
- c. Laticrete International, Inc.
- d. Or approved equal.

2.6 MISCELLANEOUS MATERIALS

- A. Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation, 112 North Alfred St., Alexandria, VA 22134 or Ceramic Tile Institute, 700 N. Virgil Ave., Los Angeles, CA 90029. Provide a neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- B. Grout and Tile Sealer: Manufacturer's standard product for sealing tile and grout joints that does not change color or appearance of grout.
 1. Provide colorless and stain resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of tile surfaces.
 2. Products:
 - a. Custom Building Products; Surfaceguard Tile and Grout Sealer.
 - b. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - c. Or approved equal.
 3. Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- C. WATERPROOFING MATERIALS:
 1. Sheet Membrane: 0.030 inch thick chlorinated polyethylene (CPE) sheet with nonwoven polyester laminated to both sides, 60 inches wide.
 2. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. "Dal-Seal TS"; by Dal-Tile Corporation; or approved equal.
- D. Waterproofing / Crack Isolation Membrane at Porcelain Tile installation:
 1. Basis of Design: "Hydroban®" as manufactured Laticrete International, Inc.; or approved equal.
 2. Single component self-curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane.
 - a. Exceeds ANSI A118.10 and A118.12.
 - b. Contains antimicrobial product protection.

- E. Leveling and Patching Compounds: Latex types as recommended by flooring manufacturer.
- F. Finishing & Edge Protection Profiles:
 - 1. Basis of Design: "Quadec, Q 60 AE" as manufactured by Schluter Systems; or approved equal.
 - a. Satin anodized aluminum finishing and edge-protection profile for tiled edges.

PART 3 - EXECUTION

3.1 TILE INSTALLATION STANDARDS

- A. ANSI Tile Installation Standard: Comply with applicable parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for installation of ceramic tile.
- B. TCNA Installation Guidelines: TCNA "Handbook for Ceramic Tile Installation (latest edition)"; comply with TCNA installation methods indicated or, if not otherwise indicated, as applicable to installation conditions shown.
- C. Comply with manufacturer's instructions for mixing and installation of proprietary materials.

3.2 INSTALLATION

- A. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.
- C. Set marble thresholds in same type of setting bed as field tile, unless otherwise indicated.
- D. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.
- E. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated or where joints occur in substrate. Do not saw cut joints.
- F. Grout tile to comply with the referenced standards, using grout material as indicated.
 - 1. Where pregrouted sheets are used, field-grout perimeter of individual sheets with same elastomeric material as used in factory pregrouted sheets.

3.3 FLOOR INSTALLATION METHODS

- A. Porcelain Tile: Install tile to comply with requirements indicated below for setting bed method, TCNA installation method related to type of subfloor construction, and grout type and in accordance with applicable ANSI installation specifications:
1. Concrete Subfloor, Interior, slab on grade or above-ground: TCNA F112 (bonded).
 - a. Mortar: Latex portland cement; ANSI A118.4 or better or ISO C2 or better.
 - b. Grout: Epoxy; ANSI A118.3 or ISO RG.
 2. Elevated concrete slabs or where indicated: TCNA F122A, thin set, with membrane.
 - a. Mortar: Latex portland cement; ANSI A118.4 or better or ISO C2S1 or better unless ANSI A118.1 or ISO C1 is recommended by membrane manufacturer. Must also be recommended by manufacturer for above-ground use.
 - b. Grout: Epoxy; ANSI A118.3 or ISO RG.
 - c. Waterproof Membrane: ANSI A108.13 or manufacturer's directions. Comply with plumbing and building codes.

3.4 WALL TILE INSTALLATION METHODS

- A. Install types of tile designated for wall application to comply with requirements indicated below for setting bed methods, TCNA installation methods related to subsurface wall conditions, and grout types and in accordance with applicable ANSI installation specifications:
1. Masonry, Interior: TCNA W202I.
 - a. Mortar: Latex portland cement; ANSI 118.4 or better or ISO C2 or better.
 - b. Grout: Latex portland cement; ANSI 118.6 or better or ISO CG1 or better.

3.5 CLEANING AND PROTECTION

- A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

- C. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.
1. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.
 2. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09300

SECTION 09510 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of each type of acoustical ceiling is shown and scheduled on the drawings.
- B. Type of acoustical ceilings specified in this section include lay in acoustical ceiling board, exposed suspension system.

1.3 QUALITY ASSURANCE

- A. Installer: Firm with a recommended three years of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.
- B. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.
- C. Surface Burning Characteristics: As follows, tested per ASTM E 84.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 50 or less.
- D. All acoustical ceilings shall be installed to conform to the requirements of International Building Code for Category C and the recommendation of the Ceiling and Interior Systems Construction Association (CISCA) for Zone 2 seismic design and comply with installation requirements for areas subject to light to moderate seismic activity.
- E. General Contractor shall provide adequate ventilation and humidity control before, during and after ceiling installation to prevent damage (sagging, etc.) to ceilings prior to Owner's acceptance of building.
- F. Warranty:
 - 1. Provide manufacturer's special project warranty against sagging or warping of acoustic ceiling boards for a minimum period of **thirty (30) years** which starts on approved date of substantial completion.
- G. Unless otherwise approved by the Architect, all Acoustical Ceiling Board types and Suspended Grid System types shall be by a single manufacturer.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required including certified test reports to show compliance with requirements of these specifications.
 - 1. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.
- B. Samples: Submit manufacturer's standard size samples of acoustical units, but not less than 6" square, and of exposed ceiling suspension members including wall and special moldings. Provide samples showing full range of colors, textures and patterns available for each type of component required.
- C. Shop Drawings: Submit shop drawings for acoustical ceilings, including layout of system components and details of connections between elements of system and between system and other building components.
 - 1. **Contractor must provide shop drawings certifying that attachment devices meet specified loads. Contractor must coordinate with all other Prime Contractors / Subcontractors for fixture loads, etc.**
- D. Certificates: Submit certificates from manufacturers of acoustical ceiling units and suspension systems attesting that their products comply with specification requirements.
- E. Testing Reports: Submit testing reports which indicate compliance with indicated requirements.
- F. Deliver extra materials to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% (rounded up to the nearest full carton) of each type of acoustic unit installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0% (rounded up to the nearest full carton) of each type suspension component installed.

1.5 PROJECT CONDITIONS

- A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Provide Acoustical Ceiling Board (ACB and AACB) and Metal Suspension System as manufactured by Armstrong World Industries; United States Gypsum Co.; CertainTeed Ceilings; or approved equal.
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 - 1. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed as performance of the "Basis of Design" Systems.
 - a. Armstrong World Industries,
 - b. USG Corporation,
 - c. CertainTeed Ceilings.
 - d. Rockfon, LLC,
 - e. Or approved equal.
 - 2. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A201 and Section 00800.

2.2 ACOUSTICAL CEILING BOARDS

- A. Refer to reflected ceiling plans for sizes and locations.
- B. Where ACB-1 is indicated: 24" x 48" x 3/4" thick, reveal edge, NRC .70; CAC 35, light reflectance 90%, sag resistance; Humiguard Plus Performance. Armstrong Ultima (Item# 1914); USG Mars ClimaPlus (Item #88185); CertainTeed Symphony m 75 (Item # 1220BB-75-1); or approved equal.
- C. Where AACB is indicated: 24" x 48" x 5/8" thick, square edge, NRC.55; CAC 40; Class 25; Sag Resistance; Humiguard Max Performance, mineral fiber composition with ceramic binders. Armstrong Fine Fissured Ceramaguard (Item# 608) white finish; USG Mars Healthcare Acoustical Panels (Item# 88271), or approved equal.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.

- B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors.
- C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.
- D. Concrete Inserts: Inserts formed from hot-dipped galvanized sheet steel and designed for attachment to concrete forms and for embedment in concrete, with holes or loops for attachment at hanger wires.
- E. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating, sized so that stress at 3-times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12gage (0.106").
- F. Type of System: Either direct-hung or indirect-hung suspension system, at Contractor's option.
 - 1. Carrying Channels: 1-1/2 inch steel channels, hot-rolled or cold-rolled, not less than 0.475 lbs. per lineal foot.
- G. Edge Moldings and Trim: Metal types and profiles indicated or, if not indicated, provide manufacturer's standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated. Provide 7/8" edge at wall angle and reveal edges.
- H. Hold-Down Clips: For interior ceilings composed of lay-in panels weighing less than 1 lb. per sq. ft., or where indicated, provide hold-down clips spaced 2'-0" o.c. on all cross tees.

2.5 EXPOSED METAL SUSPENSION SYSTEMS

- A. Double Web Steel Suspension System: For use where ACB ceilings are indicated. Manufacturer's standard system roll-formed from prefinished hot dipped galvanized steel with 15/16" wide exposed faces on flanges of structural members; other characteristics as follows:
 - 1. Structural Classification: Intermediate-Duty System.
 - 2. Finish: Painted in color as selected by Architect.
 - 3. Basis of Design: Armstrong World Industries "Prelude XL Exposed Tee System"; USG "Donn Brand DX", CertainTeed 15/16" Classic Stab; or approved equal.
- B. Double Web Suspension System: For use where AACB ceilings are indicated. Manufacturer's standard system fabricated from roll-formed prefinished hot dipped galvanized steel with 15/16" wide exposed faces of aluminum cap on flanges of structural members cap and other characteristics as follows:
 - 1. Structural Classification: Intermediate-Duty System.

2. Finish: Painted, in colors as selected from manufacturer's full line of colors. Provide white color unless indicated otherwise.
3. Basis of Design: Armstrong World Industries "Prelude Plus XL Fire Guard"; USG "Donn Brand DXA/DXLA", CertainTeed 15/16" FireSecure; or approved equal.

2.6 MISCELLANEOUS MATERIALS

- A Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine conditions under which acoustical ceiling work is to be performed and notify Architect in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

3.3 INSTALLATION

- A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and CISCA standards applicable to work.
- B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.
 1. Install tile with pattern running in one direction, unless otherwise indicated.
- C. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0".
 1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.

1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
 2. Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.
 3. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
 4. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.
- E. Cooperate with other trades and Contractors for installation of their materials and equipment, particularly with those installing the ductwork, ceiling diffusers and lighting fixtures so that diffusers, lighting fixtures and other items are located on center lines of tile or on centers of joints as shown on approved shop drawings.
1. Provide additional hanger wires to support cubicle curtain tracks, and other superimposed loads. Locate the supplemental hangers within 6 inches of each corner of the item being supported.
 2. Where light fixtures, or other recessed items occur in ceilings, frame acoustical material properly to permit installation of such recessed items and do all necessary cutting and fitting of acoustical materials and suspension systems to accommodate same. Cut neatly around all pipes passing through ceilings. Build in fixture frames and yokes in cooperation with Electrical Contractor.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage. General Contractor is responsible for cleaning or replacement of all damaged tile, regardless of how the damage was caused and regardless of by which Contractor.

END OF SECTION 09510

SECTION 09650 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of resilient flooring and accessories is shown on drawings and in schedules.
 - 1. Vinyl enhanced tile (VET).
 - 2. Luxury vinyl tile - (LVT), Alternate Bid.
 - 3. Rubber resilient wall base.
 - 4. Rubber tile floor and stair treads.
 - 5. Resilient edge strips.

1.3 RELATED SECTIONS

- A. Section 01030 - Alternate Bids.
- B. Section 01455 - Concrete In-situ Relative Humidity and pH Testing.
- C. Section 03300 - Cast in Place Concrete Slabs on Grade.
- D. Section 03450 - Self-Drying Finishing Underlayment.
- E. Section 07900 - Joint Sealer Assemblies.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ASTM F 2170-11 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - 2. ASTM F 1869-11 Standard Test Method Using Anhydrous Calcium Chloride.
 - 3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 4. ASTM F 1861 Type TS, Group 1 Performance Requirements for Resilient Rubber Wall Base.
 - 5. ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocol for Resilient Rubber Wall Base.
 - 6. ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols for Resilient Rubber Wall Base.

7. ASTM F 2169 Standard Specification for Resilient Stair Treads, Type TS, Class 1 and 2, Group 1 and 2.
 8. ASTM D 2240 Not less than 85 Shore A.
 9. ASTM D 3389 Abrasion Resistance: less than 1 gram weight loss.
 10. ASTM D 2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring of 0.6 or greater.
 11. ASTM E 648 Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I.
- B. Moisture vapor emission testing in accordance with ASTM F 1869-11. Test results should not exceed 3 pounds per 1,000 square feet per 24 hours, unless otherwise specified by the flooring or adhesive manufacturer.
1. ASTM Standard also states that relative humidity inside of the concrete slab should not exceed 75%, per ASTM F2170-11, unless otherwise specified by the flooring or adhesive manufacturer.
- C. Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
1. Wherever possible, provide each type of required resilient flooring and accessories produced by a single manufacturer.
- D. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
1. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A, Smoke <450.
 2. ASTM E648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class 1.
- E. Coefficient of Friction: The Federal and industry standard for testing coefficient of friction or the slip resistance of a surface is tested to the requirements, as outlined, in ASTM D-2047, which utilizes a friction measurement machine, commonly referred to as the James Machine.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.
- B. Samples for Verification Purposes: Submit the following samples in triplicate of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.

1. Full size tile samples.
 2. For initial selection of colors and patterns submit, prior to above, samples in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.
- C. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.
- D. Testing of Substrate:
1. Submit test reports of testing the concrete or other floor substrate, indicating compliance with manufacturer's requirements for moisture and alkalinity percentage of contents. Tests shall be performed in accordance with requirements of Section 01455.
- E. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.
- F. Replacement Material: After completion of work, deliver to project site replacement materials from same manufactured lot as materials installed, and as follows:
1. Tile flooring, not less than one box for each 50 boxes or fraction thereof, for each type, size and color installed.

1.6 PROJECT CONDITIONS

- A. Maintain minimum temperature of 65°F (18°C) or more than 85°F (29°C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation.
1. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation.
- B. Maintain the ambient relative humidity between 40% and 60% during installation.
- C. Install resilient flooring and accessories after other finishing operations, including painting, have been completed.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55°F (13°C) or more than 85°F (29°C).
- E. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturers and their recommendation for bond and maximum levels of moisture and pH per testing as performed under requirements of Section 01455.

1.7 WARRANTY

- A. Vinyl Enhanced Tile Flooring (VET)

1. Warranty: Manufacturer's standard for material and labor:
 - a. **Limited ten (10) Year Commercial Warranty for Manufacturing Defects**: Manufacturer warrants from the date of purchase for a period of ten (10) years of Commercial use that vinyl tile flooring products conform to written specifications and are free of manufacturing defects, subject to the terms and conditions specified herein.
 - 1) The customer must notify Manufacturer of any obvious visual defects prior to installation; otherwise this warranty will not apply. If the defect is found and Manufacturer is notified in writing prior to installation, Manufacturer will replace any defective product, at no charge. If the customer believes the product to be defective after installation, the customer must promptly notify Manufacturer and permit an inspection of the product. If, upon inspection, Manufacturer determines that the product is defective, Manufacturer will replace or repair the defective product at its own cost, subject to the limitations in this warranty, and prorated as follows: Material and 100% Reasonable Labor Costs (Year 1); Material and 50% Reasonable Labor Costs (Year 2); and Material Only (Years 3-10).
 - 2) Manufacturer warrants that the products will not wear through for the warranty period of ten (10) years of Commercial use. For claims based on wear-through, the customer must notify Manufacturer and permit an inspection of the flooring. If Manufacturer determines that the original flooring is worn through, Manufacturer will replace or repair the worn flooring at its own cost; however, labor costs will be the customer's responsibility except as provided on the prorated basis described in the prior paragraph.
- B. Luxury Vinyl Tile Flooring (LVT)
 1. Warranty: Manufacturer's standard for material and labor:
 - a. A **fifteen (15) year Limited Commercial Warranty** for labor and material. Warranty period shall start from approved date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but not limited to the following:
 1. Vinyl Enhanced Tile (VET); provide one of the following:
 - a. "Color Essence and Azterra", as manufactured by Johnsonite (a Tarkett Co., Azrock Collection);
 - b. Or approved equal.
 2. Manufacturers of Luxury Vinyl Tile (LVT):

- a. Basis of Design: "CMYK" as manufactured by Patcraft; or approved equal.
 - 1) Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - a) Armstrong Commercial Flooring;
 - b) Interface;
 - c) Mannington;
 - d) Milliken;
 - e) Shaw;
 - f) Tarkett;
 - g) Or approved equal.
3. Rubber Tile:
 - a. "#992 Low Profile" as manufactured by Roppe Corporation.
 - b. "Flecksibles ", as manufactured by Endura Rubber Flooring,.
 - c. Or approved equal.
4. Rubber Stair Treads with Risers:
 - a. #96 vantage tread with riser, as manufactured by Roppe Corporation.
 - b. "Flecksibles ", as manufactured by Endura Rubber Flooring,.
 - c. "Rubber Integrated Stair Tread with Riser" as manufactured by Johnsonite.
 - d. Or approved equal.
5. Rubber Resilient Wall Base and Accessories:
 - a. "Pinnacle", as manufactured by Roppe Corporation;
 - b. "BaseWorks Thermoset Rubber Wall Base", as manufactured by Johnsonite,
 - c. "RubberMyte" as manufactured by Burke Mercer Flooring Product,
 - d. Or approved equal.
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 1. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other products by other manufacturer's or which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Comparable products of other manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect/Owner.

2.2 VINYL ENHANCED TILE FLOORING (VET)

- A. Provide products in compliance with ASTM F 1066, Class 1 as per ASTM E648, through pattern, 16" x 16", with, tested for minimum slip resistance as per ASTM D 2047, and in accordance with the following:
1. Asbestos-free.
 2. Gauge: 1/8 inch.
 3. Colors: As selected by the Architect from manufacturer's available full range of colors.
 4. Provide manufacturer's polyurethane reinforced surface treatment application for ease of maintenance and as per manufacturer's recommendation.
 5. Provide manufacturer's approved adhesive.

2.3 LUXURY VINYL TILE FLOORING (LVT) - ALTERNATE BID

- A. Provide products in compliance with ASTM F 1066, Class 1 as per ASTM E648, through pattern, 12" x 24" plank, with minimum slip resistance as per ASTM D 2047 / UL 410, and as follows:
1. Asbestos-free.
 2. Wear Layer: 20 mil (.020 inches / .5 mm).
 3. Overall Thickness: 0.098 inches (2.5 mm).
 4. Finish: Exoguard+™
 5. Color(s) / Pattern(s): As selected by the Architect from manufacturer's available full range of colors and patterns.
 6. Provide manufacturer's approved adhesive.

2.4 RUBBER TILE FLOORING

- A. Raised Profile Rubber Tile: Provide rubber tile units for high traffic areas, conforms to ASTM F 1344, with raised profile surface pattern and sanded backs complying with the following requirements:
1. Raised Profile Surface Pattern: Manufacturer's chamfered edge raised profile of geometric form, height of raised profile above depressed surface and total tile thickness including profile height as indicated below:
 - a. Low Profile Raised Discs: Not more than 1.18" nor less than 1" in diameter, not less than 0.020" nor more than 0.027" in height, and between 0.150" and 0.160" in thickness.
 - b. Material Composition: Manufacture units from homogeneous rubber compound, pigments, stabilizing fillers, integral waxes and soil-releasing agents.
 - c. Tile Size: Manufacturer's standard, unless otherwise indicated.
 - d. Abrasion Resistance: ASTM D 3389, wear loss g/1000 cycles; less than .06g.
 - e. Slip Resistance: ASTM D 2047.
 - f. Flame Spread: ASTM E 162; index of 45.

2.5 ACCESSORIES

- A. Wall Base: Provide rubber base complying with ASTM F-1861, Type TS, Group 1. Vulcanized SBR rubber with matching preformed corner units, and as follows:
1. Height: 4-inches, unless otherwise indicated on the drawings.
 2. Thickness: 1/8 inch gauge.
 3. Style: Standard top-set cove.
 4. Finish / Colors: Matte finishes in colors as selected by Architect from manufacturer's available full range of colors. Allow for more than one color in any given area.
 5. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.
 6. Phthalate, chlorine and halogen free.
- B. Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from manufacturer's available full range of colors; not less than 1" wide.
- C. Resilient Stair Treads: Provide treads where shown, consisting of single-piece units for width of stair treads.
1. Units shall comply with Americans with Disabilities Act regulations,
 2. Meet building code standards from American National Standards Institute.
 3. Meet standards of American Society for Testing and Materials.
 4. Meet flammability requirements of the National Fire Protection Association Life-Safety Code 101.
 5. Product is PVC free and recyclable.
 6. Provide rubber stair tread units shall comply with FS RR-T-650, Type A, sanded backs, chamfered edge raised profile of geometric form, with raised profile surface pattern.
 - a. Thickness: Not less than 3/16" nominal and 1/4" at nosing.
 - b. Nose Design: Class 1 - square
- D. Adhesives (Cements): Water resistant, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.
1. Adhesives to be used for resilient floor applications shall not generate any odor or unpleasant smell.
- E. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

- F. Leveling and Patching Compounds: Latex types as recommended by flooring manufacturer.
- G. Slip Retardant Polish: Provide slip-retardant polish as recommended by resilient tile manufacturer.

