FOR INFORMATIONAL PURPOSES ONLY - DO NOT USE FOR BIDDING

NCPD CENTER
FOR TRAINING AND INTELLIGENCE
PHASE 2
TRAINING VILLAGE
CONTRACT NO.: B50699-03G

Item No.	Type	Description		
01	LUMP SUM (Base Bid)	LUMP SUM for furnishing all labor, materials and equipment required for all **General Construction** work associated with the construction of a new a new outdoor training complex consisting of 10 individual structures (3 dwelling types, a house of worship, school, train station, gas station, precinct house, bank, restaurant) and associated site improvements including paving, grading, drainage, lighting, and landscaping, make complete and ready for operation.		
02	LUMP SUM (Base Bid)	LUMP SUM for furnishing all labor, materials and equipment required for **Mechanical Construction** work, make complete and ready for operation.		
03	LUMP SUM (Base Bid)	LUMP SUM for furnishing all labor, materials and equipment required for **Electrical Construction** work, including standby generator, make complete and ready for operation		
04	LUMP SUM (Base Bid)	LUMP SUM for furnishing all labor, materials and equipment required for **Plumbing Construction** work, make complete and ready for operation		
05	LUMP SUM	LUMP SUM for furnishing all labor, materials and equipment required for preparation and updating of **CPM (Critical Path Method) Progress Schedule** for the duration of the Project. Note: The Lump Sum bid amount shall not be less than One Hundred Fifty Thousand Dollars and Zero Cents ($150,000.00).		
06	ALLOWANCE	Include in bid an allowance of One Hundred Thousand Dollars ($100,000.00) for testing, removal, and disposal of any contaminated soils, construction spoils, or the like, encountered during the course of construction.	$100,000	00
07	ALLOWANCE	Include in bid an allowance of One Hundred Thousand Dollars ($100,000.00) for fees requested by any utility or telecom provider for connection fees, or specialized utility, telecom, or Information Technology work not specifically characterized in the contract documents.	$100,000	00
08	ALLOWANCE	Include in bid an allowance of One Hundred Fifty Thousand Dollars ($150,000.00) for items unforeseen or not specifically characterized in the contract documents, encountered during the course of construction as directed by the County.	$150,000	00
09	ALLOWANCE	Include in bid an allowance of Two Hundred Twenty Thousand Dollars ($220,000.00) for furnishing all labor, materials and equipment required to lift, transport, and install section(s) of railroad track, rail sleepers, rail tie plates, rail joints, track ballast, and one (1) passenger train car (as provided by the Long Island Railroad).	$220,000	00

Item No.	Type	Description		
10	LUMP SUM (Add Alternate 1)	LUMP SUM for furnishing all labor, materials and equipment required for all **General Construction** work associated with the construction of the Second Floor on Building "B" (Police Precinct). Work shall also include the complete fit-out of the space, make complete and ready for operation.		
11	LUMP SUM (Add Alternate 1)	LUMP SUM for furnishing all labor, materials and equipment required for **Mechanical Construction** work associated with the construction of the Second Floor on Building "B" (Police Precinct).		
12	LUMP SUM (Add Alternate 1)	LUMP SUM for furnishing all labor, materials and equipment required for **Electrical Construction** work associated with the construction of the Second Floor on Building "B" (Police Precinct).		
13	LUMP SUM (Add Alternate 1)	LUMP SUM for furnishing all labor, materials and equipment required for **Plumbing Construction** work associated with the construction of the Second Floor on Building "B" (Police Precinct).		

Item No.	Type	Description		
14	LUMP SUM (Add Alternate 2)	LUMP SUM for furnishing all labor, materials and equipment required for all **General Construction** work associated with the construction of Building "A" Gas Station Canopy, make complete and ready for operation.		
15	LUMP SUM (Add Alternate 2)	LUMP SUM for furnishing all labor, materials and equipment required for **Mechanical Construction** work associated with Building "A" Gas Station Canopy, make complete and ready for operation.		
16	LUMP SUM (Add Alternate 2)	LUMP SUM for furnishing all labor, materials and equipment required for **Electrical Construction** work associated with Building "A" Gas Station Canopy, make complete and ready for operation		
17	LUMP SUM (Add Alternate 2)	LUMP SUM for furnishing all labor, materials and equipment required for **Plumbing Construction** work associated with Building "A" Gas Station Canopy, make complete and ready for operation		

BASIS OF AWARD: Bids on Lump Sum Contracts will be compared on the basis of the total bid price, arrived at by taking the Sum of each Bid Item, including Allowance Item(s), if any, and plus or minus the cost difference of the Alternate(s), if any, as may be selected by the Architect and/or Owner. The sum of all "Amounts Bid" will determine the low bid and the subsequent award of this Contract.

BID SECURITY: Prospective bidders are cautioned to carefully review the requirements of Paragraph H, Bid Security, of The Instructions to Bidders.

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID 10-15-22

TECHNICAL SPECIFICATIONS VOLUME -1

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DIVISION 02 - EXISTING CONDITIONS

DIVISION 03 - CONCRETE

DIVISION 04 - MASONRY

DIVISION 05 - METALS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

DIVISION 08 - OPENINGS

DIVISION 09 - FINISHES

DIVISION 10 - SPECIALTIES

DIVISION 11 - EQUIPMENT

DIVISION 12 - FURNISHINGS

DIVISION 13 - SPECIAL CONSTRUCTION

DIVISION 14 - CONVEYING EQUIPMENT

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

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SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID 10-15-22

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01 26 13	Requests For Interpretation	X					
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01 31 13	Project Management & Coordination	X					
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01 32 01	CPM (Critical Path Method) Progress Schedule (Single Prime)	X					
01 32 33	Photographic Documentation	X					
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01 35 60	Safe and Healthful Working Conditions	X					
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01 42 00	References	X					
01 45 23	Testing and Inspections	X					
01 50 00	Temporary Facilities and Controls	X					
01 60 00	Product Requirements	X					
01 73 00	Execution Requirements	X					
01 73 29	Cutting and Patching	X					
01 74 19	Construction Waste Management	X					
01 77 00	Closeout Procedures	X					
01 78 23	Operation and Maintenance Data	X					
01 78 39	Project Record Documents	X					
01 79 00	Demonstration and Training	X					
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01 91 13	General Commissioning Requirements	X					

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03 10 00	Concrete Formwork	X					
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07 25 00	Weather Barrier	X					
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08 31 13	Access Doors	X					
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08 54 00	Composite Windows	X					
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08 80 00	Glass and Glazing	X					

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09 29 00	Gypsum Drywall	X					
09 30 13	Ceramic Tile	X					
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23 05 17	Sleeves and Sleeve Seals for HVAC Piping	X					
23 05 29	Hangers and Supports for HVAC Piping and Equipment	X					
23 05 48	Vibration and Seismic Controls for HVAC	X					
23 05 53	Identification fVAC Piping and Equipment	X					
23 05 93	Testing, Adjusting, and Balancing for HVAC	X					
23 07 13	Duct Insulation	X					
23 07 19	HVAC Piping Insulation	X					
23 09 13	Instrumentation and Control Devices for HVAC	X					
23 23 00	Refrigerant Piping	X					
23 31 00	HVAC Ducts and Casings	X					
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NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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01 31 13	Project Management & Coordination	X					
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01 73 29	Cutting and Patching	X					
01 74 19	Construction Waste Management	X					
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01 78 23	Operation and Maintenance Data	X					
01 78 39	Project Record Documents	X					
01 79 00	Demonstration and Training	X					
01 81 15	Limits for Volatile Organic Compound Contents for Adhesives, Sealants,Paints and Coatings	X					
01 91 13	General Commissioning Requirements	X					

SECTION 011100 SUMMARY OF WORK

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Work covered by the Contract Documents.
   2. Type of the Contract.
   3. Use of premises.
   4. Work restrictions.
   5. Work phases.
   6. Specification formats and conventions.

B. Related Sections include the following:
   1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Description:
   1. Nassau County Police Department CTI / Training Village located adjacent to the eastern most area of the Nassau Community College property adjacent to the Meadowbrook Parkway.
   2. A portion of the subject property (former runway and approach apron area) is currently used by the NCPD as their EVOC Training Course It is understood that this EVOC course is part of the overall Training Village.
   3. The key project elements of the Center for Training and Intelligence Building & site include the following buildings:
      a. Building ‘A’ - Gas Station.
      b. Building ‘B’ – Police Precinct / Apartment.
      c. Building ‘C’ – Bank.
      d. Building ‘D’ – Levitt Home.
      e. Building ‘E’ – Cape Home.
      f. Building ‘F’ – School.
      g. Building ‘G’ – Split-Level Home.
      h. Building ‘H’ – Interfaith Chapel / Courthouse.
      i. Building ‘J’ – Restaurant / Bar.
      j. Structure ‘K’ – Train Platform.

B. The Work consists of the following:
   1. The Work includes Site / Civil / Landscape / Architectural / Structural / MEP/FP, and all other work indicated in the contract documents, drawings / specifications.
   2. All work included in the Nassau County Department of Public Works, General Conditions and Supplementary General Conditions.

C. The Project will be bid with three Add Alternates as per Specification Section 01 23 00 Alternates.

1. Add Alternate No. 1 - Building 'B' – 2nd Floor Apartment (Over Police Precinct)
2. Add Alternate No. 2 - Building 'A' - Gas Station Canopy.

D. Owner:

- Nassau County Police Department,
- Headquarters, 1490 Franklin Ave Mineola, NY 11501

E. Owner's Representative.

- Nassau County Department of Public Works,
- 1194 Prospect Avenue, Westbury, NY 11590.

F. Architect:

- Spectorgroup,
- 220 Crossways Park West, Woodbury NY 11797

G. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

- Site / Civil Engineer / Landscape Architect:
  - RDA Landscape Architecture, PC
  - 220 Lake Ave., Suite 2
  - St. James, NY 11780

- MEP/FP Engineer:
  - Collado
  - 445 Hamilton Avenue, Suite 608
  - White Plains, NY 10601

- Structural Engineer
  - Ysrael A. Seinuk
  - 228 East 45th Street, 2nd Floor
  - New York, NY 10017.

H. Construction Manager:

- To Be Determined

1.04 EXISTING CONDITIONS

A. Information contained in the Contract Documents regarding existing facilities and conditions is taken from drawings, other forms of documentation, verbal and written representations furnished by the Owner, and observations in the field without extensive exploration or dimensional verification. Contractor is required to check and verify all information in the field prior to ordering materials and prior to proceeding with construction. Contractor shall notify the Architect in writing of differences between what is indicated in the Contract Documents and the actual conditions that will materially affect the project.

1.05 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract, administered through a project specific amendment to the Master Nassau County Project Labor Agreement (PLA).

1.06 WORK UNDER OTHER CONTRACTS

A. Concurrent Work: Owner will award separate contract(s) for some construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
   1. Furniture Procurement.

1.07 USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
   1. Contractor shall be subject to the requirements of the Owner.

1.08 WORK RESTRICTIONS

A. Refer to NCDPW General Conditions for work hour restrictions.
   1. On-Site Work Hours: Work shall be generally performed in accordance with Village of Garden city Code 152-9 which restricts construction noise before 8:00 a.m. and after 8:00 p.m. Monday through Friday and before 9:00 a.m. and after 8:00 p.m. Saturday and Sunday.
      a. Additional information concerning Garden City Codes can be found at the following website: http://www.gardencityny.net/gcvillage.htm.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Nassau County Police Department unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Nassau County DPW and Nassau County Police Department not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Nassau County's written permission.

1.09 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI's "Master Format 2010 Update" numbering system.
   1. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications and that shown on Drawings.

PART 2 -PRODUCTS (NOT USED)

PART 3 -EXECUTION (NOT USED)

END OF SECTION 01 12 00

SECTION 011110 - OWNER FURNISHED ITEMS INSTALLED BY CONTRACTOR

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes the following descriptions:

1. Owner (Nassau County Department of Public Works) furnished items installed by the Contractor.

1.3 OWNER FURNISHED PRODUCTS

A. Products furnished by the Owner shall be incorporated into the project by the Contractor.

1. LIRR Train Car pick-up near the Coliseum.
2. Furniture.
3. Computer Equipment.
4. Video / Security Camera Equipment.
5. Fake Gas Pumps.
6. Kitchen Appliances.
7. Police Station Fingerprinting Machines.

B. Owner's Responsibilities

1. Arrange for and deliver necessary shop drawings, product data, and samples to the Contractor.
2. Arrange and pay for product delivery to the site, in accordance with the construction schedule.
3. Deliver supplier's bill of materials to the Contractor.
4. Inspect deliveries jointly with the Contractor.
5. Submit claims for transportation damage.
6. Arrange for replacement of damaged, defective, or missing items.
7. Arrange for manufacturer's warranties, bonds, service, inspections as required.

C. Contractor's Responsibilities

1. Designate delivery date for each product in the Construction Schedule.

2. Review shop drawings, product data, and samples.

    a. Submit to Architect with notification of any discrepancies or problems anticipated in the use of the product.

3. Receive and unload products at the site.

4. Promptly inspect products jointly with the Owner, record shortages, damaged or defective items.

5. Handle products at the site, including uncrating and storage.

6. Protect products from exposure to elements, from damage.

7. Assemble, install, connect, adjust and finish products as stipulated in the respective Section of the Specifications and/or manufacturer's recommendations.

8. Repair or replace items damaged by the Contractor.

9. Provide substrate to receive Owner furnished items that meets at a minimum industry standard tolerance with respect to items of that trade.

D. Products furnished by Owner and installed by Contractor are indicated on drawings.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION

SECTION 012100 -ALLOWANCES

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.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 SCHEDULE OF ALLOWANCES

A. List of Allowances:

1. Train Car / Train Tracks Allowance - an allowance of Two Hundred Twenty Thousand Dollars ($220,000.00) to cover transport / rigging of Train Car / Train Track from an MTA Long Island Railroad line location and for the installation of the train tracks and the installation of the train car onto the train tracks as per the indicated location on the Training Village site. The Train Car / Train Tracks are being donated by MTA Long Island Railroad.

2. Utilities Allowance - an allowance of One Hundred Thousand Dollars ($100,000.00) to cover additional specialized utility, telecom, or Information Technology work not specifically characterized in the contract documents.

3. Construction Contingency Allowance - an allowance of One Hundred Fifty Thousand Dollars ($150,000.00) to cover additional construction work required for unforeseen field conditions.

4. Testing / Contaminated Soil Removal Allowance - an allowance for testing, removal, and disposal of any contaminated soils, construction spoils, or the like, encountered during the course of construction - an allowance of One Hundred Thousand Dollars ($100,000.00).

3.2 BASIS FOR PAYMENT

A. Train Car /Train Tracks Allowance.

1. Payment under this allowance shall be paid on the basis of labor, materials, and equipment, plus overhead and profit computed in accordance with the requirements of the agreement, Article 21 “Extra Work”. Any funds remaining at the end will be eliminated by a credit change order.

B. Utilities Allowance.

1. Payment under this allowance shall be paid on the basis of labor, materials and equipment, plus overhead and profit computed in accordance with the requirements of the agreement, Article 21 “Extra Work”. Any funds remaining at the end will be eliminated by a credit change order.

C. Construction Contingency Allowance:

1. Payment under this allowance shall be paid on the basis of labor, materials and equipment, plus overhead and profit computed in accordance with the requirements of the agreement, Article 21 “Extra Work”. Any funds remaining at the end will be eliminated by a credit change order.

D. Testing / Contaminated Soil Removal Allowance:

2. Payment under this allowance shall be paid on the basis of labor, materials and equipment, plus overhead and profit computed in accordance with the requirements of the agreement, Article 21 “Extra Work”. Any funds remaining at the end will be eliminated by a credit change order.

END OF SECTION

SECTION 012300 - ALTERNATES

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. To allow the Owner to compare total costs where alternate materials and methods might be used, and to enable the Owner's decision prior to awarding the Contract, certain alternates have been established as described in this Section of these Specifications.

1.3 RELATED SECTIONS

A. Where noted herein, pertinent Sections of these Specifications describe the materials and methods required under the various alternates.

1.4 SUBMITTALS

A. Alternates described in this Section are required to be submitted on appropriate form as approved by the Owner.

B. Any additional costs to the Contractor due to the inclusion of alternates shall be included in the amount to be added to the Contract Sum, so that no additional costs shall be borne by the Owner due to the inclusion of the additive alternates.

C. Any deductive costs to the Contractor due to the inclusion of alternates shall be included in the amount to be deducted from the Contract Sum, so that all deductive costs will accrue to the Owner due to the inclusion of deductive alternates.

1.5 PROCEDURES FOR ALTERNATE BIDS

A. Each Bidder shall submit on the Proposal Form all Alternate Bids stated herein. 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 to the alternate materials, items or construction from that shown and specified.

B. The Alternate Bids, when accepted, become part of the Contract.

C. 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 the work affected. Refer to the applicable Specification Sections, and to applicable drawings, for the specific requirements of the work, regardless of whether references are so noted in the description of each Alternate. Coordinate related work and modify surrounding work as required to properly integrate with the

work of each Alternate. It is recognized that the descriptions of Alternate Bids are primarily scope definitions, and do not necessarily detail the full range of materials and processes needed to complete the work as required. Any change of details, construction, etc., as required to accommodate the Alternate shall be the responsibility of the Contractor and shall be included in his Alternate Bid Price.

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 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 of Section 013300.

PART 2 PRODUCTS

2.1 ALTERNATES

A. Add Alternate No. 1 - Building 'B' – 2nd Floor Apartment (Over Police Precinct)

B. Add Alternate No. 2 - Building 'A' - Gas Station Canopy.

PART 3 EXECUTION

3.1 ADVANCE COORDINATION

A. Immediately after award of Contract, and to the maximum extent practicable, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of Alternates as selected by the Owner; use all means necessary to alert those personnel and suppliers involved as to all changes in the work caused by the Owner's selection of alternates.

3.2 SURFACE CONDITIONS

A. Prior to installation of the Alternate items, verify that all surfaces have been modified as necessary to accept the installation and the item or items may be installed in complete accordance with their manufacturer's current recommendations; in the event of discrepancy, immediately notify the Architect and proceed as he directs.

3.3 APPROVAL OF ALTERNATE

A. Approval of the Alternate makes all requirements of scope, performance, submissions, service and guarantee binding as if that material name appeared in the Specifications for the Base Bid. All necessary changes in building design or construction to accommodate the alternate materials shall be the sole responsibility of the Contractor without extra cost to the Owner.

END OF SECTION

SECTION 012613 - REQUESTS FOR INTERPRETATION

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for requests for interpretation before and during construction.

B. The form for Requests for Interpretation is included immediately following this Section.

C. Related Work specified in other Sections includes:
   1. Submittals of RFIs by electronic means, Division 01 Section “Project Management and Coordination.”
   2. Submittals of Applications for Payment are described in Division 01 Section “Payment Procedures.”
   3. Submittals of test reports and certifications are specified in Division 01 Section “Quality Requirements.”
   4. Requirements regarding substitutions, product options, and color selections are described in Division 01 Section “Product Requirements.”
   5. Submittals for project closeout are specified in Division 01 Section “Closeout Procedures.”
   6. Requirements regarding shop drawings, product data, and samples are described in the various sections of these Specifications.

1.03 REQUESTS FOR INTERPRETATION PRIOR TO START OF CONSTRUCTION

A. Submit Requests for Interpretation (RFIs) to the County Project Manager in specified written format when information is missing from the Contract Documents and other data available to the Contractor, or such information is ambiguous or in apparent conflict with other portions of the Contract Documents.