1. POLISH FOR RESILIENT FLOORING

- a. Floor Polish: Contractor shall provide floor polish to achieve the Static Coefficient of Friction; per ASTM D 2047, of 0.5 or better for level surfaces and as per requirements of state and local codes having jurisdictions.

2.6 COLORS, TEXTURES AND PATTERNS

- A. Colors, textures and patterns shall be as selected and directed by the Architect. Patterns shall be defined as using not more than five (5) different colors of tile in any given area, applied in borders, stripes, diagonals, checkerboard patterns and other designs as indicated, or if not indicated, shall be as directed by the Architect.
 - 1. All selections shall be made from manufacturer's full product lines, for all products and accessories, (including premium textures and colors).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Inspect substrates and conditions of installation to verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Concrete Substrates: Perform concrete relative humidity and pH testing and to comply with manufacturer's recommended moisture tests before beginning installation, to verify that concrete surfaces have cured sufficiently to allow adhesive bond to resilient flooring.
 - 1. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the Owner.

3.2 PREPARATION

- A. Perform moisture content testing as required by manufacturer's instructions to ensure pH readings and moisture transmission are acceptable. Perform testing in accordance with requirements of Section 01455.
 - 1. If values exceed this level, follow manufacturer's recommendations for moisture transmission mitigation. Do not proceed until unsatisfactory conditions have been corrected.
- B. Broom clean or vacuum surfaces to be covered, and inspect subfloor.
 - 1. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.

2. Apply concrete slab primer and/or sealer, as recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.
 3. Remove paint, curing compounds, and other materials that could interfere with adhesion of resilient products.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.
- B. Access Covers: Install resilient flooring tightly to removable access covers in field of flooring, taking care that pattern will match when covers are in closed position.
- C. Tightly adhere resilient flooring to substrate with no open joints or cracks, and without raised or blistered areas. Spread adhesive evenly, so that final installation will be without telegraphed markings from adhesive or substrate.
- D. Extend resilient flooring into toe spaces, door reveals, and into closets and similar openings.
- E. Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.
- F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.
- G. Install resilient flooring on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly cement edges to perimeter of floor around covers and to covers.
- H. Tightly cement resilient flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

3.4 INSTALLATION OF TILE FLOORS

- A. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
- B. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.

1. Lay tile in pattern shown or as directed by the Architect.
- C. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.
- D. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated or where joints occur in substrate. Do not saw cut joints.

3.5 INSTALLATION OF ACCESSORIES

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
 1. Job-formed Corners:
 - a. Outside Corners: Form by bending without producing discoloration (whitening) at bends.
 - b. Inside Corners: Butt one piece to corner, then scribe next piece to fit.
 - B. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - C. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.
 - D. Apply resilient accessories to stairs as indicated and in strict accordance with manufacturer's installation instructions.

3.6 CLEANING AND PROTECTION

- A. Perform following operations immediately upon completion of resilient flooring:
 1. Sweep or vacuum floor thoroughly.
 2. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.
 3. Damp-mop floor being careful to remove black marks and excessive soil.
 4. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.
- B. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.

1. Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available metal cross-linked acrylic product acceptable to resilient flooring manufacturer.
 2. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
 3. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.
- C. Clean resilient flooring not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Clean resilient flooring by method recommended by resilient flooring manufacturer.
- D. Strip protective floor polish, which was applied after completion of installation, prior to cleaning.
1. Reapply floor polish after cleaning.

3.7 EXTRA STOCK

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
1. Tile Flooring: Furnish not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size selected and installed.
 2. Accessories: Furnish not less than 2% of each type, size and color selected and installed.

END OF SECTION 09650

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Section(s):
 - 1. Section 04200 - Unit Masonry.
 - 2. Section 05120 - Structural Steel.
 - 3. Section 05300 - Metal Decking.
 - 4. Section 05400 - Miscellaneous Structural Steel.
 - 5. Section 05500 - Metal Fabrications.
 - 6. Section 08110 - Hollow Metalwork.
 - 7. Section 08211 - Wood Doors for light frames.
 - 8. Section 08305 - Access Doors.
 - 9. Section 09250 - Gypsum Drywall.
 - 10. Division 15 - Mechanical Work.
 - 11. Division 16 - Electrical Work.

1.2 DESCRIPTION OF WORK

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified.
- B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
 - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
- C. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- D. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.
- E. Following categories of work are not included as part of field-applied finish work.
 - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, steel windows, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated components such as architectural woodwork, wood casework, and shop fabricated or factory built mechanical and electrical equipment or accessories. This is in addition to the prime coat specified herein.

2. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, and shop fabricated or factory built mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
 3. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
 4. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
 5. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.
 6. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment, identification, performance rating, name, or nomenclature plates.
- F. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified herein.
1. Painting of mechanical and electrical work is limited to those items exposed to view.
 2. Mechanical items to be painted include, but are not limited to, the following:
 - a. Piping, pipe hangers and supports.
 - b. Ductwork, insulation.
 - c. Access doors and service panels.
 3. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduit and fittings.
 - b. Backboxes.
 - c. Junction boxes.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

- C. Coefficient of Friction: The Federal and industry standard for testing coefficient of friction or the slip resistance of a surface is tested to the requirements, as outlined, in ASTM D-2047, which utilizes a friction measurement machine, commonly referred to as the James Machine.
- D. Industry Standards: Comply with industry standard established by the Painting and Decorating Contractors of America PDCA for applications, methods and recommendations and use of tools and equipment for paint and stain coatings, primers and block fillers.
- E. Lead and Chromate Contents:
 - 1. All paint products must be free of any lead or chromate contents.
- F. Volatile Organic Compound Compliant (VOC.):
 - 1. All paint products must meet the State VOC environmental regulations (OTC Regulation compliant) and the following:
 - a. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
 - (1) Primer, Sealer and Undercoater: VOC content of not more than 200 g/L.
 - (2) Specialty Primer, Sealer and Undercoater: VOC content of not more than 350 g/L.
 - (3) Rust Preventative Coating: VOC content of not more than 400 g/L.
 - (4) Flat Paints and Coatings: VOC content of not more than 100 g/L.
 - (5) Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
 - (6) Nonflat High Gloss Coatings: VOC content of not more than 250 g/L.
 - (7) Varnishes and Sanding Sealers: VOC content of not more than 350 g/L.
 - (8) Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- G. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.
 - 1. At galvanized surfaces, primer shall be a zinc dust-zinc oxide coating.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

- B. Samples: Prior to beginning work, Contractor shall furnish color chips (2 fan decks) for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
1. On 12" x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.
 2. On actual wood surfaces, provide two 4" x 8" samples of natural and stained wood finish. Label and identify each as to location and application.
 3. On concrete masonry, provide complete walls or portions of walls as sample mock-ups and in sizes and locations as directed by the Architect;
 - a. Mock-up wall samples shall be for painting on masonry for each type of finish and color, defining filler, prime and finish coat.
 - b. Mock-up wall samples shall remain until authorized by the Architect for use as part of the work.
- C. Acknowledgment of Contract Documents: Contractor / Installer shall submit to the Architect certifications signed by each of the Contractor and Installer attesting acknowledgment of requirements of the Contract Documents for specific project requirements indicated in this specifications.
1. Installer shall submit proof of evidence, (this project specification section) with his letter of certificate.
 2. Contractor / Installer shall not proceed with painting work of this section until submittal of required certifications are completed.
 3. Any work performed prior to completion of this submittal shall be subject to total rejection by the Architect. All rejected work shall be rectified without any additional cost to the Owner.
- D. Coating Maintenance Manual: Upon conclusion of the project, the contractor in conjunction with the coating manufacturer shall furnish a coating maintenance manual such as the Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an area summary with finish schedule, area detail designating where each product/color/finish was used, product data pages, SDS pages, care and cleaning instructions, touch up procedures and color samples of each color and finish used.

1.5 DELIVERY AND STORAGE

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

Name or title of material.

Fed. Spec. number, if applicable.

Manufacturer's stock number and date of manufacturer.
Manufacturer's name.
Contents by volume, for major pigment and vehicle constituents.
Thinning instructions.
Application instructions.
Color name and number.

1.6 JOB CONDITIONS

- A. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.
- B. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- D. Provide sufficient temporary illumination producing overall space/room minimum illumination level of 50 ft. candles while preparing or painting of surfaces and to assure the production of quality finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - 1. M A B
 - 2. Benjamin Moore
 - 3. PPG Architectural Coatings
 - 4. The Sherwin-Williams Company

2.2 COLORS AND FINISHES

- A. Prior to beginning work, Contractor shall furnish color chips for surfaces to be painted from manufacturers full line of products. This shall include custom colors.
 - 1. Contractor shall allow for a total of 20 different colors of each type of paint, (excluding graphics and /or art work as indicated) with change of color within a room or space occurring either on a horizontal or vertical line, [allow for multiple (6) colors at each room unless otherwise shown]. Where roof structure is exposed, steel beams, steel joists and metal decking will be painted with different colors, as selected by the Architect.
 - 2. Contractor shall allow for split frames at all new and existing hollow metal door frames to be painted.

3. Final acceptance of colors will be from samples supplied on the job.
- B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

2.3 MATERIALS

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Provide undercoat paint recommended and produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

2.4 EXTERIOR PAINT SCHEDULE

- A. Basis of Design: Provide the following paint systems for the various substrates. Other equal paint products by indicated manufacturers will be acceptable:
- B. High-Gloss Enamel (Water-base Polyester Urethane Finish)
1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer, B66W310.
 2. 2nd Coat: Sherwin-Williams, Hydrogloss 1K Water-based Urethane, B65-180.
 3. 3rd Coat: Sherwin-Williams, Hydrogloss 1K Water-based Urethane, B65-180.
 4. Apply to the following exterior surfaces: Lintels, ferrous metal and other exterior assemblies to receive paint.
 5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

2.5 INTERIOR PAINT SCHEDULE

- A. Semi-Gloss (Satin) Enamel:
1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer, B66W310.
 2. 2nd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic, B66-650.
 3. 3rd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic, B66-650.
 4. Apply to following interior surfaces: Hollow metal work, metal lites for wood doors, miscellaneous steel and ferrous metal fabrications.
 5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

B. Egg-Shell / Satin Enamel - Acrylic Latex:

1. Base Coats: Enamel Undercoat; Primer-Sealer to suit substrate or Loxon Block Surfacer, A24 for Concrete Masonry/CMU Block.
 - * Block Filler shall be Level 3 - Premium Fill; one or multiple coats for high performance block filler in accordance with PDCA industry standards. Apply mock-up to confirm appearance before application of finish coats.
2. 2nd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel, B20-2600 Series.
3. 3rd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel, B20-2600 Series.
4. Apply to the following interior surfaces: Concrete masonry units, gypsum drywall and other interior assemblies to receive paint.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

C. Flat - Acrylic Latex:

1. 1st Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Primer, B28W02600.
2. 2nd Coat: Sherwin Williams, ProMar 200 Zero VOC Flat Interior Latex Flat, B30-2600.
3. 3rd Coat: Sherwin Williams, ProMar 200 Zero VOC Flat Interior Latex Flat, B30-2600.
4. Apply to following interior surfaces: Interior surfaces of ducts, where visible through registers or grilles, etc.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

D. Egg-Shell - Dryfall Acrylic Latex:

1. 1st Coat: Galvanized steel or ferrous metal primer to suit substrate.
2. 2nd Coat: Sherwin Williams, Low VOC Waterborne Acrylic Eg-Shel Dryfall Flat, B42-80 Series.
3. 3rd Coat: Sherwin Williams, Low VOC Waterborne Acrylic Eg-Shel Dryfall Flat, B42-80 Series.
4. Apply to following interior surfaces: Overhead exposed structural steel, steel joists, underside of steel deck, etc.

5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

E. Water-Based Acrylic Epoxy:

1. Base Coats: Block fillers (Sherwin-Williams Loxon Block Surfacer, A24) and/or Primers recommended by manufacturer.

* Block Filler shall Level 3 - Premium Fill; one or multiple coats for high performance block filler in accordance with PDCA industry standards. Apply mock-up to confirm appearance and before finish coat applications.

2. 2nd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy, B73-300.
3. 3rd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy, B73-300.
4. Apply to following surfaces: CMU and other surfaces where indicated or required.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

2.6 EXTRA STOCK

- A. Contractor shall provide one gallon of extra stock for each color/type selected for use on the project. Provide unopened containers clearly marked with manufacturers color number and name.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions, included rotted or otherwise defective materials, have been observed by all concerned and corrected in a manner acceptable to Applicator.
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. General:
 1. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

2. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
 3. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
 4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
 5. Painting of materials shall commence only when the moisture content of the materials complies with manufacturer's recommendations as follows:
 - a. Concrete and masonry - 22% maximum.
 - b. Gypsum drywall - 12% maximum.
- B. Cementitious Materials:
1. Prepare cementitious surfaces of concrete, concrete block, cement plaster and gypsum drywall board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
 2. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
- C. Ferrous Metals:
1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
 2. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.
 3. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

- C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
- D. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.4 APPLICATION

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Where finish schedule calls for walls, or ceilings to be painted, paint all new and existing surfaces in same area. Paint from corner to corner on walls, or ceilings, or to a major change in direction of surface to be painted. Provide crisp, clean, sharp lines where new painted surfaces abut existing painted surfaces.
- C. **Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.**
- D. **Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.**
- E. Sand lightly between each succeeding enamel or varnish coat.
- F. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
- G. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- H. **Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer and an acceptable finished appearance in finish, color and appearance as determined by the Architect.**
- I. Primer Coat: Apply primer coat of material which is required to be painted or finished, and which has not been prime coated by others.
 - 1. **Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.**

- J. **Block Fillers: Apply block fillers using manufacturer's recommended application techniques with sufficient material and coats to achieve a pinhole-free, "Level 3 - Premium Fill Surface", and in accordance with PDCA 's industry standards.**
- K. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- L. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 CLEAN-UP AND PROTECTION

- A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
- B. Upon completion of painting work, clean all paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
 - 1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
 - 2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION 09900

SECTION 10100 - DRY MARKERBOARDS AND EXHIBITION BOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of dry markerboards and exhibition boards is indicated on the drawings.
- B. Type of dry markerboards and exhibition boards specified in this section includes the following:
 - 1. Porcelain enamel steel dry marker boards.
 - 2. Fabriccork fabric faced cork exhibition boards.
 - 3. Factory applied trim.
 - 4. Field applied trim.

1.3 REFERENCES

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics for Building Materials.
- B. ASTM C540 Gloss for ceramic materials.
- C. ASTM C614 for alkali resistance.
- D. ASTM D2244 evaluation of color differences.
- E. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.
- F. ASTM C208-72 for cellulosic fiberboard.
- G. ANSI A208.1-79 for particleboard.
- H. ANSI H35.1-82 for aluminum temper and alloy.
- I. HNSI A424-80 for steel for porcelain enameling.
- J. FS LLL-B-810 for tempered hardboard.
- K. PEI-1002 Manual and Performance Specification for Porcelain Enamel Writing Surfaces.
- L. BYK-Gardner Surface Distortion.

- M. GREENGUARD Indoor Air Quality Certified.
- N. GREENGUARD Children and Schools Indoor Air Quality Certified.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Furnish all dry markerboards and exhibition boards by a single manufacturer for the entire project.
- B. Surface Burning Characteristics: Provide exhibition board surfaces which are identical in composition to those with surface burning characteristics indicated below, as determined by testing in compliance with ASTM E84. Use only exhibition boards which are certified to meet the following standards:
 - 1. Flame Spread: Not more than 25.
 - 2. Smoke Developed: Not more than 40.
- C. Uniformity of color, corrosion, temperature, alkali, water, range of gloss test, uniform texture, light reflectance and cleanability are requirements for all groups and have specific ranges for each.
- D. Product Certifications: Provide GREENGUARD Indoor Air Quality Certified and GREENGUARD Children and Schools Indoor Air Quality Certificates for markerboards.
- E. Reflectivity of LCSII ceramicsteel Markerboard writing surfaces shall not exceed the following:
 - 1. Gloss Range / 60° Gloss meter GU (Gloss Units)
 - a. LCSII ceramicsteel for Markerboard 68 -76% (low gloss surface).
 - b. LCSII ceramicsteel for writing surfaces - Surface Distortion reduction and the optimum improvement to performance characteristics.
 - 2. Contrast/waviness for Markerboards (light and dark effects) shall be no greater than 15 [Scale 0 - 30] when tested with BYK - Gardner Wave Scan 5+ Measuring device showing visual acuity (contrast sensitivity) to the human eye at distances greater than 3 meters (10'- 0").
 - 3. Resolution (visual acuity) shall be based on 3 lines per degree and be visibly maintained beyond the current standard of 3 meters. [Byk-Gardner Wave Scan 5+ Measuring device].
 - 4. Surface distortion ("orange peel"/surface peaks and valleys) as tested by the BYK-Gardner Wave Scan 5+ Measuring device [Scale 0 - 60]. Values are established by the difference in the highpoint/low point of the Markerboard test surfaces. P 3 ceramicsteel shall establish the lowest range of distortion from 11.7 - 16.02.

1.5 SUBMITTALS

- A. Samples and colors for each:
 - 1. Face sheet materials
 - 2. Cork materials
 - 3. Vinyl materials
 - 4. Aluminum trim or wood trim types and profiles.
- B. Shop Drawings: Submit shop drawings for each type of drymarker and exhibition board. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, layout and installation details.
 - 1. Drawings shall indicate location and actual material lengths of each unit. Room elevations shall indicate joint locations and include dimension from floor and adjacent side walls, cross-sections for trim, backing, face and core materials, fastener spacing and types of units provided.
- C. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.
- D. Certification: Submit the manufacturer's certification that materials furnished for the project comply with the specified requirements.
- E. Manufacturer's Product Warranty: Submit manufacturer's product and accessories warranty and certificate of authenticity from manufacturer.
- F. Product use, regular cleaning, stain removal and precautions information in the operation and maintenance instructions.

1.6 SPECIAL PRODUCT WARRANTY

- A. Submit a "**Life of Building**" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboard writing surfaces are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards, but does not include cost of removal or reinstallation.
- B. Submit a standard warranty, stating that when installed in accordance with manufacturer's instructions and recommendations, exhibition boards are guaranteed for **one (1) year** against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material, but does not include cost of removal or reinstallation.
- C. Writing Surface Warranty Period: **Lifetime of the building** commencing on the Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: "Series 1", as manufactured by Claridge Products and Equipment, Inc., Tel.# 800.434.4610; or approved equal.
 - 1. Finishes and Colors: Shall be selected by the Architect from manufacturer's available full range of finishes and colors including painted aluminum colors.
- B. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Manufacturers of Porcelain Enamel Dry Markerboards and Exhibition Boards:
 - a. Educational Equipment.
 - b. Platinum Visual Systems
 - c. Or approved equal

2.2 MARKERBOARD MATERIALS

- A. Porcelain Enamel: Provide balanced, high pressure laminated porcelain enamel markerboards of 3-ply construction consisting of facing sheet, core material and backing.
 - 1. Face Sheet: LCS-II Porcelain Enamel grade cold rolled steel for markerboard, as indicated on drawings..
 - a. Coat the exposed face with a 3-coat process consisting of primer, ground coat and color cover coat, and the concealed face with a 2-coat process consisting of primer and ground coat.
 - 1) Bottom Ground Coat - 1.5 to 2.2 mils
 - 2) Top Ground Coat - 2.0 to 2.8 mils
 - 3) Top Cover (Color) Coat - 3.0 to 4.0 mils
 - b. Fuse cover and ground coats to the steel at the manufacturer's firing temperatures, but not less than 1,200 deg.F (649°C).
 - c. LCS-II Porcelain Enamel for markerboard with improved writing and erasing surface (3 colors low gloss and 3 colors high gloss)
 - d. Facing sheet construction:
 - 1) 1.7-2.5 mils enameled ground coat on face minimum thickness.
 - 2) 3.0 - 4.0 mils enameled cover (color) coat for markerboard.
 - 3) 1.7-2.5 mils enameled minimum ground coat on back of facing.
 - 4) Firing temperatures shall be a minimum of 1200°F for LCSII markerboard.
 - 2. Writing Surface Core: 7/16" Medium Density Fiberboard (MDF) composed of approximately 90% post-industrial waste.
 - a. Units over 12'-0" in length and longer will require H-bar at center.