B. Responses to RFIs prior to executing a Contract shall be distributed in the form of an Addendum and made available to all who are bidding or negotiating for the work.

1.04 REQUESTS FOR INTERPRETATION DURING CONSTRUCTION

A. Requests for Interpretation (RFIs): Submit requests for interpretation to the Construction Manager in writing when information is missing from the Contract Documents and other data available to the Contractor, or such information is ambiguous or in apparent conflict with other portions of the Contract Documents.

B. Requests for Interpretation (RFIs): Submit requests for interpretation to the Construction Manager in writing when information is missing from the Contract Documents and other data available to the Contractor, or such information is ambiguous or in apparent conflict with other portions of the Contract Documents.

1.05 PROCEDURES FOR REQUESTS FOR INTERPRETATION

A. No extension of Contract Time will be authorized because of failure to transmit requests for interpretation to the Architect sufficiently in advance of the Work to permit processing.

B. Requests for Interpretation shall be submitted only after the Contractor has thoroughly reviewed the Contract Documents and other data available to the Contractor, as required in the GENERAL CONDITIONS.

C. RFIs shall be submitted in writing on the form "Request for Interpretation" and shall indicate which drawings, details, and specifications need clarification and exactly what interpretation or information is required. RFIs shall be sequentially numbered. If supplemental information is required, the Contractor shall clearly articulate the requirement.

   1. RFIs submitted electronically shall be in a file separate from an e-mail or other delivery method. Requests for interpretation in the text of e-mail will be returned unanswered.

D. If appropriate, RFIs shall include proposed solutions. When proposed solutions could result in additional cost to the Owner the RFI shall indicate the estimated amount. An RFI shall not constitute a formal request for change order.

E. RFIs shall be submitted in the same format throughout the project. In addition to the information required above, each RFI shall indicate:

   1. Project Name.
   2. Sequential number of RFI.
   3. Date request is made.
   4. Name of the person or subcontractor who is making the request.

F. RFIs shall be submitted at least 14 calendar days before the answer is required in the field. If, on rare occasion, an RFI requires a shorter response time it shall be specially marked as "Urgent" and shall, in addition to the information required in all RFIs, state the reason for providing a response sooner than 14 calendar days. The Contractor is responsible for reviewing Contract Documents and field conditions sufficiently in advance to avoid the use of Urgent RFIs.

1.06 CONSTRUCTION MANAGER'S ACTION ON REQUESTS FOR INTERPRETATION

A. The Construction Manager shall review each RFI to determine whether it qualifies as an actual RFI within the meaning of this term. If the Architect determines that it is not a properly constituted RFI, it will be returned to the Contractor, un-reviewed for content, and the Contractor shall immediately close the item. The Contractor may reconsider the inquiry, re-state or supplement it to meet the definition of a proper RFI and resubmit same for consideration as a new item. The Architect shall be the sole arbiter of the legitimacy of RFIs as submitted and the Contractor must abide by the Architect's decision. RFIs which request information which is available on drawings, details, specifications, and other Contract Documents or other data available to the Contractor shall be returned with a written response: "Not an RFI. No response necessary."

B. The Architect will respond to RFIs in writing.

C. RFIs marked “Urgent” will be reviewed by the Architect within the time period requested. If, in the Architect’s determination, the reason given for urgent review is insufficient or could have been avoided by the Contractor, the Architect will so state in a separate response, and will respond to the RFI within the usual 14 calendar days.

D. A response to an RFI does not authorize changes from the Contract Documents nor does it authorize changes in the Contract Amount unless so stated separately and in writing. In the event that a Contractor believes that a response to an RFI will cause a change to the requirements of the Contract Documents in terms of cost or schedule, the Contractor shall make immediate notice to the Architect and Owner stating same, in accordance with the notice provisions of the Contract Documents. Failure to give immediate notice will waive the Contractor’s right to make claim for additional time or cost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to the Construction Manager at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:
   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      1) Labor.

2) Materials.
3) Equipment.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five (5) percent of the Contract Sum.
   a. Include separate line items under [Contractor and]principal subcontracts for Project closeout requirements in an amount totaling [five] <Insert number> percent of the Contract Sum and subcontract amount.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Construction Manager and paid for by Owner.

   1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

   1. Submit draft copy of Application for Payment seven (7) days prior to due date for review by Architect.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application for Payment Forms: Use forms acceptable to [Architect] [Construction Manager] and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.

3. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.

b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

G. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Construction Manager. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit conditional final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.

2. Schedule of values.

3. Sustainable design submittal for project materials cost data.
4. Contractor's construction schedule (preliminary if not final).
5. Products list (preliminary if not final).
6. Sustainable design action plans.
7. Schedule of unit prices.
8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.

J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Updated final statement, accounting for final changes to the Contract Sum.
3. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
5. AIA Document G707, "Consent of Surety to Final Payment."
6. Evidence that claims have been settled.
7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
8. Final liquidated damages settlement statement.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 29 00

SECTION 013113 - PROJECT MANAGEMENT AND COORDINATION

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. Work of this Section includes all labor, materials, equipment, and services necessary to complete the project management and coordination as specified herein, including, but not limited to, the following:

1. General project coordination procedures.

2. Conservation.

3. Coordination drawings.

4. Administrative and supervisory personnel.

5. Cleaning and protection.

1.3 RELATED SECTIONS

A. Project Meetings - Section 013119.

B. Submittal Procedures - Section 013300.

C. Product Requirements - Section 016000.

D. Closeout Procedures - Section 017700.

1.4 COORDINATION

A. Coordinate construction operations included in various sections of these specifications to ensure efficient and orderly installation of each part of the work. Coordinate construction operations included under different sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum accessibility for required maintenance, service, and repair.

3. Make provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.

2. Installation and removal of temporary facilities.

3. Delivery and processing of submittals.

4. Progress meetings.

5. Project closeout activities.

D. Conservation: Coordinate construction operations to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the work.

1.5 SUBMITTALS

A. Coordination Drawings: Prepare MEP/FP coordination drawings where any coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate shop drawings.

2. Indicate required installation sequences.

3. General Contractor shall have coordination meetings with subcontractors, Construction Manager, Architect and their consultants.

~~3.~~**4.** Comply with requirements contained in Section 013300, "Submittal Procedures".

B. Staff Names: Within 15 days of commencement of construction operations, submit a list and resumes of the contractor's principal staff assignments, including the superintendent and other personnel in attendance at the project site. Identify individuals and their duties and responsibilities. List their addresses, telephone and mobile numbers.

1. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the Architect.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at substantial completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High-speed operation.
21. Improper lubrication.

22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION

SECTION 013119 - PROJECT MEETINGS

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. To enable orderly review of progress during construction and to provide for systematic discussions of problems, the Contractor will conduct project meetings throughout the construction period.

B. In general, project meetings will be held at the job site in accordance with a mutually acceptable schedule.

C. The purpose of the project meetings is analysis of problems that might arise relative to execution of the work.

1.3 RELATED SECTIONS

A. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility as described in the General Conditions and are not part of the agenda of project meetings.

1.4 QUALITY ASSURANCE

A. Persons designated by the Contractor to attend and participate in project meetings shall have all required authority to commit the Contractor to solutions as agreed upon in the project meetings.

1.5 SUBMITTALS

A. Agenda Items: To the maximum extent possible, advise the Architect and Construction Manager at least twenty-four (24) hours in advance of the project meeting regarding all items on the agenda.

B. Minimum Agenda

1. Review work progress since last meeting.

2. Note field observations, problems and decisions.

3. Identify problems which impede planned progress.

4. Review off-site fabrication problems.

5. Develop corrective measures and procedures to regain schedule.

6. Coordinate projected progress with other prime contractors.

7. Review submittal schedules, expedite as required to maintain schedule.

C. Minutes: The Contractor shall compile minutes of each project meeting and shall distribute copies to the Owner, NCDPW, Construction Manager and the Architect. The Contractor shall make and distribute such other copies as he wishes. The Architect and/or Owner may issueamendments to the minutes as necessary. Contractor shall issue same to other interested parties.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 MEETING SCHEDULE

A. Coordinate with the NCDPW, Construction Manager, Architect and Owner as required to establish a mutually acceptable schedule for project meetings.

3.2 MEETING LOCATION

A. To the maximum extent practicable, project meetings shall be held at the job site. Provide adequate space and facility including table, chairs, and lighting for proper conduct of meeting.

3.3 ATTENDANCE

A. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout the construction period. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the work are involved.

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

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. Work of this Section includes administrative and procedural requirements for documenting the progress of construction during performance of the work, including but not limited to, the following:

1. Preliminary Construction Schedule.

2. Contractor's Construction Schedule.

3. Submittals Schedule.

4. Daily construction reports.

5. Material location reports.

6. Field condition reports.

7. Special reports.

8. Construction photographs.

1.3 RELATED SECTIONS

A. Project Management and Coordination - Section 013113.

B. Project Meetings - Section 013119.

C. Submittal Procedures - Section 013000.

D. Closeout Procedures - Section 017700.

1.4 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.

2. Predecessor activity is an activity that must be completed before a given activity can be started.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time belongs to Owner.

2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

G. Major Area: A story of construction, a separate building, or a similar significant construction element.

H. Milestone: A key or critical point in time for reference or measurement.

I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.5 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article and in-house scheduling personnel to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.

2. Specification Section number and title.

3. Submittal category (action or informational).

4. Name of subcontractor.

5. Description of the Work covered.

6. Scheduled date for Architect's final release.

C. Preliminary Construction Schedule: Submit two printed copies; one a single sheet of reproducible media, and one a print.

D. Preliminary Network Diagram: Submit two printed copies; one a single sheet of reproducible media, and one a print; large enough to show entire network for entire construction period.

E. Contractor's Construction Schedule: Submit two printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.

1. Submit an electronic copy of schedule and labeled to comply with requirements for submittals. Include type of schedule Initial or Updated and date on label.

F. CPM Reports: Concurrent with CPM schedule, submit three printed copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.

2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.

3. Total Float Report: List of all activities sorted in ascending order of total float.

4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.

G. Daily Construction Reports: Submit two copies at weekly intervals.

H. Material Location Reports: Submit two copies at monthly intervals.

I. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

J. Special Reports: Submit two copies at time of unusual event.

1.6 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting.

B. Photographer Qualifications: An individual of established reputation who has been regularly engaged as a professional photographer for not less than three years.

C. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013113, "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.

2. Verify availability of qualified personnel needed to develop and update schedule.

3. Discuss constraints, including work stages, area separations, interim milestones, and partial Owner occupancy.

4. Review delivery dates for Owner-furnished products.

5. Review schedule for work of Owner's separate contracts.

6. Review time required for review of submittals and resubmittals.

7. Review requirements for tests and inspections by independent testing and inspecting agencies.

8. Review time required for completion and startup procedures.

9. Review and finalize list of construction activities to be included in schedule.

10. Review submittal requirements and procedures.

11. Review procedures for updating schedule.

1.7 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

C. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting.

PART 2 PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2. Initial Submittal: Submit concurrently with preliminary network diagram. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.

2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

4. Startup and Testing Time: Include not less than 10 days for startup and testing.

5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.

2. Work under More Than One Contract: Include a separate activity for each contract.

3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.

5. Work Restrictions: Show the effect of the following items on the schedule:

   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use of premises restrictions.
   f. Provisions for future construction.
   g. Seasonal variations.
   h. Environmental control.

6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

   a. Subcontract awards.
   b. Submittals.
   c. Purchases.
   d. Mockups.
   e. Fabrication.
   f. Sample testing.
   g. Deliveries.
   h. Installation.
   i. Tests and inspections.
   j. Adjusting.
   k. Curing.
   l. Startup and placement into final use and operation.

7. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

   a. Structural completion.
   b. Permanent space enclosure.
   c. Completion of mechanical installation.
   d. Completion of electrical installation.
   e. Substantial Completion.

E. Milestones: Include milestones indicated in the schedule.

F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

H. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Preliminary Network Diagram: Submit diagram within 14 days of date established for commencement of the Work. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.

   1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for commencement of the Work.

   2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

   3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

   4. Use "one workday" as the unit of time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

    a. Preparation and processing of submittals.
    b. Purchase of materials.
    c. Delivery.
    d. Fabrication.
    e. Installation.

2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.

E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.

2. Description of activity.

3. Principal events of activity.

4. Immediately preceding and succeeding activities.

5. Early and late start dates.

6. Early and late finish dates.

7. Activity duration in workdays.

8. Total float or slack time.

9. Average size of workforce.

10. Dollar value of activity (coordinated with the Schedule of Values).

F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.

2. Changes in early and late start dates.

3. Changes in early and late finish dates.

4. Changes in activity duration’s in workdays.

5. Changes in the critical path.

6. Changes in total float or slack time.

7. Changes in the Contract Time.

G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.

2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.

3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.

4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

   a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
   b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.5 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.

2. List of separate contractors at Project site.

3. Approximate count of personnel at Project site.

4. High and low temperatures and general weather conditions.

5. Accidents.

6. Meetings and significant decisions.

7. Unusual events (refer to special reports).

8. Stoppages, delays, shortages, and losses.

9. Meter readings and similar recordings.

10. Emergency procedures.

11. Orders and requests of authorities having jurisdiction.

12. Change Orders received and implemented.

13. Construction Change Directives received.

14. Services connected and disconnected.

15. Equipment or system tests and startups.

16. Partial Completions and occupancies.

17. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, duration's, actual starts and finishes, and activity duration's.

3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified commercial photographer to take construction photographs.

B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in the file name for each image.

D. Preconstruction Photographs: Before starting construction, take four (4) color photographs of Project site and surrounding properties from different vantage points, Northeast, Northwest, Southeast and Southwest. Show existing conditions adjacent to property.

E. Periodic Construction Photographs: Take four (4) color photographs monthly, coinciding with cutoff date associated with each Application for Payment. Photographer shall select vantage points to best show status of construction and progress since last photographs were taken.

F. Final Completion Construction Photographs: Take eight (8) color photographs after date of Substantial Completion for submission as Project Record Documents. Architect may direct photographer for desired vantage points.

END OF SECTION

SECTION 013201 - CPM (CRITICAL PATH METHOD) PROGRESS SCHEDULE (SINGLE PRIME)

PART 1 GENERAL

1.1 DESCRIPTION

A. The work shall consist of preparing, submitting, and maintaining a computerized CPM (Critical Path Method) progress schedule using Primavera P3 software.

B. The purpose of the computerized CPM progress schedule is to ensure timely completion of the contract and to establish a standard methodology for time adjustment analysis based on the principles of the Critical Path Method of Scheduling.

C. For this specification, “Engineer” means Nassau County DPW authorized Construction Manager.

D. The Contractor shall ensure that any and all computer files submitted to the Engineer are in a format that can be imported directly using Primavera software, version P3 (or as approved by the Engineer).

1.2 DETAILS

A. PRE-CONSTRUCTION SCHEDULE MEETING

1. The Engineer will schedule and conduct a Pre-construction Scheduling Meeting with the Contractor within ten (10) working days after the contract has been awarded. The requirements of this specification will be reviewed at this meeting. Additionally the following topics will be discussed:
   a. Specifics of any contract Time-Related Clauses.
   b. The representation in the schedule of the Time Related work.
   c. The calendar, activity coding, and resource definition requirements unique to and consistent with the contract.
   d. The Contractor’s schedule methodology employed, proposed work sequence and any proposed deviations of sequences from the contract plans.
   e. The factors that the Contractor determines to control the completion of the project and any milestone completions contained therein.
   f. Narrative content for Initial Baseline and Monthly Updates.
   g. Schedule submission protocol for Initial Baseline and Monthly Updates.

2. The Contractors attendance at the Pre-Construction Scheduling Meeting is mandatory. No field work will be allowed, with the exception of set up of the field office, until this meeting is held.

B. INITIAL BASELINE CPM CONSTRUCTION SCHEDULE

1. Within fifteen (15) workdays following the Notice to Proceed, the Contractor shall prepare and submit to the Engineer the Initial Baseline CPM Construction Schedule for the entire project. This submission shall include the electronic Schedule file and paper reports as required and approved by the Engineer.
2. The Initial Baseline Schedule must be Cost, and resource loaded and shall represent the Contractor’s plan to construct the project. This schedule shall include all work and activities necessary to complete the project including but not limited to activities for the preparation, submittal, review, approval, fabrication, and delivery of all shop drawing and procurement

related items. The Initial Baseline CPM Construction Schedule must be set up to conform to the staging/phasing and other requirements defined in the contract.

3. The Initial Baseline Schedule shall meet all interim milestone dates and shall not extend beyond the contract completion date.

C. SCHEDULE REQUIREMENTS

1. The Contractors Initial Baseline CPM Construction Schedule shall meet the following requirements:
   a. CPM ACTIVITY NETWORK FORMAT - The schedule network shall use the Precedence Diagraming Method. (If the contractor desires to employ an alternative method prior approval by the Engineer is required and no changes to the initial submission date will be permitted.)
   b. PROJECT DEFINITIONS - The following project specific properties within the schedule shall be defined:
      1. CALENDAR - All calendars created shall encompass and account for the total duration of the contract time period. The standard calendar shall be 8-hour days, five days per week and shall account for holidays and non-working days. Additional calendars shall be created and included as required for:
         a. Work week (5 or 6 day). (When or if the contractor elects to utilize a 6-day work week he shall be responsible for the county's overtime costs as applicable by the contract requirements).
         b. Seasonal restrictions (asphalt, landscape, etc.).
         c. Concrete curing/calendar days.
         d. Shop drawing review.
         e. Any project specifics as required by the Engineer.
         f. Expected and contemplated weather conditions shall be accounted for in the calendars.
      2. ACTIVITY CODE - As a minimum following activity code shall be established:
         a. Responsibility - The party responsible for each activity. Only one party can be responsible for an activity. Include Values for "Nassau County Department of Public Works (NC)", "Prime Contractor" and third parties to the contract as appropriate (utilities, etc).
         b. Phase - Phasing consistent with Contract plans where each activity is performed; Include Values for "None", and "Project Wide".
         c. Location - Location of activity work by Stationing; Include Value for "None", and "Project Wide"
         d. Type - The type of work for each activity; Include a Value for Administrative"
         e. Added Work - Work added to the Contract and incorporated into the schedule with the Engineers Approval.
         f. As Required by Project - Any coding unique to or as required by the Engineer to facilitate the use and analysis of the Schedule. This coding shall be established in consultation with the Engineer at the Pre-Construction Scheduling Meeting.
      3. RESOURCES - The Resource Dictionary shall be established as required by the Engineer. The Resource Dictionary shall be limited to Labor and Equipment. Labor may be represented by work crews. The composition of each crew must be detailed and included as an appendix to the Narrative Report. Sub-Contractors shall be represented as a labor crew(s).
      4. COST LOADING – Basis of cost loading will be the approved bid breakdown.