3. Moisture backer shall be factory laminated to core material. A 0.005" thick aluminum backer shall be provided standard on all markerboards.
4. Perimeter trim shall be as indicated on the architectural drawings.
5. Factory Built Trim: Markerboard tray shall be 2-3/4" with 3/4" radius corners and include box tray.
6. Maprail: shall be provided on all markerboards and will be either 1" or 2", as indicated on the architectural drawings/details.
 - a. Cork insert to be Claridge Cork, color as selected by Architect.
7. Accessories (1" or 2"):
 - a. Maphooks (minimum two per 4' maprail).
 - b. Flag holder (one per room).
 - 1) Provide separate wall mount flagholder, as required. Coordinate locations with locations of projection screens.
 - c. Map roller brackets (one pair per markerboard).
 - d. Maprail end stops (one pair per display rail).
8. Lamination:
 - a. Factory machine type only.
 - b. Specially formulated adhesives.

2.3 EXHIBITION BOARD MATERIALS

- A. Fabricork: #1380 Vinyl fabric on natural cork underlay with Duracore backing.
- B. Thickness: Total laminated thickness of core and covering is 1/2". All thicknesses are nominal.
- C. Vinyl Fabric: 15 oz/ln yd.
- D. Lamination: Factory machine type with specially formulated adhesive.
- E. Metal Trim and Accessories: Factory fabricated frames and trim of not less than 0.062" thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure. Plastic accessories will not be accepted.

2.4 FABRICATION

- A. Assembly: Provide factory assembled dry markerboard and exhibition board units, except where field assembled units are required.

- B. Make joints only where the total length exceeds the maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Architect.
 - 1. Provide the manufacturer's standard vertical joint system between abutting sections of dry markerboard.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field Measurements: Take field measurements prior to the preparation of shop drawings and fabrication where possible, to ensure proper fitting of the work. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.
- B. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.2 INSTALLATION

- A. Deliver factory-built dry markerboard and exhibition board units completely assembled in one piece without joints, wherever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.
- B. Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories necessary for a complete installation.
 - 1. Anchor all components securely using tamperproof fasteners, where accessible.
 - 2. Install all dry markerboards and exhibition boards with completely concealed continuous hangers.
 - 3. Where wall mount flagholders is required install units where directed by the Architect/ Owner.
- C. Provide factory-trained installers.
- D. Apply manufacturers' adhesive behind each board using roughly ¼ cup @ 16" on center.
- E. Mounting heights from the floor for each room shall be as follows:

Consult with the Architect / Owner before start of installation:

- 1. Kindergarten 24"
- 2. First & Second grades 26"
- 3. Third & Fourth grades 28"

4. Fifth and Sixth grades 30"
 5. Seventh – ninth grades 33"
 6. Tenth and up grades 36"
- F. Provide covering for H-moldings to match vinyl-covered boards.
 - G. Clean boards using manufacturers' recommended procedures and install cleaning labels for each room.
 - H. Locate accessories on each board as specified.
 - I. Provide mitered and wrapped hairline joints for all trims.
 - J. Provide fasteners at perimeter trims 16" – 24" and 12" – 16" on trays.

3.3 ADJUST AND CLEAN

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean units in accordance with the manufacturer's instructions. Break-in markerboards only as recommended by the manufacturer.
- C. Repair or replace all damaged units and surfaces to the approval of the Architect at no additional cost to Owner.

END OF SECTION 10100

SECTION 10161 - SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of minimum Class "C", fire-rated solid toilet compartments is indicated on the drawings.
- B. Style of toilet compartments includes: Floor-anchored, overhead braced.
- C. Style of screens include: Wall-hung.
- D. Related Work:
 - 1. Section 10800 - Toilet Accessories.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.
- C. Samples: Submit full range of color samples for each type of unit required. Submit 4" square samples of each color and finish on same substrate to be used in work, for color verification after selections have been made.
- D. Test Reports: Submit manufacturer's reports of testing of rigid plastic products indicating compliance with indicated performance requirements.

1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances where ever taking of field measurements before fabrication might delay work.
- B. Coordination: Furnish inserts and anchorages which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.
- C. Manufacturer's Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for a recommended 5 years.

- D. Installer's Qualifications: A company regularly engaged in installation of products specified in this section, with a recommended minimum of 5 years of experience.
- E. **Code Compliance: Privacy partitions (including toilet partitions) shall be tested in accord and comply with NFPA 286 Room-Corner Test.**
- F. Interior Wall and Ceiling Finish Materials in accordance with IBC, Section 8031.1. shall be classified in accordance with ASTM E84 or UL 723. Interior finishes shall be grouped in the following classes:
- | | | | |
|----|-----------|--------------------|--------|
| 1. | Class A = | Flame spread index | 0-25 |
| | | Smoke developed | 0-450 |
| | Class B = | Flame spread index | 26-75 |
| | | Smoke developed | 0-450 |
| | Class C = | Flame spread index | 76-200 |
| | | Smoke developed | 0-450 |
- Exception:** "Room corner test for interior wall or ceiling finish materials"
- a. Interior wall or ceiling finish materials shall be permitted to be tested in accordance with NFPA 286 and shall comply with IBC Section 803.1.2.1.
2. In accordance with IBC 803.9 - High-density polyethylene (HDPE) and polypropylene (PP), when the material is used as an interior finish, it shall comply with IBC Section 803.1.2.
- G. Regulatory Requirements: Products and finished installations to be used by persons with disabilities must comply with requirements of the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC / ANSI A117.1-2009.

1.5 WARRANTY

- A. Manufacturer's Warranties: Provide manufacturer's standard **twenty-five (25) year** warranty for all solid plastic compartments, products and all other assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Provide products as manufactured by Scranton Products, Scranton, PA, Tel.# 800.445.5148, www.scrantonproducts.com, or approved equal, from their full line of standard textures and colors.
1. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

- a. Metpar Corp., Westbury, NY, Tel.# 516.333.2600, www.metpar.com.
- b. ASI Global Partitions, Eastanollee, GA, Tel.# 706.827.2700, www.globalpartitions.com.
- c. Bradley, Menomonee Falls, WI, Tel.# 800.272.3539, www.bradleycorp.com.
- d. Or approved equal.

2.2 MATERIALS

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.
- B. Solid Plastic: One piece seamless, one inch thick solid HDPE plastic with a homogenous color throughout fabricated from polymer resins.
- C. **Interior Wall and Ceiling Requirements by Occupancy** for flame spread index per (IBC, Table 803.11):

GROUP	SPRINKLERED			NONSPRINKLERED		
	Interior exit stairways, ramps & passageways	Corridors & enclosure for exit access stairways and ramps	Rooms & enclosed spaces ^c	Interior exit stairways, ramps & passageways ^{a, b}	Corridors & enclosure for exit access stairways and ramps	Rooms & enclosed spaces ^c
A-1, A-2	B	B	C	A	A ^d	B ^e
A-3 ^f , A-4, A-5	B	B	C	A	A ^d	C
B, E, M	B	C	C	A	B	C

Notes:

- a. Class C interior finish materials shall be permitted for wainscoting or paneling of not more than 1,000 sf of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.13.1.
- b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.
- c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered enclosing spaces and the rooms or spaces on both sides shall be considered one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the Group classification of the building or structure.
- d. Lobby areas in Group A-1, A-2 and A-3 shall not be less than Class B materials.

- e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.
- f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

2.3 FABRICATION

- A. General: Furnish standard doors, panels, screens, and pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated.
- B. Overhead-Braced Partitions: Furnish galvanized steel supports and leveling bolts at pilasters, as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous extruded aluminum anti-grip overhead-bracing at top of each pilaster. Furnish shoe at each pilaster to conceal supports and leveling mechanism.
- C. Wall-Hung Screen: Furnish panel units in sizes indicated, of same construction and finish as partition system panels.
- D. Minimum requirements for partitions are as follows:
 - 1. Doors: 1-inch thick equipped with gravity type hinges and push-pull hardware. Provide out-swinging, over-sized doors at water closet compartments for handicapped users.
 - 2. Pilasters: Adjustable, 1 inch thick; provide overhead headrail bracket.
 - 3. Fasteners: Stainless steel 1/4 inch tamper proof shoulder screws and barrel nuts.
 - 4. #14 Screw: Stainless steel #14 x 1-1/2 inch screw used along with plastic anchors for attachments to floor and building walls.
 - 5. End Cap: Aluminum cap fastened to the ends of headrail bracing.
 - 6. Headrail Bracket: 16 gauge stainless steel used to connect headrail bracing.
 - 7. Door Pull: Heavy duty Zamac chrome-plated used on out-swinging doors only. Provide on inside and outside of door.
 - 8. Latch: Anodized aluminum with bright-dip finish. Specially black hard coat slide bolt for extra long wear.
 - 9. Strike: Heavy-duty aluminum extrusion with bright-dip anodized finish: rubber door stop.
 - 10. Bumper/Coat Hook: Heavy Zamac chrome-plated with rubber bumper. All doors are furnished with hook. Bumper functions as a stop on in-swinging doors. Mounting height to be 48" above finish floor.

11. Door Stop: Zamac chrome-plated used on out-swinging doors only as a stop.
12. The Architect selects brackets, hinges and shoes as follows:
 - a. Wall Brackets shall be 1½" stirrup type made of heavy-duty aluminum (6463-T5 alloy) with a bright dip anodized finish. Stirrup brackets shall be fastened to pilasters and panels with stainless steel tamper resistant torx head sex bolts.
 - b. Hinges: Manufacturer's Stealth™ integral hinge system. Pilaster to be machined to accept door, and chrome plated Stealth™ integral hinge mechanism anchored to the door and pilaster. Door closures to be factory set to accommodate all conditions and allow for a positive opening and closing action free of impediment.
 - c. Shoes: 20 gauge stainless steel construction to secure the pilaster to the floor.
13. Provide manufacturer's special hardware and accessories to accommodate all loads and conditions of partitions and screens.

2.4 COLORS AND FINISHES

- A. Selection from manufacturer's full line of standard fire-rated colors and finishes. Allow for two colors per room, with a total of four colors.
 1. Stainless steel items shall have a polished finish.
 2. Aluminum items shall have a natural color anodized finish.
 3. Chrome plated items shall have a polished finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's recommended procedures and installation sequence. Install partitions rigid, straight, plumb, and level. Provide clearances of not more than 1/2" between pilasters and panels, and not more than 1" between panels and walls. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.
- B. Overhead-Braced Partitions: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead-brace to each pilaster with not less than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead-brace when doors are in closed position.
- C. Screens: Attach with concealed anchoring devices, as recommended by manufacturer to suit supporting structure. Set units to provide support and to resist lateral impact.

3.2 ADJUST AND CLEAN

- A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on inswinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.
- B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION 10161

SECTION 10220 - MECHANICAL SCREEN ENCLOSURE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 05400 - Miscellaneous Structural Steel,
 - 2. Section 05500 - Metal Fabrications.
 - 3. Section 07900 - Joint Sealer Assemblies.

1.2 DESCRIPTION OF WORK

- A. Extent of mechanical screen enclosure(s) is indicated on the drawings, including indication of approximate size(s) and location(s).

1.3 QUALITY ASSURANCE

- A. Performance Requirements: Comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with Air Movement and Control Association (AMCA) Standard 500.
- B. AMCA Certification: Where indicated, provide units with AMCA Certified Ratings Seal evidencing that product complies with above requirement.
- C. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- D. Field Measurements: Verify size, location and placement of louvered penthouse enclosure units prior to fabrication, wherever possible.
- E. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassemble, as necessary, for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

1. Submit shop drawings prepared by a licensed Professional Structural Engineer indicating compliance with wind and other design loading required by applicable State and Local Codes. Drawings shall be signed and sealed by the Engineer.
- C. Samples: Submit 6" square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, include 2 or more units in each sample showing limits of such variations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: "EV211" Horizontal Louver Screen, as manufactured by Ruskin®, Kansas City, MO, Tel.# 816.761.7476, www.ruskin.com; or approved equal.
1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:
 - a. Greenheck Fan Corporation, Schofield, WI, Tel.# 715.359.6171, www.greenheck.com,
 - b. Nystrom Building Products, Minneapolis, MN, Tel.# 800.547.2635, www.nystrom.com;
 - c. Or approved equal.
 2. The thinline sight proof louver screen used to hide roof top units.
 3. Provide manufacturer's standard mitered and welded corners and concealed corners.

2.2 STANDARD CONSTRUCTION

- A. Blades
1. Inverted 2" deep 6063T6 extruded aluminum with .060" nominal wall thickness.
 2. Blades are positioned at 45° angle and are spaced at approximately 3-3/16" centers.
 3. Design shall incorporate blade supports required to withstand a wind load of 20 lbs. per sq. ft. (96KPa) (equivalent of a 90 mph wind [145 KPH]).
- B. Support: As required per wind load. Consult manufacturer.
- C. Finish: 70% PVDF
- D. Maximum Factory Assembly Size
1. Shall be 75 sq. ft. (7m²) per section, not to exceed 120" w x 90" h (3048 x 2286) or 90" w x 190" h (2286 x 4826).
 2. Louver screens larger than the maximum factory assembly size will require field assembly of smaller sections.

- E. Supports
 - 1. Louver screens may be provided with rear mounted blade supports that increase overall screen depth depending on screen size, assembly configuration or windload.
- F. Fastenings
 - 1. Anchorage shall be concealed and not visible on the exterior face of the screen.
 - 2. Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be hot-dip galvanized, stainless steel or aluminum. Provide types, gauges and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- G. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- H. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).
- I. Features:
 - 1. 42% free area on a 4ft x 4ft section.
 - 2. Architecturally styled, hidden supports for attractive appearance.
 - 3. Inverted thinline blade.
 - 4. All aluminum construction for low maintenance and high resistance to corrosion.
 - 5. Sight proof blocks out obstructions from view

2.3 FABRICATION, GENERAL

- A. Provide indicated louvered mechanical screen and accessories of design, materials, sizes, depth, arrangement, and metal thicknesses indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; air leakage, where applicable; strength; durability; and uniform appearance.
- B. Fabricate framing to suit adjacent construction with tolerances for installation, including application of sealants in joints between units and adjoining work.
- C. Include supports, anchorages, and accessories required for complete assembly.
- D. Provide vertical mullions of types indicated and spacings recommended by manufacturer. At horizontal joints between louver units provide horizontal mullions except where continuous vertical assemblies are indicated.
- E. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

- F. Horizontal Blade Louvers: Size and depth indicated, with blades of profile, slope and spacing indicated, or if not indicated, to meet performance requirements.
- G. Continuous Horizontal Blades: Conceal supporting framework from vision on outside face of louver by placing braces, mullions and brackets on inside face; with close fitting, field-made splice joints in blades designed to permit expansion and contraction without deforming blades or framework.
- H. Corners: Shop miter and weld blades into prefabricated corner units to align with straight sections Include concealed bracing.

2.4 METAL FINISH

- A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces with protective covering, prior to shipment. Remove scratches and blemishes from exposed surfaces which will be visible after completing finishing process.
 - 1. Fluoropolymer Coating: Full strength 70% "Kynar 500/Hylar 5000" coating baked on for 15 minutes at 450°F in a dry film thickness of 1.0 mil, 30% reflective gloss (ASTM D 523), over minimum 0.2 mil baked on modified epoxy primer.
 - a. Color as selected by Architect from manufacturer's available full range of colors.
 - 2. Durability: Provide coating which has been field tested under normal range of weathering conditions for recommended minimum of 20 years without significant peel, blister, flake, chip, crack or check in finish, and without chalking in excess of 8 (ASTM D 659), and without fading in excess of 5 NBS units.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION

- A. Locate and place units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations require for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations, and refinish entire unit, or provide new units, at Contractor's option.

- E. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.
- F. Provide concealed gaskets, flashings, joint fillers, and install as work progresses to make installations weathertight.
- G. Refer to Section 07900 for sealants in connection with installations of louvers.

END OF SECTION 10220

SECTION 10440 - SPECIALTY SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of specialty signs is shown on the drawings.
- B. Forms of specialty signs required include the following:
 - 1. Panel signs (Room Identification Signs).
 - 2. Cast metal plaques.
 - 3. Exterior signs.
 - 4. Installation of all specialty signs.

1.3 QUALITY ASSURANCE

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.
- B. All signs shall conform to the International Building Code and ICC/ANSI A117.1. - 2009 requirements for accessible building elements.
 - 1. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.
 - 1. Submit full-size sample units, if requested by the Architect. Acceptable units may be installed as part of the work.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.
 - 1. Furnish full-size rubbings for metal plaques.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
1. Americraft Inc.
 2. Architectural Graphics Inc.
 3. ASI Sign Systems, Inc.
 4. Bayuk Graphic Systems, Inc.
 5. Brandon Signage Co.
 6. Designer Sign Company.
 7. Gemini
 8. Mohawk Sign Systems.
 9. Or approved equal.

2.2 MATERIALS

- A. GENERAL: Provide manufacturer's standard plastic signage which comply with the requirements established in the International Building Code and ICC/ANSI 117.1 - 2009 Barrier Free Standards. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).
1. Acrylic sheet material to be cut to the desired sizes with radius or square corners as indicated, or as per approved shop drawings.
 2. Manufacturer's standard acrylic material, as indicated, for Barrier Free Accessible signage indicating International Symbol of Accessibility.
 3. "Helvetica Regular" letter style, Domed Grade II Braille and other pictograms as described herein.
 4. Colors: As selected by the Architect from manufacturer's standards after award of contract, or as specified herein.
- B. Aluminum Castings: Provide aluminum castings of alloy and temper recommended by the aluminum producer and finisher for the casting process used and for the use and finish indicated.
- C. Fasteners: Unless otherwise indicated, used concealed fasteners fabricated from metals that are non-corrosive to either the sign material or the mounting surface.
- D. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.3 FABRICATION

- A. Unframed Panel Signs: Fabricate unframed panel signs with edges mechanically and smoothly finished to conform with the following requirements:

1. Edge Condition: Square cut.
2. Corner Condition: Provide radius corners for each sign type.

2.4 SIGNAGE

A. GENERAL: ALL signage MUST comply with the requirements established in the International Building Code and ICC/ANSI 117.1 - 2009. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).

B. INTERIOR SIGNAGE:

1. Room Names and Numbers Signage:

a. Provide Room Name and Numbers plastic signs for all rooms with name and room number, as shown on drawings and schedules.

1) Types "7 & 9" Signs - Classrooms and Offices:

a) As directed by the Owner / Architect provide 1/4" thick non-combustible, self extinguishing solid composite plastic sign signs with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face. Provide window insert with non-glare clear plastic cover

b) Basis of Design; provide "Series 200A Sand Carved process with window insert Series 400 Vinyl Copy" as manufactured by Mohawk Sign Systems Inc., or approved equal, by Brandon Signage Co., Tel.# 717.582.5161.

2) Type "8" Signs - Multi-Purpose Room, Stage, Cafeteria, Auditorium, Faculty Dining, Main Offices, Media Center, Kitchen, etc. :

a) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.

3) Informational Signage:

a) Provide informational plastic signs at selected doors, as shown on drawings and schedules.

i) Signs - "THIS IS NOT AN EXIT", "EXIT", etc.:

(1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.

4) Sizes:

a) As indicated or as directed by the Architect / Owner.

5) All room signs shall have radius corners.

2. Room Numbers Signage:

a. Provide Room Numbers plastic signs for all rooms with room number, as shown on drawings and schedules.