5. ACTIVITY DATA

a. ACTIVITY IDENTIFICATION - Each activity shall have a unique identifier. The identifier may be alpha-numeric, but at a minimum must be a unique number.

b. ACTIVITY DESCRIPTION - Each activity shall be unambiguously described. Descriptions such as "construct 30% of Y" are unacceptable. Activities shall be discrete to the extent necessary to accurately schedule the work.

c. ACTIVITY DURATION - Durations of individual work activities shall not exceed fifteen working days. The minimum activity duration increment is one full day. Durations of individual shop drawing review activities may exceed fifteen working days and shall be consistent with Contract Requirements. Exceptions to this will be reviewed by the Engineer on an activity-by-activity basis. If requested by the Engineer, production rates or other supporting information shall be supplied justifying the reasonableness of any given activity time duration. A Method Statement including the labor, equipment, production rates and any additional information, required to achieve a given activity shall be supplied within 5 working days when requested by the Engineer.

d. ACTIVITY RELATIONSHIPS - Activity relationships shall be finish-to-start with no lags unless directed otherwise by the Engineer. Contractor requests for exemptions will be made on a case by case basis. Each activity with the exception of the required “Project Award” and “Completion” activities shall have a predecessor and a successor activity relationship.

e. ACTIVITY START and FINISH DATES - The earliest start date, earliest finish date, latest start date, and latest finish date shall be calculated for each activity.

f. ACTIVITY TOTAL FLOAT - The total float shall be calculated for each activity. Total float is the full amount of time by which the start on an activity may be delayed without causing the project to last longer.

g. ACTIVITY CALENDARS - The appropriate calendar assignment shall be made to each activity

h. ACTIVITY CODES - Coding shall be assigned to each activity from the defined activity dictionary. Each code shall have a value assigned in a given activity.

i. ACTIVITY CONSTRAINTS - The start or completion of any activity shall not be constrained. Exceptions to this must receive prior approval in writing by the Engineer. A “Must¬ Finish-By” Date for the overall project is a constraint and must be pre-approved by the Engineer.

j. ACTIVITY RESOURCE S- The schedule shall be “Resource” loaded as required by the Engineer. The resources required to accomplish each activity shall be assigned to that activity from the ‘Resource Dictionary”

6. REQUIRED ACTIVITIES - The following activities shall be incorporated into the Schedule:

Activity ID	Activity Description	Activity Type	Logic Relationship
000010	Contract “Notice to Proceed”	Start Milestone	No Predecessors to this First Schedule Activity

999999	Completion	Finish Milestone	No Successors this Last Schedule Activity

7. DATA DATE - The Data Date and Project Start Date in the Initial Baseline Schedule shall be the NOTICE TO PROCEED DATE. The Data Date for each Monthly Update shall be the last workday of the month.

D. REVIEW AND ACCEPTANCE OF THE INITIAL BASELINE CPM CONSTRUCTION SCHEDULE

1. The Contractor shall submit to the Engineer the following items to facilitate review of the Initial Baseline CPM Construction Schedule:
   a. Narrative - A statement explaining the general sequence of work in the Contractor's schedule, a detailed definition of the work on the Critical Path, a statement regarding the meeting of any Time Restrictive Clause dates, and the explanation of any other ambiguities in the schedule.
2. The following Activity Sorts generated from the software shall be provided or as required and approved by the Engineer:
   a. Critical Path Activity Sort - The activities that comprise the projects Critical Path. The list shall start with the first activity in the path and then ascend by Early Start date to the final activity in the path.
   b. Time Related Activity Sort - For the activities necessary to complete the work within each specific Time Frame provision in the contract, shall be listed. The list shall start with the first milestone activity and then ascend by Early Start date to the final milestone activity in the network comprising each Time Frame period. Include a Critical Path activity sort for each specific Time Frame in the contract.
   c. Constraint Activity Sort - Listing of Constrained Activities and type of constraint.
   d. Listing of Calendars and Activity Coding incorporated in the Schedule

3. Electronic copies of the Initial CPM Construction Schedule shall be provided in format approved by the Engineer.
4. The Engineer will review the Initial Baseline CPM Construction Schedule and forward any comments, revisions, or requests to the Contractor. Within ten (10) workdays of the Engineer’s reply, the Contractor shall make adjustment to the Initial Baseline CPM Construction Schedule in accordance with the Engineer’s comments and resubmit copies for review consistent with the above directives.
5. Upon final revisions, the Contractor shall submit electronic file copies of the Initial Baseline CPM Construction Schedule to the Engineer. A sort of activities scheduled to start (ES) & finish (EF) in the next update period shall be included. The Logic Diagram shall be submitted as directed by the Engineer. The final submission shall be submitted for approval within five (5) workdays of the Contractor’s receipt of the final comments by the Engineer.
6. Approval of the Initial Baseline CPM Construction Schedule by the Engineer shall not be construed to imply approval of any particular method or sequence of construction or to relieve the Contractor of providing sufficient materials, equipment, and labor to guarantee completion of the project in accordance with the contract proposal, plans, and specifications. Approval shall not be construed to modify or amend the completion date. Completion dates can only be modified or amended by standard contractual means.
7. Failure to include in the Initial Baseline CPM Construction Schedule any element of work required for the performance of the contract shall not excuse the Contractor from completing all work required within the completion date(s) specified in the contract.

E. SCHEDULE UPDATES

1. MONTHLY PROGRESS UPDATES

   a. The Contractor shall update the schedule monthly. The schedule shall be updated to include all work and progress up to and including the last working day of the month. This will establish the “Data Date”. The Monthly update shall detail progress based on actual dates of activities started and completed, the percent of work completed to date on each activity started but not yet completed and the status of procurement of critical materials. The updated schedule data shall be submitted in an electronic file format acceptable to the Engineer.

   b. A Narrative Report is required for each update and shall provide the following information:

      1. Contractors transmittal letter to the Engineer stating the update period and schedule "Data Date".
      2. Work started, completed and ongoing during the update period by activity with “Actual Dates”.
      3. Description of current Critical Path and any change from previous Critical Path.
      4. Any activities added or deleted and any proposed changes in Activity Logic (Engineer’s approval in writing is required).
      5. Current Delays or Advancements
         a. Delayed or Advanced Activities.
         b. Proposed corrective action and schedule adjustments to address the Delay.
         c. Impact of Delay or Advancement on other activities (duration, ES,EF,LS,LF), milestone and completion dates.
         d. Impact of Delay or Advancement on the Critical Path.
      6. Outstanding Items that effect the schedule and status thereof (including but not limited to):
         a. Permits.
         b. Shop Drawings.
         c. Change Orders.
         d. Reviews of submittals.
         e. Approvals.
         f. Fabrication and Delivery.
      7. Scheduled Completion Date Status
         a. Contract Completion.
         b. Interim Time Frame if any.

2. The following Activity Sorts generated from the Software shall be provided:
   a. Current Critical Path Activity Sort
   b. Near Critical Activities Sort
   c. Sort of Activities scheduled to start (ES) & finish (EF) in the next Monthly update period.
   d. Any other “sort” as directed by the Engineer and/or as discussed in the pre-construction scheduling meeting.

3. The Monthly Progress Updates shall be submitted to the Engineer within five (5) work days of the “Data Date”. The Engineer shall prepare a written response within five (5) work days of receipt of the Monthly Update approving, approving with comments, or returning for resubmission within five (5) work days. If the Contractor fails to comply with the Monthly Progress Update submission requirements the Commissioner reserves the right to withhold any or all contract payments.

F. TOTAL FLOAT OWNERSHIP

1. Total Float belongs to the contract and shall not be considered as available for the exclusive use or benefit of either the County or the Contractor. Total Float is the number of days an activity may be delayed without extending the completion of either the project or an interim milestone. Float is available on a first-come, first-served basis to all identified "Responsible" parties in the schedule.

G. FLOAT MANIPULATION NOT PERMITTED

1. The Schedule shall not sequester float through such strategies as calendar manipulation, resource/labor manipulation or the extension of activity durations to fill up available float time. The Initial Baseline CPM Construction Schedule shall not attribute negative float to any activity.

H. CHANGES TO THE SCHEDULE

1. The Initial Baseline CPM Construction Schedule shall accurately reflect the manner in which the Contractor intends to proceed with the project. Changes to the schedule (the addition or deletion of activities, logic changes, and duration changes) shall be submitted in writing to the Engineer for approval and inclusion in the next Monthly Progress Update. The process of comparing the Schedule Update to Baseline shall be followed throughout the contract. Revision to any contract milestones, or contractually mandated schedule provisions will not be permitted without written authorization from the Engineer.

I. CRITICAL ACTIVITIES AND BASIS FOR TIME ADJUSTMENTS

1. The measure for Time Adjustments in the schedule shall be based on the criticality, and responsibility of the delay or advancement. Criticality is defined as the presence of the delayed or advanced activity on the projects Critical Path. The Critical Path is defined to be the longest continuous chain of activities through the schedule network that establishes the minimum overall duration in the absence of constraints in the program software. Time adjustment does not mean an extension of time for this contract.

J. CHANGES TO THE CONTRACT

1. In the event a notice of a change to the contract is received the Contractor shall notify the Engineer in writing within 10 (ten) calendar days of the effect of such change to the schedule. Change to the contract includes, but is not limited to, extra work, change orders, work suspensions, changed condition, Value Engineering Change Proposal, etc. The effect of the change to the contract on the projects Critical Path shall be stated. Any proposed revisions to the Schedule to incorporate the change to the contract shall be stated. <u>No changes shall be made to the Schedule without prior written approval of the Engineer</u>. The approved changes shall be incorporated in the next Monthly Progress Update.

1.3 TIME IMPACT ANALYSIS

A. This analysis will be performed by the Engineer (CM's scheduler) based on schedule updates as accepted in monthly schedule meetings.

B. Events, actions, and progress that cause delays or gains to the Project Schedule will be analyzed solely by the "Contemporaneous Period Analysis" method. The Contemporaneous Period Analysis evaluates delays or gains in the period in which it occurred. The analysis period for the purpose of this Specification shall be the period covered in each Monthly update to the schedule.

C. Impact of delay will be evaluated at the completion of the project. However an interim extension of time for payment purposes only may be granted by the Commissioner at his or her sole discretion at the end of contractual completion date.

1.4 RECOVERY SCHEDULES

A. General Provisions for Recovery Schedules

1. When updated Progress Schedule indicates and the Engineer determines that the ability to comply with the Contract Times falls behind schedule due to delay attributed to the CONTRACTORS, General Contractor shall prepare and submit a Progress Schedule demonstrating responsible Contractor's plan to accelerate related work to achieve compliance with the Contract Times ("recovery schedule") for Engineer's acceptance.