- 1) Type "10" Signs - Boiler Room, Elevator Machine, Storage, Janitor, Electrical, Mechanical, etc.:
 - a) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
3. Room Occupant Capacity Signs:
 - a. Provide room occupant capacity signs for room capacity more than 50 persons and as indicated.
 - 1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
4. Barrier Free Accessibility Signs and Directional Signage:
 - a. Basis of Design; "Vandal-resistant signs" as manufactured by Americraft Inc. Tel.# 800.237.3984.
 - 1) Provide injection molded process, 1/8" thick acrylic with non-glare clear front surface, graphics and colors on second surface (Back surface), with radius corners and stepped edging. Provide mounting holes with stainless steel screws. Colors to be selected by the Architect from manufacturer's available full range of colors.
 - 2) Provide tactile plastic signs displaying international symbol of accessibility in tactile form and accompanied by Grade II Braille.
 - 3) For Directional Signage indicate the route to the nearest accessible element.
 - 4) Provide signage at the following locations and as indicated on the Contract Drawings:
 - a) Accessible toilet units including stalls.
 - b) Accessible areas of refuge.
5. Area Refuge Signage:
 - a. Provide where area refuge is shown on the Contract Drawings. Locate at interior and exterior of doors accessing the area refuge.
 - 1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
6. Special Signage:
 - a. Fire Protection System (Sprinkler) Control Valves Location Signage:
 - 1) Provide signage where indicated or required by Code, of silk screened copy, on baked enamel aluminum sheet material 0.063 thick, in two

colors; with 4" high letters in white on red colors, or as otherwise required by authorities having jurisdiction and indicating "Sprinkler Control Valves".

b. Solar Photovoltaic Signage, etc.:

- 1) Provide signage where indicated or required by Code, of silk screened copy, on baked enamel aluminum sheet material 0.063 thick, in two colors; with 1-1/4" high and have a stroke width of 1/4" red Roman or Latin letters on white reflective background, as otherwise required by authorities having jurisdiction.

7. Signage Locations:

a. Along the door on the latch side and shall be mounted as follows:

- 1) 48" minimum to the lowest tactile character on the sign measured from the finish floor.
- 2) 60" maximum to baseline of highest tactile character on the sign measured from the finish floor.

b. For locations having double doors, mounting shall be to the right of the right hand door.

c. Where there is no wall space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall.

8. Graphic Content and Style: Provide sign copy to comply with the requirements indicated for sizes, styles, spacing, content, positions, materials, finishes and colors of letters, numbers, symbols and other graphic devices.

a. Raised Copy Thickness: Not less than 1/32" from the sign face.

b. Raised characters shall be in different color and meets the Barrier Free requirements for a 70% contrast ratio of colors. Colors shall be selected from manufacturer's available full range of colors.

c. Raised characters and symbols for tactile signs shall be 5/8" high minimum and 2" high maximum. Sign size shall suit the required letters and numbers.

9. Braille Copy: Braille Copy shall be Grade II and shall conform to Specification 800, National Library Service, Library of Congress. Braille shall be raised integral .0625 diameter.

a. Braille shall be separated 1/2" minimum from the corresponding raised characters or symbols.

10. Mounting: As directed by the Architect using required fasteners.

C. EXTERIOR SIGNS:

1. Accessible parking signs, and traffic control signs to be located as shown on drawings or as indicated herein.
 - a. Provide silk screened copy, on baked enamel aluminum, colors as indicated or as otherwise required by authorities having jurisdiction, (Manual on Uniform Traffic Control Devices latest edition) with aluminum post embedded in concrete.
2. Fasteners and Anchors: Use manufacturer's recommended type, size and quantity of fasteners for indicated signs. Provide concealed mounting and predrilled holes for setting wall anchors.
3. Mounting Posts: 2-7/8" diameter, aluminum pipe, finish and color to be selected by the Architect from manufacturer's standard.
 - a. Provide aluminum interlocking brackets and bolt/nut sets.
4. Signage for identifying emblem for Structure with Truss Construction:
 - a. Provide emblem signage of bright and reflective backed enamel aluminum color, isoscales triangle shape, 12" horizontally by 6" vertically with the following letters, of size and color to make them conspicuous, printed on the emblem:
 - 1) "R" to signify a roof with truss construction; or
 - b. The emblem shall be permanently affixed to the left of the main entrance door at a height between four and six feet above the ground, and as directed by the Architect.

2.5 CAST METAL PLAQUE

- A. Provide a rectangular 2'-8" x 1'-10" plaque with raised letter copy. Raised letter copy shall be as directed by the Architect / Owner.
- B. Fabricate cast metal plaques to comply with requirements specified for metal, border style, background texture and finish and to comply with requirements shown for thickness, size, shape and copy.
- C. Produce castings free from pits, scale, sand holes or other defects.
- D. Hand tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish.
 1. Metal: Aluminum casting as selected by the Architect.
 2. Border Style: None (straight), polished edge.
 3. Background Texture: Manufacturer's standard pebble texture.

4. Background Finish: Provide dark statuary finish to comply with the requirement specified for aluminum finishes, or as selected by the Architect from manufacturer's available finishes.

2.6 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's available full range of colors.
- B. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.

1. Aluminum Finishes:

- a. Class II Clear Anodized Medium Satin Finish: Provide AA-M31C22A31 finish (medium satin mechanical finish, with chemical etch, medium matte finish, 0.4 mil thick minimum anodic coating).
- b. Baked Enamel Finish: Provide finish AA-M4xC12C42R1x (manufacturer's standard non-directional mechanical finish including sanding and filing, cleaning with inhibited chemicals, conversion coated with an acid-chromate-fluoride-phosphate treatment and painted with organic coating specified below).
 - 1) Organic Coating: Provide manufacturer's standard thermosetting enamel system consisting of a prime coat and a finish coat.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Locate sign units and accessories where shown or scheduled, using mounting methods of the type described and in compliance with the applicable Codes and regulation.
- B. Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- C. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
 1. Silicone Adhesive Mounting: Use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous or vinyl-covered surfaces.
 - a. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.
 - b. Fasteners and Anchors: Manufacturer recommended concealed types for indicated signage and substrate materials.

2. Cast Metal Plaques: Mount cast plaques using the standard method recommended by the plaque manufacturer for the type of wall surface indicated.
 - a. Concealed Mounting: Mount the plaques by inserting threaded studs into tapped lugs on the back of the plaque. Set in predrilled holes filled with quick-setting cement.

3.2 CLEANING AND PROTECTION

- A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10440

SECTION 10500 - METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of metal lockers is shown on the drawings.
- B. Type of products in this section includes the following:
 - 1. Heavy Duty Type Corridor Lockers.
- C. Metal base for lockers is specified in this section.
- D. Related Sections:
 - 1. Section 03300 - Concrete Work (base).
 - 2. Section 10440 - Specialty Signs.
 - 3. Section 10522 - Fire Extinguishers.

1.3 QUALITY ASSURANCE

- A. Uniformity: Provide each type of metal locker as produced by a single manufacturer, including necessary mounting accessories, fittings, and fastenings.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for metal locker units.
- B. Samples: Submit color samples on squares of same metal to be used for fabrication of lockers.
- C. Shop Drawings: Submit shop drawings for metal lockers, verifying dimensions affecting locker installations. Show lockers in detail, method of installation, fillers, trim, base, and accessories. Include locker numbering sequence information.
- D. Combination Listing and Master Keys: Submit listings for combination locks and their respective locker numbers. Coordinate with shop drawings submittal, if required. Deliver master keys directly to the Owner's Representative.
- E. Color Charts: Provide color charts showing manufacturer's available full range of standard and optional colors.

1.5 JOB CONDITIONS

- A. Do not deliver metal lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage, and installation.

1.6 WARRANTY

- A. The manufacturer warrants to the Owner that all items pertaining to the lockers shall be free of defective material or faulty workmanship for the life of the product when used in accordance with the manufacturer's specification and/or operating instructions.
 - 1. This warranty applies to the original purchaser only.
 - 2. Warranty excludes consequential, incidental or any other damages directly or indirectly resulting from failure or loss of use of products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Provide products as manufactured by Republic Storage Products, LLC, Uniontown, OH, Tel.# 800.477.1255, www.republicstorage.com; or approved equal.
- B. Subject to compliance with requirements of the "Basis of Design", manufacturers offering products which may be incorporated in the work include but not limited to the following:
 - 1. Penco Products Inc., Skippack, PA, Tel.# 800.562.1000, www.pencoproducts.com.
 - 2. Lyon Workspace Products, Aurora, IL, Tel.# 800.323.0082/630.892.8941, www.lyonworkspace.com.
 - 3. Or approved equal.
- C. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 - 1. Comparable products of other manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed above.
 - 2. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- D. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A201 and Section 00800.

2.2 MATERIALS

- A. Sheet Steel: Mild cold-rolled and leveled steel, free from buckle, scale, and surface imperfections.
- B. Fasteners: Cadmium, zinc, or nickel plated steel; exposed bolt heads, slotless type; self-locking nuts or locker washers for nuts on moving parts.
- C. Equipment: Hooks and hang rods of cadmium-plated or zinc-plated steel or cast aluminum.

2.3 FABRICATION, GENERAL

- A. Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make all exposed metal edges safe to touch. Weld frame members together to form rigid, one-piece structure. Bolt, or rivet other joints and connections as standard with manufacturer. Grind exposed welds flush. Do not expose bolts or rivet heads on fronts of locker doors or frames.
- B. Frames: Fabricate of 16-gauge channels, minimum, with continuous stop/strike formed on vertical members.
- C. Finishing: Chemically pretreat metal with manufacturer's standard degreasing and phosphatizing process. Apply baked-on enamel finish to all surfaces, exposed and concealed, at a minimum of 300°F, for 30 minutes, except plates and non-ferrous metal.
- D. Color: Provide locker units in colors as selected by Architect from manufacturer's available full range of colors. Allow for two (2) colors.

2.4 HEAVY DUTY TYPE CORRIDOR LOCKERS

- A. Basis of Design: "Quiet Lockers"; Republic Storage Systems Company, Inc.; or approved equal.
 - 1. Construction: Provide Lockers built on the unit principle - each locker shall have an individual door and frame, individual top, bottom, back and shelves with common intermediate uprights separating compartments. Assembly fasteners shall be zinc plated, low round head, slotless, fin neck machine screws with hex nuts. Bolt or rivet heads shall not be exposed on faces of doors or frames.
 - 2. Door Frame: 16 gauge formed into deep, 1" face channel shapes with a continuous vertical door strike integral with the frame on both sides of the door opening. Cross frame members of 16 gauge channel shapes, including intermediate cross frame on double and triple-tier lockers shall be securely welded to vertical framing members to ensure rigidity.
 - 3. Doors: 16 gauge steel formed with a full channel shape on the lock side to fully conceal the lock bar, channel formation on the hinge side and right angle formations across the top and bottom. Ventilation consists of full perimeter opening plus Verti-Vent slots in top and bottom of doors and one row of 1/2" round holes in the upper and lower surface of the inner panel.

4. Locking Devices: Provide positive automatic pre-locking type, whereby locker may be locked while door is open, then closed without unlocking and without damaging locking mechanism.
5. Quiet Latching: One-piece, pre-lubricated, spring steel latch completely contained within the lock bar, under tension, to provide a rattle-free operation. The lock bar shall be of pre-painted, double-channel steel construction. The lock bar shall be securely contained in the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door.
 - a. There shall be three latching points for lockers over 42" in height and two latching points for all tiered lockers 42" and under in height.
 - b. The lock bar travel is to be limited by contacting resilient elastomeric cushioning devices located inside the lock bar.
6. Recessed Handle: A non-protruding lifting feature shall be provided for actuating the lock bar when opening the door. It shall be contained in a formed 20 gauge stainless steel pocket that is securely assembled to the door. This pocket also must provide a recessed area for accommodating the various lock types and the number plate. The lifting trigger within the recess pocket shall be an integral part of the steel slide plate which is securely attached to the lock bar and functions to transfer the lifting force to the lock bar. The exposed portion of the lifting trigger shall be encased in a molded ABS thermoplastic cover.
 - a. Handle shall have provision for built-in-locks of combination types.
7. Locks: Unless otherwise indicated all lockers shall be furnished with one of the following:
 - a. Built-In Combination Lock: All lockers shall be equipped with Spring - bolt operation built-in combination locks. Locks shall be Key-controlled, 3-number dialing combination and capable of at least five different combination changes. Changes shall be made automatically by use of master control key.
 - 1) **Locks shall match the existing manufacturer and type currently in the school.**
8. Hinges: Shall be at least a 2" high, 5-knuckle, full loop, tight pin style, securely welded to frame and riveted to the inside of the door flange with steel rivets. Locker doors 42" high and less shall have two hinges. Doors over 42" shall have three hinges.
9. Body: Shall consist of 24 gauge upright sheets, backs, tops, bottoms and shelves. Tops, bottoms and shelves shall be flanged on all four sides. Backs shall be flanged on two sides. Uprights shall be offset at the front and flanged at the rear to provide a double lapped rear corner.
10. Frame Hooks: Shall accept latching and shall be of heavy gauge steel, set close in and welded to the door frame. A continuous vertical strike on the door frame shall protect frame hooks from door slam damage.

11. Door Silencers: The impact caused by the door closing shall be absorbed by a soft rubber silencer which to be securely installed on each frame hook.
12. Acoustical Treatment: Shall consist of quiet latching and door silencers as outlined above.
13. Interior Locker Accessories: Single-tier lockers over 42" high shall have one hat/book shelf. Other tiered lockers do not require shelves. All single, double and triple tier lockers over 18" in height shall have one double prong back hook (single prong in 9" width) and two single prong wall hooks in each compartment. All hooks shall be made of steel, formed with ball points, zinc-plated and attached with two bolts or rivets.
14. Number Plates: Each locker shall have a polished aluminum number plate with black numerals not less than 1/2" high. Plates to be attached with rivets to the lower surface within the recess handle pocket. Do not mount number plate on door face.

2.5 LOCKER ACCESSORIES

- A. Provide locker accessories as shown or as required for each indicated locker type. Locker accessories shall include but not limited to the following:
 1. Continuous Sloping Tops: Lockers shall be provided with continuous sloping tops formed from 20 gauge minimum sheet steel with a slope that has a rise equal to 1/3 the locker depth (approximately 18 degrees). Tops shall be provided in lengths as long as practical and provided with slip joints without visible fasteners at splice locations. Necessary end panels (or hip ends) and mitered corners shall be provided. Tops shall be finished to match lockers.
 2. Trim: Provide trim at jambs and head of recessed lockers, consisting of not less than 18-gauge cold-rolled steel, 3" wide as necessary. Factory-finish trim to match lockers. Secure trim to lockers with concealed fastening clips.
 3. Filler Panels: Provide filler panels where indicated, of not less than 18-gauge steel sheet, factory-fabricated and finished to match locker units.
 4. Boxed end Panels: Provide boxed end panels on all exposed end lockers, of not less than 16 gauge sheet steel to match locker depth and height and shall have a 1" edge dimension. Double-row end panels shall have a zee reinforced members. All panels shall be installed with concealed fasteners, and shall have finish to match lockers.
 5. Signage: Provide and install signage for both barrier-free accessible lockers and lockers which will house fire extinguishers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install metal lockers at locations shown in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation.

- B. Space fastenings about 48" o.c., unless otherwise recommended by manufacturer, and apply through back-up reinforcing plates where necessary to avoid metal distortion; conceal fasteners insofar as possible.
- C. Install trim, metal base, sloping top units, and metal filler panels where indicated or required, using concealed fasteners to provide flush, hairline joints against adjacent surfaces.
- D. Install benches in compliance with manufacturer's instructions.

3.2 ADJUST AND CLEAN

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch-up marred finishes, but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10500

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of fire extinguishers, cabinets and accessories is indicated on the drawings.
- B. Definition: "Fire Extinguishers" as used in this section refers to units which can be hand-carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems.
- C. Type of products required include:
 - 1. Fire extinguishers.
 - 2. Fire extinguisher cabinets.
 - 3. Fire Extinguisher and blanket in barrier-free safety center
 - 4. Signs.
- D. Related Sections:
 - 1. Section 10522 - Metal Lockers.
 - 2. Section 11011 - Casework and Equipment.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain products in this section from one manufacturer.
- B. Coordination: Verify that fire extinguisher cabinets are sized to accommodate fire extinguishers of type and capacity indicated.
- C. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

1.4 SUBMITTALS

- A. Product Data: Submit product data for each type of product included in this section. For fire extinguisher cabinets include roughing-in dimensions and details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, and panel style and materials.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
 - b. Faulty operation of valves or release levers.
2. Warranty Period: **Six (6) years** from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 1. J.L. Industries.
 2. Larsen's Mfg. Co.
 3. Potter Roemer
 4. Or approved equal.

2.2 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.
- B. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirements.
- C. Multi-Purpose Dry Chemical Type: UL-rated 2-A:10:B:C, 5 lbs. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

2.3 FIRE EXTINGUISHER CABINETS

- A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.
- C. Cabinet Type: Suitable for mounting conditions indicated, of the following types:
 1. Recessed: Cabinet box (tub) fully recessed in walls of sufficient depth to suit style of trim indicated.
 2. Provide fire rated UL listed type cabinets.
- D. Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.

- E. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
 - 1. Square-Edge Trim: Square edges with backbend depths as follows:
 - a. 1/4" to 5/16".
 - 2. Trim Metal: Of same metal as door.
- F. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
 - 1. Enameled Steel: Manufacturer's standard finish, hollow steel door construction with tubular stiles and rails.
- G. Door Glazing: Tempered float glass complying with FS DD-G-1403, grade B, style I, type I, quality q3, class as indicated below:
 - 1. Clear glass, class 1 (transparent).
- H. Door Style: Manufacturer's standard design as indicated below and on drawing.
 - 1. Vertical Duo-Panel: Tempered glass, 1/8" thick.
- I. Door Hardware: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.

2.4 SIGNAGE

- A. Identification: Signage complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Basis of Design: "PTD-182", V-Shaped Sign - 'FIRE EXTINGUISHER' with picture of extinguisher on red background; or approved equal.

2.5 FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS

- A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.
- B. Painted Finishes: Provide painted finish to comply with requirements indicated below for extent, preparation and type:
- C. Extent of Painted Finish: Apply painted finish to both concealed and exposed surfaces of cabinet components except where other than a painted finish is indicated.
- D. Color: Provide color or color matches indicated, or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

- E. Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale.
- F. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply cabinet manufacturer's standard baked enamel finish system to the following surfaces:
 - 1. Interior of cabinet.
 - 2. Exterior of cabinet except for those surfaces indicated to receive another finish.

2.6 COMBINATION FIRE BLANKET/EXTINGUISHER CABINET

- A. Fire Blanket: 62" x 84", fabricated of 100% reprocessed wool, treated with fire resistant chemical.
- B. Combination Cabinet, Larsen FB 3612 Series, or approved equal, with solid door. "Fire Extinguisher" and "Fire Blanket" lettering, red baked enamel finish.
 - 1. Provide Larsen FB 1016 for surface mount fire blanket cabinets.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
- B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
- C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
- D. Where exact location of surface-mounted cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Architect.

3.2 IDENTIFICATION

- A. Identify existence of fire extinguisher in cabinet with die cut vertical lettering spelling "FIRE EXTINGUISHER" applied to door. Provide lettering to comply with requirements indicated for letter style, color, size, spacing and location or, if not otherwise indicated, as selected by Architect from manufacturer's standard vertical arrangements.
- B. Identify bracket-mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style and location as selected by Architect.

END OF SECTION 10522

SECTION 10650 - OPERABLE PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of operable partitions, including locations and details, are indicated on drawings and in schedules.
- B. Type of operable partitions required includes: Manually-operated, flat panel, paired panel operation.
- C. Punching of overhead structural support per template provided by operable partition installer is specified elsewhere in a Division-5 Section.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature and installation instructions for operable partitions and installation accessory required.
 - 1. Submit written data on physical characteristics, durability, resistance to fading and flame resistance characteristics.
- B. Shop Drawings: Submit shop drawings showing locations and extent of operable partitions. Include plans, elevations, and large scale details of anchorages, and accessory items. Indicate location of each unit with building, conditions at openings, typical and special details, location and installation requirements for hardware and operators.
- C. Include methods of installation for type of support structure and fastening condition.
- D. Template Drawings Submit location template drawings for items supported or anchored by permanent construction.
- E. Samples for Initial Selection Purposes: Manufacturer's standard color charts showing full range of colors and materials for each component exposed to view, available for each type of operable partition required.
- F. Samples for Verification Purposes: Submit the following:
 - 1. 6" square samples of each panel facing material selected.
 - 2. 12" square samples of each finish selected.
- G. Prepare samples from same material to be used for the work.
- H. Sample of Manufacturer's / Installer's Warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm (material producer) with a recommended 5 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
- B. Installer Qualifications: Firm specializing in operable partition installation with a recommended 5 years of experience in installation of operable partitions similar to those required for this project.
- C. Single Source Responsibility: Provide material produced by a single manufacturer partitions and mounting hardware.
- D. Acoustical Performance: Panels have been tested in accordance with ASTM E90 test procedure, and shall have attained an **STC rating of 50**.
 - 1. Test reports by an Independent Acoustical Laboratory shall be available upon request by the Architect. NSSEA "Class" ratings will not be acceptable.
- E. Field Sound Performance, (N.I.C. and/or F.S.T.C.): Panels of similar size and model operable wall assemblies have been tested by an Independent Acoustical Consultant in accordance with ASTM E336 and ASTM E413, and achieved an N.I.C. and/or F.S.T.C. rating.
 - 1. Test reports by shall be available upon request by the Architect.
- F. Warranty: See Section 01900 for the required special project warranty.