2. When recovery schedule will affect another prime Contractor on the Project, input on proposed recovery schedule action from the responsible prime Contractors must be provided within 10 work days of such determination by the Engineer. Incorporate requirements of other prime Contractors into the recovery schedule to the extent applicable.
3. Submit recovery schedule within 10 work days after submittal of updated Progress Schedule where need for recovery schedule is indicated or include in next update as directed by the Engineer.

B. Implementation of Recovery Schedule

1. At no additional cost to OWNER, do one or more of the following: furnish additional labor, provide additional construction equipment, provide suitable materials, employ additional work shifts, expedite procurement of materials and equipment to be incorporated into the Work, and other measures necessary to complete the Work within the Contract Times.
2. Item 1 above is also applicable when prime Contractor is required to accelerate their Work to recover lost time.
3. Upon acceptance of recovery schedule by Engineer, incorporate recovery schedule into the next Progress Schedule update.

C. Lack of Action

1. Prime Contractor's refusal, failure, or neglect to take appropriate recovery action, or General Contractor's refusal to submit a recovery schedule and take appropriate recovery action, shall constitute reasonable evidence that CONTRACTOR is not prosecuting the Work or separable part thereof with the diligence that will ensure completion within the Contract Times. Such lack of action shall constitute sufficient basis for OWNER to exercise remedies available to OWNER under the Contract Documents.

1.5 METHOD OF MEASUREMENT

A. The CPM (Critical Path Method) Progress Schedule will be measured for payment on a Lump Sum Basis.

1.6 BASIS OF PAYMENT

A. The lump sum price bid for the Critical Path Method Scheduling system shall include the cost of preparation and submission of the Initial Baseline Schedule and the preparation and submission of the monthly updates.

1. Payment will be made as follows:
   a. Upon submission of the Initial Baseline CPM Construction Schedule 20%
   b. Upon acceptance of the Baseline CPM Construction Schedule 20%
   c. The balance will be paid in equal monthly payments distributed over the contract. These payments will be contingent on the submission of acceptable monthly updates, 60%
   d. No additional payment over and above the lump sum price bid will be made for addition or deletion of work, delays, or any other reason whatsoever.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 013200

SECTION 01 32 33 PHOTOGRAPHIC DOCUMENTATION

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
   1. Preconstruction photographs.
   2. Periodic construction photographs.

B. See Division 01 Section "Closeout Procedures" for submitting digital media as Project Record Documents at Project closeout.

C. See Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.

1.03 SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.
B. Construction Photographs: Provide photographs in number and frequency in accordance with GC-37 of the General Conditions.
C. Photographic Prints: Submit two prints of each photographic view within three days of taking photographs.
   1. Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte prints on single-weight commercial-grade photographic paper, enclosed back to back in clear plastic sleeves that are punched for standard 3-ring binder.
   2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
      a. Name of Project.
      b. Name and address of photographer.
      c. Name of Architect.
      d. Name of Contractor.
      e. Date photograph was taken if not date stamped by camera.
      f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
      g. Unique sequential identifier.
   3. Digital Images: Submit a complete set of digital image electronic files with each submittal of prints on CD-ROM. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.

1.04 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.05 COORDINATION

A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.06 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 -PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in uncompressed PNG, JPG, or JPEG format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 pixels.

PART 3 -EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified commercial photographer to take construction photographs.

B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
   1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
   1. Date and Time: Include date and time in filename for each image.
   2. Field Office Images: Maintain one set of images on CD-ROM in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect.

D. Preconstruction Photographs: Before commencement of demolition, take digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
   1. Flag construction limits before taking construction photographs.
   2. Take eight photographs to show existing conditions adjacent to property before starting the Work.
   3. Take eight photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

E. Periodic Construction Photographs: Take at least 12 digital photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

F. Provide photos to highlight the implemented construction IAQ practices in accordance with the submittal requirements in Division 01 Section “Indoor Air Quality (IAQ) Management.”

G. Additional Photographs: Architect may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
   1. Three days' notice will be given, where feasible.
   2. In emergency situations, take additional photographs within 24 hours of request.
   3. Circumstances that could require additional photographs include, but are not limited to, the following:
      a. Special events planned at Project site.
      b. Immediate follow-up when on-site events result in construction damage or losses.
      c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
      d. Substantial Completion of a major phase or component of the Work.
      e. Extra record photographs at time of final acceptance.
      f. Owner's request for special publicity photographs.

END OF SECTION 01 32 33

SECTION 013300 - SUBMITTAL PROCEDURES

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. Work of this Section includes all labor, materials, equipment, and services necessary to complete submittal requirements as specified herein, including, but not limited to, the following:

1. Shop drawings and samples.

2. Integrated drawings.

1.3 RELATED SECTIONS

A. Construction Progress Documentation - Section 013200.

PART 2 PRODUCTS

2.1 SHOP DRAWINGS AND SAMPLES

A. General

1. The Contractor shall be responsible for coordinating the schedule for submittal of shop drawings and samples with his progress schedule and the requirements of the Contract Schedule and submit a coordinated schedule of submission of all shop drawings and samples to the Architect.

2. Failure of the Contractor to schedule and submit shop drawings and samples in ample time for checking, correction, and rechecking will not justify any delay in the Contract Schedule. Allow ample time for items to be tested, including time for retesting if the tests or mock-ups fail.

3. Samples, shop drawings, manufacturers' literature, and other required information shall be submitted in sufficient time to permit proper consideration and action on same before any materials and items are delivered on the work. Stagger submissions so that the Architect can review the documents in an orderly and timely manner. All samples of materials requiring laboratory tests shall be submitted to the laboratory for testing not less than 90 days before such materials are required to be used in the work. All other samples, manufacturers' literature, and other sample information shall be submitted for approval not less than 30 days before such materials are required to be used in the work.

4. Shop drawings for each Section of the work shall be numbered consecutively, and the numbering system shall be retained throughout all revisions. Each drawing shall have adequate clear space for the stamps of the Contractor, Architect, and one of the Architect's consultants.

5. All shop drawings shall be thoroughly checked by the Construction Manager and Contractor for compliance with the Contract Documents before submitting them to the Architect and shall bear the Contractor's stamp of approval certifying that they have been so checked.

6. Any shop drawings submitted without this stamp of approval and certification, and shop drawings which, in the Architect's sole opinion, are incomplete, contain errors or have not been checked, or only checked superficially, will be returned unchecked by the Architect for re- submission by the Contractor.

7. Any shop drawings submitted without a New York State Engineer's sign and seal as required by sections of this specification, will be returned unchecked by the Architect for re- submission by the Contractor.

8. In checking shop drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the shop drawings of any Section or trade with the requirements of all other Sections or trades whose work is related thereto, as required for proper and complete installation of the work. The Architect will review shop drawings. The Architect's acceptance of shop drawings is for design only and not method of assembly or erection. Acceptance shall in no way be construed as (1) permitting any departure whatsoever from the Contract Documents; (2) relieving the Contractor of full responsibility for any error in details, dimensions, omissions, or otherwise that may exist; (3) relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing, or deficiencies in strength; (4) relieving the Contractor of full responsibility for satisfactory performance of all work and coordination with the work of all subcontractors and other contractors; or (5) permitting departure from additional details or instructions previously furnished by the Architect. Acceptance of such drawings shall not be construed as a complete check, nor shall it relieve the Contractor from responsibility for proper fitting of the work, nor from the necessity of furnishing any work which may not be indicated on shop drawings when approved. The Contractor shall be solely responsible for any quantities which may be shown on the shop drawings.

9. Architect will review each submittal. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken. See below for Architects stamp.

SUBMITTAL REVIEW

☐ Reviewed. No exceptions taken.
☐ Rejected. Resubmission Required.
☐ Reviewed. Exceptions noted. Resubmission not required.
☐ Information received. No review required.
☐ Reviewed. Exceptions noted. Resubmission required.
☐ No action taken.

Architect's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the project plans and specifications, nor departures, therefrom. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly and for performing his work in a safe manner.

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Reviewed by Date

10. No work shall be fabricated, manufactured, or installed from shop drawings stamped "Reviewed, Exceptions noted. Resubmission required." or "Rejected. Resubmission required." and such shop drawings shall be corrected and resubmitted by the Contractor until accepted by the Architect. At least one complete set of shop drawings marked "Reviewed, Exceptions noted. Resubmission required." or "Rejected. Resubmission required." shall be kept at the site in the Contractor's field office for reference at all times. "Reviewed, Exception noted. Resubmission required." or "Rejected. Resubmission required." shop drawings shall not be permitted at the site.

11. Submittals Marked "Reviewed. No Exceptions Taken" Submittals which require no corrections by the Architect will be marked "Reviewed. No Exceptions Taken".

12. Submittals Marked "Reviewed. Exceptions Noted. Resubmission not required": Submittals which require only a minor amount of correcting shall be marked "Reviewed. Exceptions Noted. Resubmission not required" This mark shall mean that checking is complete, and all corrections are obvious without ambiguity. Fabrication will be allowed on work marked "Reviewed. Exceptions Noted. Resubmission not required" provided such action will expedite construction and noted corrections are adhered to. If fabrication is not made strictly in accordance with corrections noted, the item shall be rejected in the field, and the Contractor will be required to replace such work in accordance with corrected submittals.

13. Submittals Marked "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required" When submittals are contrary to contract requirements or too many corrections are required, they shall be marked "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required" No work shall be fabricated under this mark. The Architect shall list his reasons for rejection on the submittals or in the transmittal letter accompanying their return. The submittals must be corrected and resubmitted for approval.

14. All shop drawings and samples shall be identified as follows:

    a. Date of submittal.
    b. Title of project.
    c. Name of Contractor and date of his approval.
    d. Name of subcontractor or supplier and date of submittal to Contractor.
    e. Number of submission.
    f. Any qualification, departure, or deviation from the requirements of the Contract shall be EXPLICITLY NOTED.
    g. Federal Specification or ASTM number where required.
    h. Such additional information as may be required by the Specifications for the particular material being furnished.