1.5 TESTING

- A. Test Reports: Submit certified test reports evidencing compliance with requirements for the following:
 - 1. Fire performance characteristic.
 - 2. Physical properties indicated.
- B. Fire Performance Characteristics: Provide vinyl fabric covering that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Surface Burning Characteristics as follows:
 - a. Flame Spread: Not more than 25.
 - b. Smoke Developed: Not more than 50.
 - 1) Test Method: ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures,

humidity; laid flat, blocked off ground to prevent sagging and warping. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements of the "Basis of Design", manufacturer offering products which may be incorporated in the work include the following:
1. Basis of Design: "Acousti-Seal #932" Series of paired flat panels hinged together in pairs, manually operated, top-supported with operable floor seals, as manufactured by Modernfold Inc., Greenfield, IN, Tel. 800.869.9685 / www.modernfold.com; or approved equal.
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
1. Comparable products of other manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed above.
 2. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Subject to compliance with the specification sections contained herein, provide operable partitions from one of the following:
1. Panelfold Inc., Miami, FL, Tel.# 305.688.3501, www.panelfold.com
 2. Hufcor Inc., Janesville, WI, Tel.# 800.542.2371, x214 / 800.356.6968, www.hufcor.com
 3. Or approved equal.
- D. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A232 and Section 00800.

2.2 MATERIALS

- A. Operation:
1. Series of paired flat panels, 48" w. Refer to Reflected Ceiling Plan and Room Finish Schedule for required panel height.
 - 2.. Top supported with operable floor seals.
 3. Manually operated.
 4. Final Closure: horizontally expanding panel edge with removable crank.
 5. Hinged panel closure.
 6. Angle jamb.

2.3 SUSPENSION SYSTEM

A. #17 Suspension System:

1. Suspension Tracks: Min. 11-gauge, 0.12-inch roll-formed steel track supported by adjustable steel hanger brackets, supporting the load-bearing surface of the track, connected to existing structural beam by pairs of 3/8-inch diameter threaded rods.

B. Carriers:

1. Right Angle Turn: Two carriers of low-friction polymer, reinforced with steel, that permit panels to traverse L, T and X intersections without mechanical switching, on all panels except hinged closure panels.
2. "Smart Track": Two all-steel trolleys with steel tired ball bearing wheels. Non-steel tires are not acceptable. Suspension system shall provide automatic indexing of panels into stack area using preprogrammed switches and trolleys without electric, pneumatic, or mechanical activation.

C. Panel Construction: Provide construction as indicated:

1. All panel horizontal and vertical framing members fabricated from minimum 18-gauge formed steel with overlapped and welded corners for rigidity. Top channel is reinforced to support suspension system components. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of the edges of the panel skin.
2. Panel Skin: Nominal 21-gauge roll-formed steel wrapping around panel edge. Panel skins shall be lock formed and welded directly to the frame for unitized construction.
3. Acoustical rating of panels with this construction: **50 STC**.
4. Panel Size: 3" thick x 48" wide. Refer to Reflected Ceiling Plan and Room Finish Schedule for required panel height and (VIF).

2.4 PANEL FINISH

- ### A. Panel Finish: Factory applied, Class "A" rated material. Reinforced heavy duty vinyl with woven backing weighing not less than 30 ounce per lineal yard.

2.5 SOUND SEALS

- ### A. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic astragals or astragals in only one panel edge are not acceptable.

- ### B. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.

- C. Horizontal Bottom Seal: Automatic operable seals providing nominal 2-inch operating clearance with an operating range of +1/2-inch to -1-1/2-inch which automatically drop as panels are positioned, without the need for tools or cranks.

2.6 ACCESSORIES

- A. Work Surfaces:
 - 1. Markerboard: White enamel on steel, bonded to the face of the panel with trim without exposed fasteners, where indicated on the drawings.
 - a. Magnetic Chalk Trays: Provide in locations indicated.
 - 2. Tackboard: Minimum 1/4-inch natural cork, covered with fabric, with horizontal trim without exposed fasteners. Trim is not acceptable on vertical edges, where indicated on the drawings.
 - a. Magnetic Trays: Provide in locations indicated.

2.7 COLORS AND PATTERNS

- A. Provide materials in colors and patterns as selected by Architect from manufacturer's standard colors and patterns.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine site at which partitions will be installed. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, drawings and approved shop drawings.
- B. Install operable partitions and accessories after other finishing operations, including painting, have been completed.
- C. Match operable partitions by installing panels from marked packages in numbered sequence indicated on shop drawings.
- D. Broken, cracked, chipped, or deformed partitions are not acceptable.

3.3 CLEANING

- A. Clean all operable partition surfaces and clean adjacent surfaces soiled by work of this section according to manufacturer's written instructions. Avoid use of abrasive cleaners or solutions containing corrosive solvents.

- B. Remove debris created by operable partition work from work site.
- C. Protect partitions against damage during construction period. Ensure that partitions will be without damage or deterioration at time of substantial completion.

3.4 ADJUSTING

- A. Adjust operable partitions to operate smoothly, easily and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.5 EXAMINATION

- A. Examine flooring, structural support and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operation of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 DEMONSTRATION

- A. Demonstrate proper operation and maintenance procedures to Owner's personnel.
- B. Provide operation & maintenance manuals to Architect for review.

END OF SECTION 10650

SECTION 10730 - CANOPY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary/ Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Building supported, pre-engineered metal canopies including fascia channels, decking, tension rods, and attachment hardware.
- B. Related Sections:
 - 1. Section 04200 - Unit Masonry.

1.3 REFERENCES

- A. Aluminum Association (AA)DAF 45 - Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association (AAMA)
 - 1. 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Architectural Extrusions and Panels.
- C. American Society of Civil Engineers (ASCE) 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International (ASTM)
 - 1. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. B429 - Standard Specification for Aluminum-Alloy Extruded Pipe and Tube.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements: Design canopy system to withstand:
 - 1. Standards for wind pressure, snow load, and drifting snow load in accordance with current adopted form of the Uniform Construction code or accepted requirements of local municipality.

1.5 SUBMITTALS

- A. Submittals for Review:

1. Shop Drawings: Indicate system components, dimensions, attachments, and accessories.
2. Samples:
 - a. 3 x 3 inch coating samples in specified color.
 - b. 6 inch long fascia extrusion sample showing profile and standard finish.
 - c. 6 inch decking samples showing profile and standard finish.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum 5 years experience in installation of canopy products.
 1. Mockup: Provide mockup of canopy system including all framing members, supports, decking, hanger rods, and attachments at location selected by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: Extrudeck Series as manufactured by MASA Architectural Canopies, Avenel, NJ 07001; Tel.# 800-761-7446, www.architecturalcanopies.com; or approved equal.
- B. Subject to compliance with the specification sections contained herein, provide canopies from one of the following:
 1. Mapes Architectural Canopies, Lincoln, NE 68514, Tel.# 888.273.1132, www.mapescanopies.com.
 2. Architectural Fabrications, Fort Worth, TX 76104, Tel.# 817.926.7270, www.arch-fab.com.
 3. Or approved equal.

2.2 MATERIALS

- A. Aluminum Extrusions:
 1. ASTM B221& ASTM B429 6063-T5 alloy and temper.
- B. Hardware:
 1. All fasteners shall be (stainless steel) or (zinc coated) for corrosion resistance.

2.3 COMPONENTS

- A. Framing:
 1. Type: Extruded aluminum "J" channel fascia.
 2. Size: 8" x .125".
- B. Canopy Supports: Extruded Aluminum Canopy Support "I" Beam.

- C. Decking: 3" x 6" x .090" Interlocking Extruded aluminum flat soffit decking, as selected from MASA decking options.
- D. Attachment: 1.050" diameter steel hanger rod, finished to match canopy.
- E. Custom Fascia Profiles: 4" Crown.
- F. Other Components: other components as indicated or as required for system attachment and performance.

2.4 FABRICATION

- A. Fabricate canopy system in accordance with approved Shop Drawings.
- B. Kit canopies to be mechanically assembled with shear stress strength as per engineering. Pre-assembled canopies are shop welded by MASA approved personnel.
- C. Drainage system to be concealed type. Covered surfaces direct water to field drilled drain, to be coordinated at site.

2.5 FINISH

- A. Kynar 500: Color to be selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 FIELD DIMENSIONS

- A. Field verify dimensions of supporting structure at site of installation prior to fabrication.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Install components plumb and level, in proper plane, free from warp and twist.
- C. Anchor system to building components; provide adequate clearance for movement caused by thermal expansion and contraction and wind loads.

3.3 ADJUSTING

- A. Touch up minor scratches and abrasions on finished surfaces to match original finish.
- B. Clean with mild, non-abrasive solution and a cotton cloth under low pressure.

END OF SECTION 10730

SECTION 10800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of each type of toilet accessory is indicated on the drawings and schedules.
- B. Type of toilet accessories required includes but are not limited to the following:
 - 1. Mirrors
 - 2. Grab bars
 - 3. Napkin disposals
 - 4. Mop and broom holder/utility shelf
 - 5. Hand dryers
- C. Refer to the Toilet Room Accessories Schedule which identifies items supplied by the Owner and installed by the General Contractor.

1.3 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.
- B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices and cut-out requirements in other work.

1.5 WARRANTY

- A. Bradley Washroom Accessories: Warranty is limited to replacing or repairing, at the manufacturer's option, transportation charges prepaid by the purchaser, any washroom accessory unit or part thereof which their inspection shall show to have been defective within the limitation of the warranty. Period of warranty is measured from the date of their invoice as follows:

1. Complete unit (except mirrors) - **One (1) year**.
2. Stainless Steel Mirror Frames - **Fifteen (15) years** - against corrosion.
3. Tempered Glass Mirrors - **Five (5) years** - against silver spoilage.
4. Polished #8 Architectural Grade Finish on 304 Series Stainless Steel - **One (1) year** against corrosion.
5. Bright Annealed Finish on 430 Series Stainless Steel - **One (1) year** against corrosion.

Note: Warranty does not cover installation labor charges and does not apply to any units which have been damaged by accident, abuse, improper installation, improper maintenance, or altered in any way.

- B. Hand Dryer - Saniflow: Manufacturer's standard warranty to be free from defects for a period of **ten (10) years**.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Catalog numbers used herein are Bradley Washroom Accessories, or approved equal. Refer to drawings for schedule and additional information. Similar products for other indicated manufacturers will be acceptable.
- B. Subject to compliance with requirements, manufacturers offering toilet accessories which may be incorporated in the work include one of the following:
 1. American Specialties, Inc.
 2. Bobrick Washroom Equipment, Inc.
 3. Or approved equal

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge (.034") minimum, unless otherwise indicated.
- B. Brass: Leaded and unleaded, flat products, FS QQ-B-613; Rods, shapes, forgings, and flat products with finished edges, FS QQ-B-626.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gauge (.040") minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
- G. Mirror Glass: ASTM C-1048, Type I, Class 1, Quality q2, 1/4" thick, with silver coating, copper protective coating, and non-metallic paint coating complying with FS DD-M-411. Provide tempered safety glass for all mirrors.

- H. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- I. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

2.3 PRODUCT DESCRIPTIONS

- A. Mirror Units: #780 Series, Mirror plates shall be of No. 1 quality 1/4" polished safety glass, silvered and electrolytically copper backed.
 - 1. Frames shall be 3/4" x 3/4", type 304, 18 gauge satin finish stainless steel angle with mitered corners, welded and polished smooth, with 20 gauge angle stiffeners welded to frame, 20 gauge galvanized steel back with formed edges secured to frame with concealed screws and equipped with integral 18 gauge cold rolled steel all welded construction wall hangers.
 - 2. Mirror units shall guaranteed by the manufacturer for a period of **fifteen (15) years** which starts on approved date of installation.
 - 3. Sizes as indicated on drawings and schedules.
- B. Grab Bars: (Provide quantity and types indicated)
 - 1. Stainless Steel Type: Provide grab bars with wall thickness not less than 18 (.050") gauge and as follows:
 - a. Mounting: Concealed, manufacturer's standard flanges and anchorages.
 - b. Clearance: 1-1/2" clearance between wall surface and inside face of bar.
 - c. Gripping Surfaces: Manufacturer's non-slip texture.
 - d. Heavy-Duty Size: Outside diameter of 1-1/2".
- C. Circular Waste Chute: No. P10-696, 6" diameter, type 304, 22 gauge stainless steel. Unit shall be installed in the countertop.
- D. Napkin Disposals: Surface mounted, Model 4722-15, one toilet compartment, fabricated of type 304, 22 gauge stainless steel with exposed surfaces in satin finish. Self-closing push flap door and stainless steel removable receptacle with tumbler lock. Overall dimensions - 10-3/4" w x 15-1/8" h x 4" d.

2.4 MISCELLANEOUS ACCESSORIES

- A. Mop and Broom Holder/Utility Shelf: No. 9954, combination unit with 18-gauge (.050") Type 304 stainless steel shelf with 1/2" returns, 16-gauge (.062") support brackets for wall mounting, provide 16-gauge stainless steel hooks for wiping rags on front of shelf, together with spring-loaded rubber cam type mop/broom holders; 1/4" diameter stainless steel drying rod suspended beneath shelf. Provide 36" long unit with 4 mop/broom holders and 3 hooks.
- B. Hand Dryer: Model "M06A-UL" Speedflow, as manufactured by Saniflow, a Mediclinics Co. Surface-mounted ADA-compliant hand dryer, high impact 1/16" thick one-piece steel cover; white epoxy finish. Hand dryer includes a fully adjustable (8500 - 11,200 rpm) universal-type

brush motor, with a heating element, power of 110 W. Noise level from 58-67 dBA while delivering 43-57 CFM of air at 108°F and 110 mph as maximum air velocity (Max - 9,840 LFM) during user controlled drying cycle. Dryer shall have a total power of 110-1,150 W with a consumption of 1.4 to 9.5 A. Unit shall be UL and CSA approved, according to UL 499, CSA C22.2 standards, and GreenSpec approved.

2.5 FABRICATION

- A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either the interior surface of the accessory or on the back surface, the manufacturer shall indicate the manufacturer's information, model number on a printed waterproof label or a stamped nameplate attached to the accessory.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which work is to be installed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 INSTALLATION

- A. Install toilet accessory units in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Use all metal type fasteners such as anchors, plates, screws, bolts and expansion shields, type as required by the construction to which accessories are to be secured. Exposed hardware shall match finish of the accessory.

3.3 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces after removing temporary labels and protective coatings.

END OF SECTION 10800

SECTION 11000 - GENERAL REQUIREMENTS - CASEWORK AND EQUIPMENT WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Part 1 through Part 6 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Casework and Equipment Work includes all items listed on schedules. All general requirements of this section apply to all equipment Contracts.

1.3 QUALITY ASSURANCE

- A. Products of individual manufacturers are scheduled to establish type and standard of quality. Products of other manufacturers proposed to be used shall meet the published specifications of the specified product as to materials, finishes, design and fabrication, to the satisfaction of the Architect.
- B. Compatibility: Provide each type of equipment by a single manufacturer, including accessories. It is of the utmost importance that a stability of design and interchangeability of parts and pieces be provided, and it shall be specifically understood that a miscellaneous assortment of equipment assembled by dealers or agents will not be considered as meeting requirements of the specification.
- C. Casework and/or Equipment Work specified herein and other Division 11 specification sections have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 - 1. Comparable products of other manufacturers will be considered only if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed by manufacturers for indicated model numbers.
 - 2. The General Contractor will not award subcontract for Casework or Equipment supplier unless the Architect has approved that supplier's samples, certificates, individual product drawings, and proof of ability to perform.

1.4 SUBMITTALS

- A. Submit manufacturer's technical data, catalog cuts and installation instructions for each type of furniture and equipment.
- B. Samples: Submit, for verification purposes, samples of each exposed material from which equipment units and accessories are composed, in each color, finish, pattern and texture indicated. If these qualities are not indicated, submit, for initial selection, manufacturer's color charts or samples of actual materials showing full range of standard colors, finishes, patterns, and textures available. Include samples of the following:
 - 1. Plastic laminate
 - 2. Baked enamel finishes for metal components

3. Wood and plywood materials and finishes
 4. Exposed fasteners
- C. Submit full-size samples of finished units when complete with hardware, doors, adjustable shelves, etc., when requested by Architect. Acceptable sample units will be used for comparison inspection at project. Unless otherwise directed, acceptable sample units may be incorporated in the work. Notify Architect of their exact locations. If not incorporated in the work, retain acceptable sample units in the building until completion and acceptance of the work. Remove sample units from the premises when directed by Architect.
- D. Shop Drawings
1. Submit shop drawings showing plans, elevations, ends cross-sections. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
 2. Coordinate shop drawings with other work involved.

1.5 PRODUCT HANDLING

- A. Deliver casework only after wet operations in building are complete.
- B. Store completed equipment in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.
- C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective coating.

1.6 JOB CONDITIONS

- A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.
- B. Examination of Substrate and Conditions
 1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a matter to permit it to be moved through properly into place.
 2. Examine the substrate and the conditions under which the work under this section is to be performed, including condition of substrate to which equipment is to be attached, and notify the Architect, in writing, of unsatisfactory conditions. Do not proceed with work under this section until satisfactory conditions have been corrected in an acceptable manner.

1.7 QUALIFICATION OF SUPPLIERS OF CASEWORK AND EQUIPMENT

- A. That it owns and operates a factory or factories adequate for and devoted to the manufacture of casework, equipment or material which is proposed to furnish and maintains strict inspection and quality control over the various manufacturing operations performed

to produce a satisfactory end product of the standard and quality set forth in the detailed specification.

1. That is at the time of submitting products and equipment and had been engaged in the manufacturing of casework or equipment for a recommended 10 consecutive years and has maintained during this time a published catalog of such specialized equipment, including a line similar to the specified.
2. That the manufacturer or his franchised representative shall have a major installation of equipment delivered and installed over a recommended 10 years conforming to the design and quality specified herein.

1.8 VARIATION FROM MATERIALS, PRODUCTS AND EQUIPMENT SPECIFIED

- A. The designs, materials, finishes, functions and upholsteries have been selected by the Owner on the advise of the Architect with intention of creating an integrated building design. For this reason, no variations from the plans, specifications and design guide will be permitted except as noted below.
 1. Whenever and wherever in any of the contract documents an article, material or equipment is defined by describing a proprietary product or by using the statement, "as manufactured by", it is the intent that this shall describe by reference the materials desired; craftsmanship and method of manufacture, as well as the size and dimensions rather than detailing all of these requirements herein. It is not the intention to limit the bidding on such items, but merely to indicate that the item must conform to these standards.
 2. **Any Laboratory Casework manufacturer requesting equivalence must submit test report from a Scientific Equipment and Furniture Association (SEFA) approved independent testing facility showing compliance with SEFA-8 standards. Failure to provide the required information maybe cause for rejection.**

PART 2 - PRODUCTS

2.1 See Schedules on Drawings.

2.2 GENERAL REQUIREMENTS (As applicable for each Contract)

- A. BASIS OF DESIGN: CATALOG NUMBERS REFER TO CAMPBELL-RHEA CASEWORK CATALOG, ETC.; OR APPROVED EQUAL, UNLESS OTHERWISE SHOWN, SEE PARAGRAPH 1.2 ABOVE.
- B. ALL CASEWORK DOORS AND DRAWERS TO HAVE LOCKS KEYED ALIKE PER ROOM AND MASTER KEYED. SCIENCE CLASSROOMS SHALL HAVE LOCKS KEYED INDIVIDUALLY AT STUDENT LAB STATIONS AND MASTERKEYED PER ROOM.
 1. The Contractor shall package keys for each room separately and identify the room number on the package and deliver to the Owner's Representative.
- C. ALL TOPS SHALL BE 1-1/2" PLYWOOD WITH PLASTIC LAMINATE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).

- D. ALL BACKSPASHES SHALL BE 3/4" PLYWOOD WITH PLASTIC LAMINATE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).
- E. ALL FURNITURE, CASEWORK AND EQUIPMENT SHOWN DOTTED AND/OR IS INDICATED AS (N.I.C.) IS NOT IN CONTRACT.
- F. UNLESS OTHERWISE SHOWN, THE CASEWORK AND EQUIPMENT WORK SUBCONTRACTOR SHALL SUPPLY AND DELIVER ALL SINKS, TAILPIECES, FAUCETS, STRAINERS AND GAS COCKS, IN CASEWORK TO THE PLUMBING AND DRAINAGE WORK CONTRACTOR.
 - 1. PLUMBING CONTRACTOR SHALL SUPPLY AND INSTALL ALL TRAPS, VALVES ETC AND SHALL MAKE FINAL CONNECTIONS TO ALL WASTE/VENTS, WATER AND GAS LINES, ETC. AS REQUIRED TO MAKE SYSTEMS FULLY FUNCTIONAL.
 - 2. UNLESS OTHERWISE SHOWN, CASEWORK AND EQUIPMENT SUBCONTRACTOR SHALL MAKE SINK CUT-OUTS.
 - 3. SINK CABINETS TO BE INSTALLED BEFORE THE INSTALLATION OF ADJACENT CABINETS.
- G. UNLESS OTHERWISE SHOWN, CASEWORK AND EQUIPMENT WORK SUBCONTRACTOR SHALL SUPPLY AND DELIVER ALL DUPLEX OUTLETS, SWITCHES, AND COVER PLATES ETC. REQUIRED FOR INSTALLATION IN CASEWORK, TABLES, ETC., TO THE ELECTRICAL WORK CONTRACTOR, READY FOR INSTALLATION AND FINAL CONNECTION BY ELECTRICAL CONTRACTOR.
 - 1. ALL DUPLEX OUTLETS SHALL BE G.F.I.C., UNLESS NOTED OTHERWISE.
- H. ALL CONTRACTORS TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND NOTIFY ARCHITECT IN WRITTEN FORM OF ANY DISCREPANCIES.
- I. PROVIDE ALL FILLERS AS REQUIRED. FINISH TO MATCH CASEWORK.
- J. UNLESS OTHERWISE SHOWN, RUBBER BASE ON ALL CASEWORK BY G.C.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition casework and furniture to average prevailing humidity conditions in installation areas prior to installing.

3.2 INSTALLATION

- A. Deliver, uncrate, set in place and install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes in corners.

- B. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.
- C. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- D. Adjust shelving, tables and chair heights (if applicable), as required and as directed by the Architect/Owner.
- E. Inspect for dents, scratches, tears, stains, holes, etc. Replace any items showing damage, loose joints or other defects.

3.3 CLEANING AND PROTECTION

- A. Clean and polish all items, remove packing cases and debris from the site.
- B. Protection: Perform all procedures and precautions for protection of materials and installed casework from damage by the work of other trades until acceptance of the work by the Owner.
- C. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

END OF SECTION 11000

SECTION 11011 - CASEWORK AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Section Includes: Wood Casework and related equipment.
1. Pre-manufactured wood casework and equipment, covered by this specification and accompanying drawings, are manufactured or supplied by one manufacturer to avoid divided responsibility.
- B. Work included in this section:
1. Furnish all items of equipment as listed in the specifications, equipment schedule and/or as shown on the drawings, including delivery to the building, unpacking, setting in place, leveling, and scribing to walls and floors as required.
 2. **Furnishing:** Equipment Subcontractor shall make cutouts, holes and openings in countertops so as to be ready for installation of fixtures by the Plumbing Work Contractor.
 - a. The Casework and Equipment Subcontractor(s) shall turn over to the Plumbing Contractor in a package, all sinks, fixtures, faucets, tailpieces, strainers, gas cocks, etc., and nipples and locknuts, etc., for installation and final connection by the Plumbing Contractor.
 3. **Furnishing:** Equipment Subcontractor shall make cutouts, holes and openings in countertops so as to be ready for installation of fixtures by the Electrical Work Contractor.
 - a. The Casework and Equipment Subcontractor(s) shall turn over to the Electrical Contractor in a package, all electrical devices, for installation and final connection by the Electrical Contractor.
 4. The Casework and Equipment Subcontractor shall provide an itemized lists and a designated site location for the transfer of the above referenced materials to the Plumbing and Electrical Contractors. The list shall have a description of the items and quantity along with a sign-off line for the Plumbing and Electrical Contractor(s).
 - a. **A copy of the signed list is to be submitted to the Architect/Owner prior to billing for this equipment.**
 5. All debris, dirt and rubbish accumulated as a result of this installation shall be removed and the premises left clean and orderly.
 6. All contractors shall familiarize themselves with the job conditions and building measurements in order to coordinate the planning, design, connections, delivery and erection of the fixed casework and related equipment furnished under these specifications with other related and associated work during the term of this contract.

- C. Work included under the work of other contracts:
1. The **connection** of sinks, tailpieces, traps, service lines, drainlines, and piping within the equipment and through, under or along the backs of working surfaces as required by the specifications and/or as shown on the drawing shall be by the Plumbing and Drainage Work Contractor in accordance with Part-4 Specifications Sections.
 2. The **connection** of electrical receptacles, shall be by the Electrical Work Contractor in accordance with Part-6 Specifications Sections.
 3. The furnishing of any framing or reinforcements for walls, floors, or ceilings to support any equipment, General Construction Work Contractor in accordance with Part-2 Specifications Sections.

1.2 QUALITY ASSURANCE

- A. Provide all casework (for integration with tops, sinks and service fixtures, as required) manufactured or furnished by the same company for single responsibility.
- B. Basis of Design: **"Campbell Rhea - Classic Oak Series", as manufactured by Institutional Casework, Inc., Paris Tennessee.**
- C. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
1. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed above.
 - a. Wood-Metal Industries.
 - b. Diversified Woodcraft.
 - c. Leonard Peterson - Vanguard Line, Lipped.
 - d. Or approved equal.
 2. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
 3. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A201 and Section 00800.
 4. Substituted product(s) shall be meet the following minimum requirements:
 - a. All four corners of drawer boxes must be dove-tailed together, and the bottom of all drawer boxes must be let in to the sides, front and back, to be "fully captured." Applied drawer bottoms will not be permitted.

- b. All drawer front shall be fabricated from solid red oak lumber.
 - c. All cabinet doors shall be framed with solid oak rails on four sides. Tall case doors shall include a lightweight core to reduce stress on hinges. Doors constructed of plywood or particleboard, edge-banded with oak will not be permitted. Tall case doors shall be mounted with (4) hinges.
 - d. All glass in doors shall be tempered safety glass. Float glass **will not** be permitted.
 - e. All tall case doors shall be complete with three-point latching mechanism. Single-point latching will not be permitted.
5. The General Contractor will not award subcontract to a wood laboratory casework supplier who is not on the approved list, unless the Architect has approved that supplier's samples, certificates, individual product drawings, and proof of ability to perform.

1.3 SUBMITTALS

- A. Submit two copies of manufacturer's data and installation instructions for each type of equipment.
- B. Samples:
 - 1. Submit samples of available laminated plastic patterns and colors for Architect's selection.
 - 2. Submit one full size sample of finished base cabinet unit complete with hardware, doors and drawers, without finish top.
 - 3. Submit one full size sample of finished wall mounted cabinet unit complete with hardware, doors and adjustable shelves.
 - 4. Acceptable sample units will be used for comparison inspections at project. Unless otherwise directed, acceptable sample units may be incorporated in the work. Notify Architect of their exact locations. If not incorporated in the work, retain acceptable sample units in the building until completion and acceptance of the work.
 - 5. Remove sample units from the premises when directed by the Architect.
- C. Shop Drawings
 - 1. Submit shop drawings showing plans, elevations, ends, cross-sections, service run spaces, locations and type of service fixtures with lines thereto. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
 - 2. Coordinate shop drawings with other work involved.

D. Test Reports - Certifications:

1. Submit the following:
 - a. Test reports certifying that the casework finish complies with chemical and other resistance requirements of the specifications.
 - b. Performance test reports from an independent testing lab on each specified top material.

1.4 PRODUCT HANDLING

- A. Deliver casework only after wet operations in building are complete.
- B. Store completed wood furniture in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.
- C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective coating.

1.5 JOB CONDITIONS

- A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.
- B. Examination of Substrate and Conditions
 1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a matter to permit it to be moved through properly into place.
 2. Examine the substrate and the conditions under which the work under this section is to be performed, and notify the Architect, in writing, of unsatisfactory conditions. Do not proceed with work under this section until satisfactory conditions have been corrected in an acceptable manner.

1.6 WARRANTY

- A. Manufacturer shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of delivery.
 1. Within the warranty period, manufacturer shall repair, replace, or refund the purchase price of defective casework.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The best cabinet making practices for casework construction shall be followed. All cabinets shall be integral units, each completely enclosed without the use of common partitions unless otherwise specified.

2.2 MATERIALS

A. Lumber:

1. Oak lumber is red oak, grade FAS or better, air dried and kiln dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Red oak lumber exposed to view, is free of stains, splits, shakes, season checks and other similar defects.
2. Other hardwoods are grade FAS or better, air dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Other hardwoods are used in semi-exposed, or unexposed, areas and comply with NHLA grading for FAS or better lumber.

B. Plywood:

1. Oak plywood is red oak, grade A-2, plain sliced, book-matched, crossbanded, and has a solid core.
 - a. 3/4 inch is a minimum of 7-ply.
 - b. 1/2 inch is a minimum of 5-ply.
 - c. 1/4 inch is a minimum of 3-ply.
 - d. 3/32 inch is a minimum of 3-ply.
2. Other hardwood plywoods are sound grade, have a solid core and are suitable for semi-exposed or unexposed areas.
 - a. 3/4 inch is a minimum of 7-ply.
 - b. 1/2 inch is a minimum of 5-ply.
 - c. 1/4 inch is a minimum of 3-ply.
 - d. 3/32 inch is a minimum of 3-ply.

C. Hardboard:

1. Hardboard is service tempered and consists of steam-exploded wood fibers, highly compressed into a hard, dense, 1/4 inch thick, homogeneous sheet, using natural resins and other added binders.
2. Physical properties:
 - a. Average modulus of rupture is 5,300 lbs./sq. inch
 - b. Density is 50 to 60 lbs./cu. foot
 - c. Tensile strength of 3,500 lbs./sq. inch.

D. Particleboard:

1. Particleboard is industrial grade.
2. Physical properties:
 - a. Density, 46 to 50 lbs./cu. ft.
 - b. Modulus of rupture, minimum, 2,200 psi
 - c. Modulus of elasticity, minimum, 450,000 psi.

E. Glass:

1. Tempered safety glass: Heat treated glass, 1/4 inch thick with a minimum of 88 percent clarity.

F. Service Fixtures:

1. Water, gas, steam, or other services: Triple chrome plated, have heavy-duty construction and are specifically designed for laboratory use.

- a. **Water Faucets - Hot and Cold:** Faucets are cast from red brass, and have four-arm type handles with color coded indexes. Faucets have serrated hose nozzles. Faucets have patented REX unit ceramic disc cartridges, and replaceable seats. The stem is brass, with full Acme threads, and has a brass cap nut. Goosenecks are rigid. Fixture outlets are tapped 3/8 inch I.P.S. for aerators, vacuum breakers, hose connections, and or other accessories. Provide vacuum breakers.

(1) Provide lever handle type faucet control for barrier free applications in accordance with sink notes indicated on drawings.

- b. **Gas, Air and Vacuum Cocks:** Ground key cocks, made from high grade, brass forgings, have integral ten serration, non-slip hose ends. Wing handle has color-coded index, one piece construction, precision ground, and lapped to fit cock chamber. Handle operates with a 1/4 turn, and is spring-loaded.

- c. **Multiple Service Fixtures:** Triple chrome plated fixtures have one cold water faucet and two ground key cocks for gas, air, and or vacuum services. Cold water valve has patented REX unit ceramic disc cartridge. Faucet has a rigid gooseneck, one four-arm handle, and serrated hose nozzle. Provide vacuum breakers. Ground key cocks have serrated non-slip hose end and color coded, spring-loaded wing handles.

- d. **Vacuum Breakers:** Watts NLF-9, or comparable, vacuum breakers are brass with polished chrome plating, screw-in type with stainless steel working parts, and durable rubber diaphragm and disc. Vacuum breaker is for hot or cold faucet and has a primary valve with a soft disc that seats against mating part. The secondary check valve utilizes a soft disc to metal seating. Breaker is tapped 3/8 inch N.P.T.

2. Electrical Fixtures: Receptacles are 3-wire grounded, 20 A, 125V AC, with stainless steel cover plates and cadmium-plated steel boxes. Pedestal boxes are brushed, cast aluminum with conduit nipples and lock nuts.

- a. G.F.I. fixtures: 20 A, 125V AC, with a brown nylon face and a LED indicator light. Conform to UL Standard 943 Class A, have hospital grade high abuse receptacle construction, and certified corrosion resistance with cupro-nickel exposed metal parts. Provide terminal screw wiring connections and a trip time of 0.025 seconds.

3. Sinks and Sink Outlets:

- a. **Epoxy resin** sinks are non-glaring black, specially modified epoxy resins, molded in one solid piece for optimum physical and chemical resistance. Inside corners are

coved and the bottom is dished to the outlet. Outlets are epoxy resin, specially compounded and cured for optimum physical and chemical resistance, and 1-1/2 inches in diameter, unless otherwise specified.

NOTE: Coordinate with Plumbing Drawings and Specifications.

G. Tops (See Equipment Schedule):

1. Rhearesin: Top is one inch thick, molded from a modified epoxy resin and has optimum physical and chemical resistance. The specially compounded and cured uniform mixture, throughout the thickness of the top, is not dependent on a surface coating for chemical, or stain, resistance. Exposed edges and corners are radiused, and a drip groove is provided on under surface, when specified. Curb is four inches high.
 - a. Color: Manufacturer's standard Black.
2. Rheatex: Top surface and edges are 0.050 inch thick, horizontal grade, **high pressure, plastic laminate** applied to a 46-50 lb. density particleboard core. Finished top is one inch thick, and the curb is four inches high unless specifically dimensioned higher on Equipment Plans. A phenolic backing sheet is applied to the bottom surface.
 - a. Colors: to be selected from manufacturer's available full range of colors.

H. Hardware and Accessories:

1. Pulls: Shall be selected by the Architect from manufacturer's available standard and custom units at no additional cost to the Owner.
2. Handles:
 - a. Latching handle LH-1 is die cast zinc alloy, 4-1/4 inches long, has a dull chrome plated finish. Handle operates with 1/4 turn. Double door cases have latching handles on the right door and dummy handles on the left door. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors.
 - b. Locking handle LK-1 is a latching handle with a lock mechanism incorporated into the handle head. On double door cases, the left door has a dummy handle, and the right door has the locking handle. Lock is laboratory grade with a 5-disc tumbler mechanism and a dull chrome plated face. Tumblers and keys are brass, while the plug and cylinder are die cast zinc alloy. Locks are keyed differently, master keyed and furnished with 2 keys per lock.
3. Locks:
 - a. Lock SL-1 is a laboratory grade, cylinder cam lock, with a 5-disc tumbler mechanism, and a dull chrome plated face. Tumblers and keys are brass, while plug and cylinder are die cast zinc alloy. Lock operates with a 180 degree turn of the key. There are 500 key changes standard. Locks are keyed differently, master keyed and furnished with 2 keys per lock.

- b. Locks are to be furnished on all doors and drawers.
4. Hinges:
- a. Hinge CP-1 is heavy duty, institutional type, 5-knuckle hospital tipped, and made from .095 inch thick, chrome plated mild steel. Hinge is wrap around style, and 2-3/4 inches high. The wing for mounting to end panel has 4 holes, two of which are slotted for adjustability; wing for the door has 5 holes, two of which are slotted for adjustability.
 - b. Elbow catch is a steel, spring loaded catch that releases with finger pressure. The catch and steel strike plate are mounted with screws. Strike plate screw holes are slotted for adjustability and pin hole is provided to help anchor its position.
6. Drawer Slides:
- a. Drawer slides DS-1 are electrostatically epoxy powder coated, cold rolled steel, heavy-duty, side mounted, and have a 150 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides have automatic positive stop levers to prevent accidental drawer removal, but allow quick removal without tools.
 - b. File drawer slides FD-1 are zinc plated, cold rolled steel, heavy-duty, side mounted, and have a 100 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers. Slides are full extension with a positive stop, and a lift out disconnect.
7. Shelf Clips:
- a. **Shelf support clips shall be "seismic" twin pin type for mounting on interior of cabinet work. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves in all cabinets are adjustable on 32mm centers.**
 - 1) **Single pin support clips and surface mounted metal support strips and clips subject to corrosion are not acceptable.**
8. Leg Shoes:
- a. Leg shoes are closed-bottom style, 2½ inches square, and molded of 1/8 inch black polyethylene.
9. Crossbars and Greenlaw Arms:
- a. Crossbars and Greenlaw Arms are 3/4 inch diameter, anodized aluminum rods, with ends rounded.
10. Upright Rods:
- a. Upright Rods are 3/4 inch diameter, anodized aluminum, 36 inches long with a rounded top and a tapered bottom, to fit rod sockets.

11. Clamps:
 - a. Clamps are 1 inch square aluminum stock, with two, 3/4 inch diameter openings, at right angles to each other, bored through sides. Thumb screws are provided at each end of the clamp, tighten against the rods to hold positions.
12. Rod Sockets:
 - a. Rod sockets are mushroom type, machined from a solid aluminum rod. Secured to the top by heavy aluminum lock nut and washer.
13. Burette Rods:
 - a. Burette rods are 1/2 inch diameter, anodized aluminum and either 18 or 24 inches long. Rods are furnished with a tapered aluminum adapter to fit rod socket.

2.3 FABRICATION

- A. Factory assembly of casework in the largest components possible aids in the installation. Mortise and tenon construction with glued and screwed joints is used for maximum strength; and the use of precision jigs and clamps ensures square corners and plumb vertical surfaces.
- B. Fabrication of laboratory casework and equipment is completed to dimensions in the final, approved copy of shop drawings.
- C. Base Cabinets:
 1. All base cabinets are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each base cabinet is completely enclosed without the use of common partitions, and has flush construction with overlapping doors and drawers, which provides a dust resistant interior. A base cabinet has a full horizontal top frame with bored, doweled and glued joints, intermediate front rails and a 3/4 inch plywood bottom; rear horizontal parting rails and separators are provided as required. Horizontal top frame, intermediate parting rails and the bottom are bored, doweled and glued. Separators where indicated, are let into routed intermediate rails. Backs are recessed and encapsulated into dadoed end panels and further secured with glue blocks on each side, except where they need to be removable for access to plumbing. Backs are screwed to the top frame and further secured with glue blocks on each side. An enclosed toe space, 2-1/4 inches by 4 inches, is furnished with the toe rail bored, doweled and glued to end panels.
- D. Wall and Upper Cases:
 1. All wall and upper cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels; and glued and screwed to the back. Backs are recessed and encapsulated into dadoed end panels, and further secured with glue

blocks on each side. Exterior hanger rails, at the top of the back, are glued to the back and then screwed to the top panel and bored, doweled and glued into end panels. Exterior hanger rails, at the bottom of the back, are glued to the back and then screwed to the bottom panel and bored, doweled and glued into end panels. Adjustable shelves are supported on **“seismic” twin pin type** shelf clips, which fit into holes drilled 32 mm on centers, in the case end panels.