15. If the Contractor wishes to deviate from the materials or details as shown in Specifications or Drawings, he shall submit the proposed deviation with shop drawings and/or samples stating the extent and the materials or details being replaced. The Contractor shall also submit information on the allowed credit or extra cost required for the proposed deviation, if any, and also all information relating to the work of other Sections revised by the proposed deviation.

16. The Architect and Engineer will review and review shop drawings and samples for within 15 business days unless it is a large submittal that requires additional time, but only for conformance with the design concept of the work and with information contained in the Contract Documents.

17. Incomplete shop drawings will be returned without checking for proper submission, and this shall not be considered as cause for delay of the work or extra compensation to the Contractor.

18. The Contractor shall submit appropriate transmittal forms with every submittal of shop drawings, manufacturer's literature, and samples. All reproducibles shall be rolled on cardboard tubes for resubmittal. The Contractor shall submit all required shop drawings, manufacturer's literature and samples in accordance with the procedures specified herein.

19. Unless otherwise specifically directed by the Architect, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.

20. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

21. Submit one copy of each standard referred to in the Specifications (ASTM, Fed. Spec., etc.) with the submission of each respective shop drawing, sample, or literature.

B. Submission of Shop Drawings

1. Architectural Work: Submit pdf of each shop drawing to the Architect for review. If no exceptions taken, the Architect will return pdf stamped "Reviewed. No Exceptions Taken" or "Reviewed. Exceptions Noted. Resubmission not required" and the Contractor shall print the required number of copies. In the event the Architect returns pdf stamped "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required" the Contractor shall make indicated changes and resubmit pdf to the Architect.

2. Structural Work and Mechanical Work: Submit pdf of each shop drawing to the Architect. to the Architect for review. Architect will forward to appreciate Engineer for their review, If no exceptions taken, the Architect will return pdf stamped "Reviewed. No Exceptions Taken" or "Reviewed. Exceptions Noted. Resubmission not required" and the Contractor shall print the required number of copies. In the event the Architect returns pdf stamped "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required" the Contractor shall make indicated changes and resubmit pdf to the Architect.

3. Prints: The Contractor shall provide all prints or shop drawings as reasonably required by subcontractors, material suppliers, superintendents, inspectors, and others as required for the work, or as directed by the Architect. The Contractor shall pay all costs in connection with printing and distribution of shop drawings.

C. Submission of Manufacturer's Literature, Including Catalog, Catalog Cuts, Brochures, Charts, Test Data, and Similar Information

1. Manufacturer's literature will receive consideration only when accompanied by the transmittal form properly filled out, as indicated, and listing each item of literature, as well as the Specification Section and paragraph numbers describing such materials. Any deviations from contract requirements shall be stated on the above form or attached to it.

2. Architectural Work: Submit pdf of manufacturer's literature to the Architect for review, Once reviewed the Architect will return pdf stamped "Reviewed. No Exceptions Taken" or "Reviewed. Exceptions Noted. Resubmission not required" The Contractor shall resubmit pdf of correct or corrected literature of all submissions stamped by the Architect "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required"

3. Structural Work and Mechanical Work: Submit pdf of manufacturer's literature to the Architect, Architect will forward to structural engineer for their review. Once reviewed the Architect will return pdf stamped "Reviewed. No Exceptions Taken" or "Reviewed. Exceptions Noted. Resubmission not required" The Contractor shall resubmit pdf of correct or corrected literature of all submissions stamped by the Architect "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required"

4. All copies of manufacturer's literature required to be resubmitted hereunder shall be original printed material. Reproductions of printed material will not receive consideration.

D. Submission of Samples

1. Contractor to submit four (4) samples unless otherwise indicated in the Specifications.

2. Samples will receive consideration only when each is clearly labeled and when accompanied by the transmittal form properly filled out, as indicated, and listing each sample, as well as the listing of any ASTM, Federal or other standard references specified, or applicable and such additional information as may be required by the Specifications for the materials being submitted. Any deviation from the contract requirements shall be so stated on the above form or attached to it.

3. The Architect shall have the right to require submission of samples of any materials, whether or not specifically indicated in the various Sections of the Specifications.

4. Unless otherwise specified, samples of sufficient size to indicate general visual effect shall be submitted. Where samples must show a range of color, texture, finish, graining, or other similar property, the Contractor shall submit sets of pairs illustrating the full scope of the range.

5. Three (3) samples of each submission will be returned to the Contractor; and for the supplier and one from the Contractor to store on site for reference by the Architect. Samples stamped "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required" by the Architect, the Contractor is to submit four (4) samples unless otherwise indicated in the Specifications.

6. All samples stamped "Reviewed. No Exceptions Taken" or "Reviewed. Exceptions Noted. Resubmission not required" shall be kept at the site in the Contractor's field office facilities for reference at all times. "Reviewed. Exceptions noted. Resubmission required" or "Rejected. Resubmission required" samples shall not be kept at the site.

2.2 INTEGRATED DRAWINGS

A. The HVAC subcontractor shall prepare a Drawing or Drawings showing duct work, heating and sprinkler piping. This Drawing shall include location of grilles, registers, etc., and access doors in hung ceilings. Locations shall be fixed by elevations and dimensions from column center lines and/or walls.

B. The HVAC subcontractor shall prepare and distribute to the Plumbing and Electrical subcontractors, the General Contractor, and to the Architect a AutoCAD drawing file of the above.

C. The HVAC subcontractor shall lay out in the AutoCAD drawing file the reflected ceiling plan, beam soffit elevations, ceiling heights, roof openings, etc.

D. The Plumbing subcontractor shall lay out in the AutoCAD drawing file the piping, valves, clean-outs, etc., indicating locations and elevations and shall indicate the necessary access doors.

E. The Electrical subcontractor shall indicate in the AutoCAD drawing file the fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.

F. The General Contractor shall indicate in the AutoCAD drawing file any structural framing, ceiling hangers, etc.

G. The General Contractor shall call as many meetings with the subcontractors as are necessary to resolve any conflicts that become apparent. He will call on the services of the Consultant Engineer or Architect where necessary. The General Contractor is fully responsible for the coordination of the Drawing or Drawings.

H. On resolution of the conflicts, each subcontractor shall enter his own work on the HVAC subcontractor's AutoCAD drawing file, which shall become the master or integrated Drawings. The master AutoCAD drawing file shall be signed by each contributing subcontractor to indicate his acceptance of the arrangement of the work. The contractor shall submit to the Architect a reproducible copy of the AutoCAD drawing file.

I. An AutoCAD drawing file of the master integrated Drawing will be prepared by the HVAC subcontractor. The General Contractor will make distribution.

J. Each subcontractor shall prepare his Shop Drawings in accordance with the integrated Drawings. No work will be permitted without reviewed Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.

PART 3 EXECUTION

3.1 COORDINATION OF SUBMITTALS

A. Prior to submittal for Architect's review, use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, materials, catalog numbers and similar data.

2. Coordinate as required with all trades and with public agencies involved.

3. Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.

4. Clearly indicate all deviations from the Contract Documents.

B. Unless otherwise specifically permitted by the Architect, make all submittals in groups containing all associated items; the Architect may reject partial submittals as not complying with the provisions of the Contract Documents.

END OF SECTION

SECTION 013560 - SAFE AND HEALTHFUL WORKING CONDITIONS

PART 1 GENERAL

1.1 SUMMARY

A. This section describes the requirements for safe and healthful working conditions as an integral part of the project construction.

1.2 DEFINITION

A. Safety staff shall mean the safety professional and his/her safety representative(s) or the safety person.

1.3 GENERAL REQUIREMENTS

A. In prosecuting the work of this Contract, the Contractor shall provide working conditions on each operation that shall be as safe and healthful as the nature of that operation permits. The various operations connected with the work shall be so conducted that they will not be unsafe or injurious to health; and the Contractor shall comply with all regulations and published recommendations of the New York State Department of Labor and all provisions, regulations and recommendations issued pursuant to the Federal Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, as amended, and with laws, rules, and regulations of other authorities having jurisdiction, with regard to all matters relating to safe and healthful working conditions.

1. Compliance with governmental requirements is mandated by law and considered only a minimum level of safety performance.
2. All work shall also be performed in accordance with safe work practice, and contractor's Health and Safety Plan, as approved by the Construction Manager in writing.

B. The Contractor shall be responsible for the safety of the Contractor's employees, the public, and all other persons at or about the site of the work. The Contractor shall be solely responsible for the adequacy and safety of all construction methods, materials, equipment, and the safe prosecution of the work.

C. The Contractor shall employ a properly qualified safety professional familiar with all work under this contract whose duties shall be to initiate, review, and cause implementation of measures for the protection of health and prevention of accidents.

D. The safety staff shall be provided with an appropriate office on the job site to maintain and keep available safety records, up-to-date copies of all pertinent safety rules, regulations and governing legislation, material safety data sheets, and the site safety plan including information concerning foreseeable emergency conditions, location of emergency and telephone contacts for supportive actions.

E. The Contractor shall stop work whenever a work procedure or a condition at a work site is deemed unsafe by the safety staff.

1.5 SUBMITTALS

A. The Contractor shall submit a Health and Safety Plan (HASP), prepared prior to the start of any construction for acceptance by the CM, in writing.

1. The HASP shall be available to workers on site and be submitted to the Construction Manager and or Nassau County Department of Public Works and Owner at least two (2) weeks before the beginning of any field work.
2. Copies of the plan shall be provided to the Contractors' insurers and their risk managers, if any, by the Contractor.

B. Within thirty (30) days of receiving a "Notice to Proceed", the Contractor shall submit the name of a safety professional, employed by the Contractor, responsible for project safety management, and of the safety representative(s) who will work under his/her direction.