E. Tall Cases:

1. All tall cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels and glued and screwed to the back. An exterior back cross rail is provided at the top of each case, glued to the back, and then screwed to the top panel and bored, doweled and glued into the end panels. Additional back cross rails are provided, as required. Backs are recessed, let into dadoed end panels, and further secured with glue blocks at the sides. An enclosed toe space, 2-1/4 inches by 4 inches high, is furnished with toe rail securely bored, doweled and glued to end panels and bottom panel.
2. Rails:
 - a. Interior: 2-1/4 inches by 3/4 inch, solid hardwood
 - b. Exterior: 4-1/8 inches by 3/4 inch, solid oak
3. Top panel, bottom panel, dividers, fixed shelf and adjustable shelves:
 - a. Cases with exposed interiors: All are 1 inch oak plywood
 - b. Cases with unexposed interiors: All are 1 inch hardwood plywood.
4. Backs:
 - a. Cases with exposed interiors and exposed exteriors: Back is 1/4 inch oak plywood.
 - b. Cases with unexposed interiors and unexposed exteriors: Back is 1/4 inch service tempered hardboard.
5. End panels:
 - a. Cases with exposed interiors: End panels are 3/4 inch oak plywood.
 - b. Cases with exposed exteriors: end panels are 3/4 inch oak plywood.
 - c. Cases with unexposed interiors and one exposed end panel and one unexposed end panel: Exposed end panel is 3/4 inch oak plywood; unexposed end panel is 3/4 inch hardwood plywood.
 - d. Cases with unexposed interiors and unexposed exteriors: end panels are 3/4 inch hardwood plywood.
6. Exposed edges of end panels, dividers and shelves are edgebanded with 1/4 inch solid oak.

7. Exterior back cross rails: 3 inches by 3/4 inch hardwood plywood.

F. Drawers:

1. Components:

- a. Drawer front: 13/16 inch oak lumber.
- b. Drawer sides and back: 1/2 inch hardwood lumber.
- c. Drawer bottom: 1/4 inch service tempered hardboard.
- d. Construction: All four corners of the drawer are dovetailed and glued. Edges of the drawer front are machine radiused to form a lip and overlap the opening 1/4 inch on all sides. Drawer fronts are one piece of lumber, providing consistency in color and grain within each drawer front. The back perimeter of the drawer front is routed so drawer front is recessed into the opening and projects 13/32 of an inch. The top edge of drawer sides and back are radiused. The bottom is let into the box on four sides and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. In cabinets 24 inches or less in width, drawers have one, AL-1 aluminum pull which is surface mounted with 2 screws, 4 inches on centers. In cabinets over 24 inches wide, drawers have two AL-1 aluminum pulls. Drawers are supported on DS-1 slides which are side mounted, heavy duty, electrostatically epoxy powder coated, cold rolled steel, and have a 150 lb. load capacity. Slides are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. DS-1 slides have automatic, positive stop levers to prevent drawer's accidental removal, but allow for quick removal without tools. File drawers are supported on side mounted FD-1 full extension steel slides. File drawers have an interior, screw mounted, metal bottom track and an adjustable metal file follower. Lock SL-1 is furnished when indicated.

G. Doors:

1. Hinged solid doors, 48 inches or less in height:

- a. Core ply: Solid oak rails on four edges framing a particleboard core.
- b. Hardwood plywood crossbands: Four; two laminated on each side of core ply.
- c. Red oak veneer: Face plys; one applied to each side.
- d. Construction: Hinged solid doors, 48 inches or less in height, are 13/16 inch thick and have solid oak rails on the four edges. Doors overlap the opening 1/4 inch on all sides and have machined radiused edges. Doors have one aluminum pull which is surface mounted with two screws. Doors have two, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges, each attached with 5 tempered steel screws into solid oak framing of door, and 4 Euro screws into the end panel. Doors are secured by zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catch and steel strike plate are attached with screws. On lockable double door

cabinets, the left door is secured with a steel, spring loaded, elbow catch that releases with finger pressure. The catch and the strike plate are attached with screws. Strike plate screw holes are slotted for adjustability and a pin hole is provided to help anchor plate's position. Lock SL-1 is furnished when indicated.

2. Hinged solid doors over 48 inches in height:
 - a. Core ply: Solid oak rails on four edges framing a particleboard core.
 - b. Hardwood plywood crossbands: Four; two laminated on each side of core ply.
 - c. Red oak veneer: Face plys; one applied to each side.
 - d. Construction: Hinged solid doors over 48 inches in height, are one inch thick and have solid oak rails on the four edges. Doors overlap opening 1/4 inch on all sides, and machined radiused edges. Single doors and right door of double doors have a LH-1 latching handle, which is 4-1/4 inches long, streamline design, with a dull chrome plated finish. Handle operates with 1/4 turn. Left door of double doors has a fixed handle, which is the same size and finish as a LH-1 latching handle. A three point latching system provides single doors and right door of double doors positive engagement at the top and bottom of the door with tapered aluminum rods which engage plastic strike plates and pull the door snug. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors. Right door of double doors lap over the integral machined astragal on left door, securely holding door shut. Doors have three, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 tempered steel screws in to solid oak framing of the door, and 4 Euro screws into the end panel. Left door of double doors is additionally secured with two zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catches and steel strike plates are attached with screws. Catch screw holes are slotted for adjustability, and the strike plate has two nips to help anchor its position. Locking handle LK-1 is furnished when indicated.

3. Hinged glazed doors, 48 inches or less in height:
 - a. Frame: 1-1/16 inch by 3 inches, solid oak.
 - b. Glass: 1/4 thick tempered glass.
 - c. Construction: Hinged glazed doors, 48 inches or less in height, are solid oak frames with joints bored, doweled and glued. The balance of the door is glass. Doors have slightly machine radiused, squared edges which overlap opening 1/4 inch on all sides. The back perimeter of the door is routed so the door is recessed into the opening and projects 13/32 of an inch. Door has one, aluminum pull which is surface mounted with two screws. Doors have two, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 tempered steel screws into solid oak framing of the door, and 4 Euro screws into the end panel. All doors are secured by zinc plated steel, friction roller catches,

with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catch and steel strike plate are attached with screws. Catch screw holes are slotted for adjustability. On lockable double door cabinets, the left door is secured with a steel, spring loaded, elbow catch that releases with finger pressure. The catch and the strike plate are attached with screws. Strike plate screw holes are slotted for adjustability and a pin hole is provided to help anchor plate's position. Lock SL-1 is furnished when indicated.

4. Hinged glazed doors, over 48 inches in height:
 - a. Frame: 1-1/16 inch by 3 inches, solid oak.
 - b. Center cross frame member: 1-1/16 inch by 3 inches, solid oak.
 - c. Glass: 1/4 inch thick tempered glass.
 - d. Construction: Hinged glazed doors, over 48 inches in height, are solid oak frames with a center cross frame member. All joints in the frame are bored, doweled and glued. The balance of the door is glass. Doors have slightly machine radiused, and overlap opening 1/4 inch on all sides. The back perimeter of the door is routed so the door is recessed into the opening and projects 13/32 of an inch. Single doors and right door of double doors have a LH-1 latching handle, which is 4-1/4 inches long, streamline design, with a dull chrome plated finish. Handle operates with 1/4 turn. Left door of double doors has a fixed handle, which is the same size and finish as a LH-1 latching handle. A three point latching system provides single doors and right door of double doors positive engagement at the top and bottom of the door with tapered aluminum rods which engage plastic strike plates and pull the door snug. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors. Right door of double doors lap over the integral machined astragal on left door, securely holding door shut. Doors have three, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 tempered steel screws into solid oak framing of the door, and 4 Euro screws into the end panel. The left door of double doors is additionally secured with two zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catches and steel strike plates are attached with screws. Catch screw holes are slotted for adjustability. Locking handle LK-1 is furnished when indicated.

H. Casework Finishes:

1. Surfaces to be Finished: Exposed exterior and exposed interior surfaces of cabinets receive the full finishing process. The unexposed interior surfaces of cupboards, drawers, wall cases, upper cases, and tall cases receive a baked on protective coat of moisture and chemical resistant catalyzed sealer, and a top coat of clear, catalyzed conversion varnish. Other unexposed surfaces are processed through standard finishing steps, and receive a baked on protective coat of moisture and chemical resistant catalyzed sealer.

2. Finishing Process: Prior to assembly lumber for doors, drawers and cabinets, and plywood for cabinets, are machine sanded with 120 grit, 180 grit, and finally, 220 grit sand paper. Flat surfaces receive two additional machine sandings: one in an orbital crossbelt sander with 40 micron and 60 micron grit sanding belts; and, one through a rotary polisher with 150 grit sand paper. Door and drawer front edges are machine sanded to a very smooth surface through a profile edge sander utilizing a 100 grit and a 150 grit paper. After assembly, drawers, doors, and casework are thoroughly examined and fine-finished by hand to provide a consistently smooth surface. Prior to the first application in the finishing process, items are placed in the dust-off booth where compressed air is used to remove loose fibers and dust. Selected surfaces are stained with NGR stain to the desired color and allowed to dry. Next a protective coat of moisture and chemical resistant, catalyzed sealer is applied. After flash drying, items are oven baked at 130°F. Following a cool down period, surfaces that receive the final top coat are carefully hand sanded and wiped clean. A top coat of clear, catalyzed, conversion varnish is applied, allowed to dry, and then oven baked at 130°F. The final top coat provides chemical resistance, toughness, durability, and excellent color stability with a smooth finish and high-gloss lustre.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition casework and furniture to average prevailing humidity conditions in installation areas prior to installing.

3.2 INSTALLATION

- A. Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes at corners. Install wall cabinets in accordance with details on drawings.
- B. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.
- C. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING AND PROTECTION

- A. Repair or remove and replace defective work as directed upon completion of installation.
- B. Protection: Perform all procedures and precautions for protection of materials and installed casework from damage by the work of other trades until acceptance of the work by the Owner. Advise HVAC Contractor of the required temperature/humidity conditions which must be maintained during the remainder of the construction period.
- C. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

- D. Clean up cut out pieces, sawdust and debris, packing cases, etc. Leave areas in broom clean condition. Remove all debris as a result of work of this Contract.

END OF SECTION 11011

PART 3 - STRUCTURAL STEEL AND ORNAMENTAL IRON WORK

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SUMMARY

- A. Extent of concrete work is shown on drawings.
- B. Concrete paving and walks are specified in Division 2.

1.03 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds and others as required by Architect.
- B. Samples: Submit samples of materials as requested by Architect, including names, sources and descriptions.
- C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.
- D. Materials Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- E. Shop Drawings: Reinforcement: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing diagrams of bent bars, arrangement of concrete reinforcement.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings".
 - 2. ACI 318 "Building Code Requirements for Reinforced Concrete".
 - 3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
- B. Concrete Testing Service: Engage a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

2.03 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II.
 - 1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
- C. Light Weight Aggregates: ASTM C330 and as herein specified, coarse shale, slate or slag aggregate, free from expanded clay
- D. Water: Drinkable.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Air-Mix"; Euclid Chemical Co.

- b. "Sika Aer"; Sika Corp.
 - c. "MB-VR or MB-AE"; Master Builders.
 - d. "Darex AEA" or "Daravair"; W.R. Grace.

- F. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.05 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "WRDA" Hycol"; W.R.Grace.
 - b. "Eucon WR-75" or "Eucon WR-89"; Euclid Chemical Co.
 - c. "Pozzolith 322N"; Master Builders.

- G. High-Range Water-Reducing Admixture (Super Plasticizer) ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Daracem 100" or "WRDA-19"; W.R. Grace.
 - b. "Eucon 37"; Euclid Chemical Co.
 - c. "Rheobuild 1000"; Master Builders.
 - d. "Sika 86"; Sika Corporation.

- H. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.024 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Accelguard 80"; Euclid Chemical Co.
 - b. "Daraset"; W.R. Grace
 - c. "Plastocrete 161FL" or "SikeSet NC"; Sika Corporation

- I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D and containing not more than 0.05 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Pozzolith Retarder"; Master Builders.
 - b. "Eucon Retarder 75"; Euclid Chemical Co.
 - c. "Daratard 17"; W.R. Grace.
 - d. "Plastocrete 161R"; Sika Corporation.

- J. Prohibited Admixtures: Calcium chloride thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

2.04 RELATED MATERIALS

- A. Extruded Polystyrene Board Insulation: Rigid closed-cell extruded, expanded polystyrene insulation board with integral high-density skin, complying with ASTM C-

578 Type IV: min. 25 psi compressive strength ASTM D 1621: k value of 0.20 ASTM C 518: 0.30% maximum water absorption ASTM C272: 1.1 perm/inch max water vapor transmission: manufacturer's standard length and widths.

1. Manufacturer: Subject to compliance with requirements, provide products of one of the following or an approved equal:
 - a. Dow Chemical Co: Midland MI
 - b. VC Industries/V.5 Gypsum: Chicago, IL.
 - c. GreenGuard XPS: Pactive LLC: Austin, TX
- B. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements provide one of the following:
 3. Non-metallic
 - a. "Euco-NS"; Euclid Chemical Co.
 - b. "Duragrout"; L&M Construction Chemicals, Inc.
 - c. "Masterflow 713"; Master Builders
 - d. "Five Star Grout"; U.S. Grout Corporation.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- E. Clear curing and sealing compound (VOC Compliant): The compound shall have 30% solids content minimum, and will not yellow under ultraviolet light after 500 hours of test in accordance with ASTM C-1315 and will have test data from an independent testing laboratory indicating a maximum moisture loss of 0.039 grams per sq. cm. when applied at a rate of 300 sq. ft. per gallon. Sodium silicate compounds are not permitted.
 1. Product: "Super Aqua-Cure VOX" by Euclid Chemical Co.
 2. Product: "Dress & Seal WB30" by L&M Construction Chemicals, Inc
 3. Product: "Kure-n-Seal 30 VOC" by Sonneborne
 4. Or approved equal.
- F. Vapor Barrier: Provide vapor barrier which conforms to ASTM E1745, Class A. The membrane shall have a water-vapor transmission rate no greater than 0.01 gr./ft²/hr/inch Hg when tested in accordance with ASTM E96. The vapor barrier shall be placed over prepared base material where indicated below slabs on grade. Vapor barrier shall be no less than 15 mil thick. Installation of vapor barrier to comply with ASTM E1643.

1. Product: Stego Wrap (15 mil) Vapor Barrier by Stego Industries LLC
2. Product: VaporBlock (15 mil) by Raven Industries
3. Product: Zero Perm by Alumiseal
4. Product: Premoulded Membrane with PLASMATIC CORE by W.R. Meadows.

2.05 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
- B. Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
- D. For normal weight aggregate mixes: 3000 psi 28-day compressive strength; W/C ratio, 0.51 maximum, 3500 psi 28-day compressive strength W/C ratio, 0.47 maximum.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be admitted to and accepted by Architect before using in work.
- F. Admixtures:
 1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
 2. Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight and concrete with water/cement ratios below 0.50.
 3. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
 4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits.
 - a. 5% for maximum 2" aggregate
 - b. 6% for maximum 3/4" aggregate
 - c. 7% for maximum 1/2" aggregate
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 1. Ramps, slabs and sloping surfaces: Not more than 3".

2. Reinforced foundation systems: Not less than 1" and not more than 3".
3. Concrete containing HRWR admixture (super-plasticizer): Not more than 8" after addition of HRWR to site-verified 2"-3" slump concrete.
4. Other concrete: Not less than 1" nor more than 4"

2.06 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified.
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

PART 3 - EXECUTION

3.01 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structure are of correct size, shape, alignment, elevations and position.
- B. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keywarp, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features, required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

3.02 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate at a maximum spacing of 90 feet, so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Control Joints: Locate and install control joints as indicated or at a maximum spacing of 30 feet. Locate at a spacing which does not impair appearance of the structure as acceptable to Architect. Use "SOFFCUT" saw to cut joints in slab. Joint to be cut the same day as the pour.
- C. Joint filler and sealant materials are specified in Division-7 sections of these specifications.

3.04 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms, or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.05 CONCRETE PLACEMENT

- A. Preplacement inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.
- B. General: Comply with ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

- E. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- F. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- G. Maintain reinforcing in proper position during concrete placement operations.
- H. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which would be caused by frost, freezing actions or low temperatures, in compliance with ACI 306R.
- I. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- J. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305R.

3.06 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
- B. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of Ff18 - Ff15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
- D. After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff20 - Ff17. Grind smooth surface defects which would telegraph through supplied floor covering system.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.

3.07 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing and by combinations thereof, as herein specified.
- E. Provide moisture curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- F. Provide moisture-cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, place in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- G. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting and other coatings and finish materials, unless otherwise acceptable to Architect.
- H. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
- I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover, unless otherwise directed.

3.08 MISCELLANEOUS CONCRETE ITEMS

- A. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- B. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

3.09 CONCRETE SURFACE REPAIRS

- A. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- B. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions.
- C. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- D. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
- E. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material.

3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The owner will employ a testing laboratory to perform the following tests, inspect formwork and reinforcement placement and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- D. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- E. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

- F. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
- G. Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- H. Nondestructive Testing: Impact hammer, sonoscope or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- I. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03300

SECTION 05120 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections and type of steel required.
- B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" as modified here and as otherwise shown on drawings.
 - 1. Section 2.1 to include "Lintels shown or otherwise enumerated or scheduled."
 - 2. Section 4.4, The first two sentences of this section are to be replaced with the following, "Shop drawings are to be made by the fabricator, prints thereof are to be submitted to the structural engineer and architect for their examination and approval. These shop drawings are to be submitted in minimum of the following three phases: Anchor bolt plans and advanced shipment pieces; Erection plans and thirdly; Piece details (maximum of 100 sheets per submission). The fabricator is to await the receipt of the previous phase prior to submission of the next phase. The fabricator is to include an allowance of fourteen (14) calendar days in his schedule for the review of these drawings by the structural engineer for the return of shop drawings. These calendar days start from the time the drawings are received by the engineer."
- C. Miscellaneous Metal Fabricators are specified elsewhere in Division 5.
- D. Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.
- E. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - 1. Promptly remove and replace materials or fabricated components which do not comply.
- F. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.
 - 1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

1.02 SUBMITTALS

- A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.
 - 3. Structural steel primer paint.
- B. Shop Drawings: Submit shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.
- C. Include details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols; and show size, length and type of each weld.
 - 1. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
- D. Test Reports: Submit copies of tests conducted on shop and field bolted and welded connections. Include data on type (s) of tests conducted and test results.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
- B. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
- C. AISC "Specifications for Architecturally Exposed Structural Steel".
- D. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
- E. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
- F. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
- G. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 - 1. If recertification of welders is required, retesting will be Contractor's responsibility.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- B. Structural Steel Wide Flange Shapes: ASTM A 992/A572, Grade 50
- C. Other Structural Steel Shapes, Plates and Bars: ASTM A 36.
- D. Cold-Formed Steel Tubing: ASTM A 500, Grade B.
- E. Anchor Bolts: ASTM F 1554, Grade 36, nonheaded type unless otherwise indicated.
- F. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts and hardened washers, as follows:
 - 1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.
 - 2. Direct tension indicator washers may be used at Contractor's option.
- G. Electrodes for Welding: Comply with AWS Code.
- H. Structural Steel Primer Paint: SSPC – Paint 23.

2.02 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
- B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
- C. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final

structure free of markings, burrs and other defects.

- D. Connections: Weld or bolt shop connections, as indicated.
- E. Bolt field connections, except where welded connections or other connections are indicated.
 - 1. Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.
- F. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBS).
- G. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds and methods used in correcting welding work.
- H. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
- I. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.
- J. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- K. Field drill holes in existing steel members for connection of new steel as noted on the drawings.

2.03 SHOP PAINTING

- A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar or to receive fire-proofing. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.
- B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - 1. SP-1 "Solvent Cleaning".
 - 2. SP-3 "Power Tool Cleaning".
- C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with Manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.

PART 3 - EXECUTION

3.01 ERECTION

- A. Surveys: Employ a registered professional engineer or land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustment to structural steel work have been agreed upon with Architect.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
- C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- D. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- E. Level and plumb individual members of structure within specified AISC tolerances.
- F. Splice members only where indicated and accepted on shop drawings.
- G. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
- H. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and removal of paint on surfaces adjacent to field welds.
- I. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only as acceptable to Architect.
- K. Touch-Up Painting: Immediately after erection,,clean field welds, bolted connections and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
- L. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.02 QUALITY CONTROL

- A. Owner to engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any noncompliance of original work, and as may be necessary to show compliance of corrected work.
- F. Shop Bolted Connections: Inspect or test in accordance with AISC specifications.
- G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
- H. Field Bolted Connections: Inspect in accordance with AISC specifications.
- I. Field Welding: Inspect and test during erection of structural steel as follows:
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
- J. Testing agency shall confirm that the structure is square, plumb and level in accordance with AISC tolerances.
- K. In addition to visual inspection, field-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.

1. Liquid Penetration Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
4. Ultrasonic Inspection: ASTM E 164.

3.03 STEEL ALLOWANCE

- A. Provide and include in this bid a lump sum of \$15,000 (3 tons of steel @ \$5,000.00 per ton) of fabricated and erected steel. This steel shall be provided at any time until final acceptance of this contract by the Architect. This steel may consist of W. F. Sections, angles, frames or various miscellaneous steel. Include shop drawings, fabrication and erection in this item.
 1. Upon completion of the project, any of the allowance work not used, shall be credited to the Owner against the contract price at the rate of two dollars and fifty cents (\$2.50) per pound.

END OF SECTION 05120

SECTION 05210 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.01 SCOPE

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.
- B. The extent of steel joists is shown on the drawings, including basic layout and type of joists required.

1.02 QUALITY ASSURANCE

- A. Provide joists fabricated in compliance with the following, and as herein specified.
 - 1. AISC-SJI "Standard Specifications and Load Tables" for:
 - a. K-Series Open Web Steel Joists
 - b. LH-Series Steel Joists
- B. Steel joist manufacturer shall be an approved member of the Steel Joist Institute for the types of joists supplied.
- C. Qualification of Welding Work:
 - 1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure".
 - 2. Joists welded in place are subject to inspection and testing. Expense of removing and replacing any portion of the steel joists for testing purposes will be borne by the Owner if welds are found to be satisfactory. Remove and replace any work found to be defective and provide new acceptable work.
- D. Workmanship:
 - 1. Steel Inspection and Testing Service: Employ, at Contractor's expense, a testing laboratory acceptable to the Architect to inspect welded connections and to perform tests and submit inspection and test reports to the Architect.

1.03 SUBMITTALS

- A. Manufacturer's Data, Steel Joists:
 - 1. Submit two (2) copies of manufacturer's specifications and installation instructions for each type of joist and its accessories. Include manufacturer's certification that joists comply with AISC-SJI "Specifications".

- B. Shop Drawings, Steel Joists:
 - 1. Submit detailed drawings showing layout of joist units, special connections, jointing and accessories. Include the mark, number, type, location and spacing of joists and bridging.

Provide templates or location drawings for installation of anchor bolts.
- C. Delivery, Storage and Handling:
 - 1. Deliver, store and handle steel joists as recommended in AISC-SJI "Specifications". Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel: Comply with AISC-SJI "Specifications".
- B. Steel Prime Paint: Comply with SJI "Specifications".

2.02 FABRICATION

- A. General: Fabricate steel joists in accordance with AISC-SJI "Specifications".
- B. Extended Ends: Provide extended ends on joists where shown, complying with the manufacturer's standards and requirements of applicable AISC-SJI "Specifications" and load tables.
- C. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support the ceiling construction. Extend ends to within 1/2" of the finished wall surface unless otherwise indicated.
- D. Bridging: Provide horizontal or diagonal type bridging for "open web" joists, complying with AISC-SJI "Specifications". Provide bridging anchors for ends of all bridging lines terminating at walls or beams.
- E. End Anchorage: Provide end anchorages to secure joists to adjacent construction, complying with AISC-SJI "Specifications", unless otherwise indicated.
- F. Header Units: Provide header units to support tail joists at openings not framed with steel shapes.
- G. Shop Painting: Shop paint all steel joist work, except contact surfaces which are to be welded or high-strength bolted.

- H. Surface Preparation: After inspection and before shipping, clean steelwork to be painted complying with SJI "Specifications" unless otherwise indicated.
- I. Application: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of 1.5 mils. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

PART 3 - EXECUTION

3.01 ERECTION

- A. Place and secure steel joists in accordance with AISC-SJI "Specifications", final shop drawings and as herein specified.
- B. Furnish anchor bolts and other devices to be built into the concrete and masonry construction. Furnish templates for the accurate location of anchors in other work.
 - 1. Furnish unfinished threaded fasteners for anchor bolts, unless otherwise indicated.
 - 2. Refer to Division 3 sections for installation of anchors set in concrete.
 - 3. Refer to Division 4 sections for installation of anchors set in masonry.
- C. Placing Joists:
 - 1. Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.
 - 2. Provide temporary bridging, connections and anchors to ensure lateral stability during construction. Where "open web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.
- D. Bridging: Install bridging simultaneously with joist erection, before any construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
- E. Fastening Joists: Field weld or high-strength bolt joists to supporting steel framework in accordance with AISC-SJI "Specifications" and as shown on drawings for the type of joists used. Coordinate welding sequence and procedure with the placing of joists.
- F. Touch-Up Painting: After joist installation, paint all field bolt heads and nuts, and welded areas, abraded or rusty surfaces on joists and steel supporting members. Wire brush surfaces and clean with solvent before painting. Use the same type of paint as used for shop painting.

3.02 FIELD QUALITY CONTROLS

- A. The testing agency shall conduct and interpret the tests and state in each report whether the test specimens comply with the requirements, and specifically state any deviations therefrom.
 - 1. Provide access for the testing agency to places where steel joist work is being fabricated or produced so that required inspection and testing can be accomplished.
 - 2. The testing agency may inspect steel joist work at the plant before shipment; however, the Architect reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

- B. Inspection of Shop Painting:
 - 1. Visually evaluate surface preparation by comparison with pictorial standards in accordance with SSPC-Vis 1.
 - 2. Measure dry film thickness with a magnetic film thickness gage in accordance with SSPC-PA 2.
 - 3. Visually inspect dried film for runs,sags, dry spray, overspray and missed areas.

- C. Correct deficiencies in steel joist work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of the original work, and as may be necessary to show compliance of corrected work.

END OF SECTION 05210

SECTION 05300 - STEEL DECKING

PART 1 - GENERAL

1.01 SUMMARY

- A. Extent of metal decking is indicated on drawings, including basic layout and type of deck units required.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.
- B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.
- C. Provide acoustical inserts for metal deck for installation by others.

1.03 QUALITY ASSURANCE

- A. Code and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated or specified:
 - 1. AISI "Specification for the Design of Cold-Formed Steel Structural Members".
 - 2. AWS D1.3 "Structural Welding Code - Sheet Steel".
 - 3. SDI "Design Manual for Floor Decks and Roof Decks"
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1.
- C. Welded decking in place is subject to inspection and testing. Expense of removing and replacing portions of decking for testing purposes will be borne by Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following or approved equal.
 - 1. Metal Roof Deck Units:
 - a. Roof Deck, Inc.
 - b. Canam-United Steel Deck
 - c. New Millennium Building Systems
 - d. Nucor-Vulcraft Group
 - e. Epic Metal Inc.

2. Composite Metal Floor Deck Units:
 - a. Canam-United Steel Deck
 - b. New Millennium Building Systems
 - c. Nucor-Vulcraft Group

2.02 MATERIALS

- A. Steel for Galvanized Metal Deck Units: ASTM A 653, Grade 33 or higher – Roof Decking; ASTM A 652, Grade 40 or higher – Floor Decking.
- B. Steel for Painted Metal Deck Units: ASTM A 1008, Grade 33 or higher – Roof Decking; ASTM A 652, Grade 40 or higher – Floor Decking
- C. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.
- D. Galvanizing: ASTM A 653, G60.
- E. Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces complying with Military Specifications MIL-P-21035 (Ships).
- F. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.

2.03 FABRICATION

- A. General: Form deck units in lengths to be continuous over three (3) or more spans, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated.
- B. Roof Deck Units: Provide deck configurations complying with SDI "Roof Deck Specifications" of metal thickness, depth and width as shown.
- C. Open-Beam Composite Units: Fabricate deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slabs. Fabricate open-beam units with fluted section having interlocking side laps: of metal thickness, depth and width as shown.
- D. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045" min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.
- E. Roof Sump Pans: Fabricate from single pieces of .071" min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1-1/2" below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
- C. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
- E. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
- F. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- G. Fastening Deck Units:
 - 1. Fasten roof deck units to steel supporting members by not less than 5/8" diameter fusion welds or elongated welds of equal strength, spaced not more than 12" o.c. In addition, secure deck to each supporting member in ribs where side laps occur.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds and methods used in correcting welding work.
- I. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.
- J. Mechanically fasten side laps of adjacent deck units between supports, at intervals not exceeding 36" o.c. using self-tapping No. 10 or larger machine screws, unless a closer spacing or a larger screw is called for on the drawing.
- K. Uplift Loading: Install and anchor roof deck units to resist gross uplift of 45 lbs. per sq. ft. at eave overhang, building corners and perimeter, and 30 lbs. per sq. ft. for other roof areas.
- L. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.
- M. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units, except where taped joints are required.
- N. Shear Connectors: Weld shear connectors to supports through decking units in accordance with manufacturer's instructions. Do not weld shear connectors through two layers (lapped ends) of decking units. Weld only on clean, dry deck surfaces.
- O. Pour Stops: Weld continuous pour stops to supporting decking units or structural

steel supports with a minimum 1" long weld at 12" on center. Install pour stop with a minimum of 2" bearing on supports.

1. Provide pour stops at edge of all slabs, all openings and as indicated on drawings.
- P. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" o.c. with at least one weld at each corner. Cut opening in roof sump bottom to accommodate drain size indicated.
- Q. Edge Finish Strips: Provide metal finish strips at edges of roof decking, parallel to flutes. Weld into position to provide a complete deck installation.
- R. Touch-Up Painting: After deck installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
1. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
 2. Touch-up painted surface with same type of shop paint used on adjacent surfaces.
- S. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.
- T. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas and rust spots, as required after erection and before proceeding with field painting, is included in Division 9 under Painting.

3.02 QUALITY CONTROL

- A. The owner shall employ a testing laboratory satisfactory to the Architect to perform the following tests and to submit testing and inspection reports.
1. Welding: Inspect welding to determine if welds are at proper locations, are proper size and material, and meet AWS standards.
 2. Sidelap Connections: Inspect sidelap connections to determine if the connections are in accordance with contract documents.
 3. Shear Connectors: All shear connectors shall be visually inspected and tapped with a hammer. All/ any studs which do not appear to have a sound weld or which produce a dull sound rather than a ringing sound when tapped shall be further tested as follows:
 - a. The stud shall be struck with a hammer and bent approximately 15 degrees off perpendicular towards the nearest end of the beam. Studs meeting this test without coming loose shall remain on the beam. Studs failing this test shall be replaced.

END OF SECTION 05300

SECTION 05400 - MISCELLANEOUS STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Definition: Miscellaneous structural steel include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of Structural Steel or other metal fabrication systems specified elsewhere.
- B. Extent of miscellaneous structural steel fabrications is indicated on drawings and schedules.
 - 1. Work of this section shall include miscellaneous structural steel framing and supports for floor, wall and roof openings whether or not shown on the structural drawings.
 - a. Refer to architectural, mechanical and electrical drawings for the following:
 - 1) Locations and sizes of roof penetrations, roof top supported mechanical and electrical equipment, roof drains, ducts, piping, raceways, etc.
 - 2) Locations and sizes of wall penetrations, wall chases, louvers, duct penetrations, etc.
 - 3) Locations and sizes of floor penetrations; ducts, piping, raceways, etc.
 - 4) Locations of all steel handrails, railings and guardrails.
 - b. All miscellaneous structural steel supports shall be in accordance with typical structural steel details and schedules shown on structural steel drawings and/or as directed by the Architect.
 - c. All miscellaneous structural steel supports shall meet indicated load requirements and/or as directed by the Architect.
 - d. In existing building(s) where alteration and/or renovation work is/are indicated, refer to Division 1 Sections for miscellaneous structural steel framing and supports which may be assigned to be provided and installed by other Trades.
- C. Types of work in this section include metal fabrications for:
 - 1. Loose Steel lintels, bearing and leveling plates and miscellaneous steel framing and supports
 - 2. Steel Framed Stairs:
 - a. Metal Stairs
 - b. Steel wire mesh guardrails
 - 3. Steel railings, handrails, and guardrails at all stairs.

D. Related Sections:

1. Section 01400 - Testing Laboratory Service.
2. Section 03300 - Concrete Work
3. Section 04200 - Unit Masonry
4. Section 05120 - Structural Steel
5. Section 05210 - Steel Joists
6. Section 05300 - Metal Decking
7. Section 05500 - Metal Fabrications
8. Section 09900 - Painting
9. Division 15 - Mechanical Work

1.3 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrications might delay work.
- B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Delegated Design:
1. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. Designated Design includes, but is not limited to:
 - a. Miscellaneous steel framing, stair stringers, tread pans, platforms, landings and supplemental framing for landings, metal framing, hangers, columns, struts, clips, brackets, bearing plates and other components.
 - b. Handrails, guardrails, balusters, newel posts, clips struts, brackets, bearing plates and other components.
 2. Professional Engineer Qualifications: A professional engineer legally authorized to practice in the jurisdiction where Project is located, (State of New Jersey), and experienced in providing engineering services of the kind indicated that have resulted in the installation of structural assemblies, similar to this Project in material, design, and extent and that has a record of successful in-service performance. Provide analysis data and signed & sealed documents.
 3. Conform to all applicable State and Local Codes for design loads and all other requirements.
 4. Refer to paragraph 1.4 - SUBMITTALS (below).
- D. Regulatory Requirements: Products and finished installations to be used by persons with disabilities must comply with requirements of the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC / ANSI A117.1-2009.

- E. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Architectural Class.
 - a. Fabricator Qualifications: A firm experienced in producing metal stairs similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- F. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel," and AWS D1.3, "Structural Welding Code-Sheet Steel."

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous steel fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
 - 1. Submit shop drawings for miscellaneous steel framing and supports, steel stairs and railings. Signed and sealed shop drawings shall be submitted by a qualified professional Structural Engineer, licenced in the state where project is located
- C. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.
- D. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of miscellaneous structural steel work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Steel
 - 1. Steel Plates, Shapes and Bars: ASTM A 36.
 - 2. Steel Tubing: Cold-formed, ASTM A 500; or hot-rolled, ASTM A 501.
 - 3. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
 - 4. Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

5. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
 6. Gray Iron Castings: ASTM A 48, Class 30.
 7. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
- C. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- D. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
- E. Grout:
1. Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C588, Type M.
 2. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- F. Fasteners:
1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
 2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
 3. Lag Bolts: Square head type, FS FF-B-561.
 4. Machine Screws: Cadmium plated steel, FS FF-S-92.
 5. Wood Screws: Flat head carbon steel, FS FF-S-111.
 6. Plain Washers: Round, carbon steel, FS FF-W-92.
 7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
- G. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
1. Lock Washers: Helical spring type carbon steel, FS FF-W-84.
- H. Paint:
1. Surface Preparation: SSPC-2P6 commercial Blast Cleaning.
 2. Primer: Tnemec Series 90-97 Tneme-Zinc, or equal, @ 2.5 - 3.5 mils (dry)
 3. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900.

2.2 FABRICATION, GENERAL

- A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.
- E. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- F. Galvanizing:
 - 1. Provide a zinc coating for exterior items and those items indicated or specified to be galvanized, as follows:
 - a. ASTM A 153 for galvanizing iron and steel hardware.
 - b. ASTM A 123 for galvanized rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
 - c. ASTM A 386 for galvanizing assembled steel products.
- G. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- H. Shop Painting
 - 1. Shop paint miscellaneous structural steel, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.
 - 2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-6.
 - 3. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
 - 4. Apply one shop coat to fabricated metal items, except apply two coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 MISCELLANEOUS STRUCTURAL STEEL

- A. Steel Railings and Handrails: Provide handrails to comply with applicable State and Local Regulatory Requirements and in accordance with minimum requirements indicated in the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC / ANSI A117.1-2009.

1. Structural Performances: Provide railing and handrail assemblies which, when installed, shall comply ASCE standards for minimum design loads for handrail assemblies and guardrail systems and capable of withstanding the following loads applied as indicated:
 - a. To resist a load of 50 pound per linear foot applied in any direction at the top and to transfer this load through the supports to the structure.
 - b. To resist a single concentrated load of 200 pounds applied in any direction at any point along the top, and have attachment devices and supporting structure to transfer this loading to the building structural assemblies, walls, floors or slabs. This load shall act concurrently with loads indicated in Paragraph "a" above.
 - c. Intermediate rails (all those except the handrail), balusters and panel fillers shall withstand a horizontally applied normal load of 50 lbs. On an area not to exceed one square foot area including openings and space between rails. Reactions due to this loading are not required to be superimposed with those of paragraphs "a" and "b" above.
 - d. Guards: Intermediate rails and balusters capable of withstanding a horizontal concentrated load of 200 lbs. applied on a one square foot area at any point in system of gross area of guard, including any open areas, of which they are a part. Load need not be assumed to be acting concurrently with uniform horizontal loads on top rails of railing assembly in determining stress on guard supporting members.
 - e. Guards shall be designed and constructed for a uniform load of 50 pounds per foot applied horizontally at required guardrail height and a simultaneous uniform load of 100 pounds applied vertically downwards at top of guardrail.
 - f. In-fill Area:
 - 1) Concentrated Load: 200 pounds, horizontal load , applied on a 1-square-foot area at any point in the system, including intermediate rail or other elements serving this purpose.
 - 2) This loading condition shall not be applied simultaneously with loading conditions indicated above, (a, b, and c).
- B. Fabricate pipe railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of pipe of sizes and wall thickness indicated, or if not shown, as required to support indicated design loading. Unless otherwise indicated all shown dimensions for pipes, rails and other round shapes are outside diameter.
 1. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - a. At tee and cross intersections provide coped joints.
 - b. At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radiuses indicated.
 - c. Perform welding to comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

2. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.
3. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.
4. Close exposed ends of pipe by welding 3/16" thick steel plate in place or by use of prefabricated fittings.
5. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

2.4 STEEL FRAMED STAIRS

1. General: Construct stairs to conform to sizes and arrangements indicated; join pieces together by welding unless otherwise indicated.
 - a. Provide complete stair assemblies including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates and other components necessary for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure.
2. Stair Framing: Fabricate stringers of structural steel channels, plates, or a combination of both as indicated.
 - a. Provide closures for exposed ends of stringers.
 - b. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated.
 - c. Bolt or weld headers to strings, newels and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on exposed finish surfaces.
 - d. Provide continuous steel scribe plates at masonry walls. Match stringer width.
3. Where masonry walls support steel stairs, provide temporary supporting struts designed for erection of steel stair components before installation of masonry.
4. Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Provide structural steel sheet for metal pans of minimum thickness of 0.0677 inch, unless otherwise indicated, but not less than that required to support total design loading.
5. Form metal pans of cold-rolled carbon steel sheet unless otherwise indicated.
6. Attach risers and subtreads to stringers by means of brackets made of steel angles or bars. Weld brackets to strings and attach metal pans to brackets by welding, riveting or bolting.

7. Coordinate steel stair work with concrete work specified in Section 03300.

2.5 STEEL STAIRS AND RAILINGS:

1. Basis of Design: Subject to compliance with indicated requirements, provide metal stair and railings as manufactured by American Stair Corp. Inc.; Pacific Stair Corp., EeStairs; or approved equal.
2. Provide subplatforms of configuration and construction indicated, or if not indicated, of same metal as risers and subreads and in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.
3. Steel Floor Plate Treads and Platforms: Provide raised pattern steel floor plate complying with FS QQ-F-461, Class I. Provide pattern indicated or, if not indicated, as selected from manufacturer's standard patterns.
4. Form treads of 1/4" thick steel floor plate with integral nosing and back edge stiffener. Weld steel supporting brackets to strings and treads to brackets.
 - a. Provide stairs capable of supporting a minimum live load of 100 psi and a concentrated load of 300 psi.
5. Provide steel railings, handrails and guardrails as indicated or selected from manufacturer's available full range of types.
 - a. Perforated Steel Infill Grille at Stairs:
 - 1) Fabricate to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including thickness of material, spacings, and anchorage, but not less than that needed to withstand indicated loads.
6. Finishes and Colors: As indicated in Section 09900.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
 1. Coordinate work of this section with other work affected by other Trades.
 2. Obtain locations, opening sizes, weighs and other required information from affected trades.
 3. Comply with coordination requirements indicated in Division 1 Sections.

3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- E. Set loose lintels weighing more than 200 pounds, leveling and grouting as for plates. Deliver loose lintels weighing less than 200 pounds to the General Construction Contractor, allow sufficient time for scheduling his installations.

3.3 PIPE RAILINGS AND HANDRAILS

- A. Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
 - 1. Anchor posts in concrete by means of sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
 - 2. Leave anchorage joint exposed; wipe off excess grout and leave 1/8 inch build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.
 - 3. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
- B. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.
- C. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 - 3. For hollow masonry anchorage, use toggle bolts having square heads.

3.4 ADJUST AND CLEAN

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.
- B. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- C. For galvanize surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05400