C. Documentation and/or personal references confirming the qualifications may also be required.

1. The persons proposed as a safety person, safety professional, or safety representative(s), may be rejected by the Construction Manager and or Nassau County Department of Public Works for failure to have adequate qualifications or other cause.

D. In addition, the Contractor shall submit the names, addresses, and telephone numbers of three (3) supervisory personnel who may be contacted in the event of an emergency occurring during non-working hours.

1.6 QUALIFICATIONS

A. Safety Professional:

1. Certification by the Board of Certified Safety Professional as a Certified Safety Professional.
2. Minimum of five (5) years of professional safety management experience in the types of construction and conditions expected to be encountered on the site.

B. Safety Person:

1. Qualifications of the safety person must include a minimum of five (5) years of relevant construction experience, two (2) years of which are related to safety management.

C. The Safety staff shall be completely experienced with OSHA requirements and knowledgeable of all applicable health and safety requirements of all governing laws, rules and regulations as well as of good safety practice. The safety staff shall not include the project manager, engineer, or superintendent, or anyone else working on the project. The safety staff shall have no other duties except those directly related to safety.

PART 2 PRODUCTS

2.1 HEALTH AND SAFETY PLAN

A. The Contractor shall commit to writing a specific site Health and Safety Plan before the start of any construction for acceptance by the Construction Manager.

2.2 ACCIDENT REPORTS

A. The Contractor shall promptly (within the hour of the incident) report to the Construction Manger all accidents involving injury to personnel or damage to equipment and structures, investigate these accidents and prepare a preliminary report and submit within twenty-four (24) hours of the accident. The Contractor must submit a final accident report to the Construction Manager as follows:

1. The summary report, due by the tenth (10th) day of the incident, shall include descriptions of corrective actions to reduce the probability of similar accidents.
2. In addition, the Contractor shall furnish to the Construction Manager and or Nassau County Department of Public Works, a copy of all accident and health or safety hazard reports received from OSHA or any other government agency, within one (1) day of receipt, and attach the final plan.

B. In addition to the reports which the Contractor is required to file under the provisions of the Workman's Compensation Law, he/she shall submit to the Construction Manager and or Nassau County Department of Public Works on or before the tenth (10th) day of each month, a report giving the total force employed on his/her Contract in man- days during the previous calendar month, the number and character of all accidents resulting in loss of time or considered reportable by OSHA, and any other information on classification of employees, injuries received on the work, and disabilities arising therefrom, that may be required by the Engineer.

1. The submittal shall also contain an audit report for the prior month, including the safety training conducted, the above equipment logs, records of the condition of the work areas, safety and health records, OSHA and ANSI Z16.1 incidence rates for frequency and severity of recordable accidents, and an evaluation of the effectiveness of the HASP with any changes necessary.
2. The safety professional or safety person and the Contractor shall sign this audit report. The Engineer will review these reports for Contractor's compliance with the safety provisions of the Contract.

2.3 SAFETY AND RESCUE EQUIPMENT

A. The Contractor shall have proper safety and rescue equipment, adequately maintained and readily available, for any foreseeable contingency. This equipment shall include such applicable items as: proper fire extinguishers, first aid supplies, safety ropes and harness, stretchers, water safety devices, oxygen breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, combustible gas detectors, etc.

B. This equipment shall be kept in a protected area and checked at scheduled intervals. A log shall be maintained indicating who checked the equipment, when it was checked, and that it was acceptable. This equipment log shall be updated monthly and be submitted with the monthly report. Equipment that requires calibration shall have copies of dated calibration certificates on site.

C. Substitute safety and rescue equipment must be provided while primary equipment is being serviced or calibrated.

2.4 PROTECTIVE EQUIPMENT

A. All personnel employed by the Contractor or his subcontractors or any visitors whenever entering the job site shall be required to wear appropriate personal protection equipment required for that area. The Contractor shall provide all necessary personal protective equipment as requested by the Engineer for his/her designated representatives.

PART 3 EXECUTION

3.1 SAFETY STAFF DUTIES

A. The safety professional shall visit and audit all work areas as frequently as necessary (a minimum of once a week) and shall be available for consultation whenever necessary. The safety staff shall have full authority to implement and enforce the Health and Safety Plan to take immediate action to correct unsafe, hazardous, or unhealthful conditions.

B. A member of the safety staff must be at the job site full time (a minimum of eight (8) hours per working day) whenever work is in progress. When multiple shift work is in progress, more than one (1) safety representative may be required. The safety staff shall as a minimum:

1. Schedule safety training programs as required by law, the safety plan, and good safety practice. An outline of materials to be covered shall be provided with the safety plan. All employees shall be instructed on the recognition of hazards, observance of precautions, of the contents of the safety plan and the use of protective and emergency equipment.
2. Determine that operators of specific equipment are qualified by training and/or experience before they are allowed to operate such equipment.
3. Develop and implement emergency response procedures. Post the name, address, and hours of the nearest medical doctor, name and address of nearby clinics and hospitals, and the telephone numbers of the appropriate ambulance service, fire, and the police department.
4. Post all appropriate notices regarding safety and health regulations at locations which afford maximum exposure to all personnel at the job site.
5. Post appropriate instructions and warning signs in regard to all hazardous areas or conditions which cannot be eliminated. Identification of these areas shall be based on experience, on site surveillance, and severity of hazard. Such signs shall not be used in place of appropriate workplace controls. In order to alert the workers “Safety First” signs should be posted, as ordered by the Engineer at no extra cost.
6. Ascertain by personal inspection that all safety rules and regulations are enforced. Make inspections at least once a shift to ensure that all machines, tools, and equipment are in a safe operating condition, and that all work areas are free of hazards. Take necessary and timely corrective actions to eliminate all unsafe acts and/or conditions, and submit to the Engineer each day, a copy of his/her findings on the inspection check list report forms established in the safety plan.
7. Submit to the Construction Manager and or Nassau County Department of Public Works, copies of all safety inspection reports and citations from regulating agencies and insurance companies within one (1) workday of receipt of such reports.
8. Provide safety training and orientation to authorized visitors to ensure their safety while occupying the job site.
9. Perform all related tasks necessary to achieve the highest degree of safety that the nature of the work permits.

3.2 MEASUREMENT OF PAYMENT

A. No separate payment for the article “Safe and Healthful Working Conditions” will be made. The costs of same will be included in the Lump Sum Bid.

END OF SECTION 013560

SECTION 014000 - QUALITY REQUIREMENTS

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. This Section includes administrative and procedural requirements for quality assurance and quality control.

1.3 RELATED SECTIONS

A. Project Management and Coordination - Section 013113.

B. Testing and Inspection - Section 014523.

C. Divisions 2 through 32 Sections for specific test and inspection requirements.

1.4 DEFINITIONS

A. Quality-Assurance 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. 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.

1.5 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. Contractor to provide signed / sealed submittal as required by New York State Engineer.
2. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

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: 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 Nassau County Department of Public Work'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 the State of New York, 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.

H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.

1. 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.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect 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.

I. 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 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, unless otherwise directed by the Architect.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 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.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 42 00 REFERENCES

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes definitions of terms used throughout the specifications and on the drawings, and general standards that are referred to in Specifications in Divisions 01 through 49.
B. Related Work
   1. The building codes under which the Work is designed and is to be constructed are noted on the Drawings.
   2. Requirements for copies of references at the project site are specified in Division 01 Section “Temporary Facilities and Controls”.

1.03 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. “Agreement” and “Contract” are synonymous.

C. "Reviewed": When used to convey Architect's or Project Manager’s action on Contractor's submittals, applications, and requests, "Reviewed" is limited to the duties and responsibilities of the Architect or the Project Manager as stated in the Conditions of the Contract.

D. “Contractor” and “General Contractor” are synonymous.

E. “Construction Manager” and the abbreviation “CM” shall mean “a representative of Nassau County Department of Public Works, assigned to manage the construction of the project on the Nassau County Department of Public Work’s behalf, or a consultant employed by Nassau County Department of Public Works to provide Construction Management services in connection with the Project”.

F. "Directed": A command or instruction by Architect or Project Manager. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

G. “Drawings” and “plans” are synonymous.

H. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

I. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

J. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

K. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, including coordinating with other Contractors.

L. "Nassau County Department of Public Works Representative" (sometimes referred to as “Nassau County Department of Public Works Construction Manager”: The individual named by the Nassau County Department of Public Works whose responsibility it is to convey decisions of Nassau County Department of Public Works to the Contractor and otherwise facilitate communications among the Project team members.

M. "Provide": Furnish and install, complete and ready for the intended use.

N. "Project Site": 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.

O. "Architect / Engineer" as noted in these Contract Documents refers to Architect / Engineers listed in the Project Directory.

P. "Relocate": Move from the existing location to a new location and installed complete and ready for use.

Q. "Coordinate": Cooperate with related trades to provide the components of the Work in correct sequence, size, and location to create a complete system ready for intended use.

R. "Verify": Measure, investigate, review, test, check the accuracy or correctness of and prove by demonstration, evidence, or testimony, the location, size dimension, and condition of an item.

S. "Regulations": Includes laws, statutes, ordinances 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, whether they are lawfully imposed by authorities having jurisdiction or not.

T. "Installer": An entity engaged by the Contractor, either as an employee or Sub-Contractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform. The term "experienced" when used with the term "Installer" means having a minimum of five years of experience on projects similar in size and scope to this project and familiar with the precautions required, and has complied with requirements of the authority having jurisdiction.

U. "Governing Authorities", "Authorities Having Jurisdiction", "Town", “City”, "Municipality", or "Public Authority" shall include Federal, State, County or Municipal government and bureaus and subdivisions thereof, to the extent of the jurisdiction of any of them.

V. “Typical”: Provide the item in every situation and location where such items are indicated or in every repeated element of the facility, unless another item is specifically indicated in the Contract Documents.

1.04 STANDARDS

A. Various standards are referenced in the Specifications and notes on the Drawings. Reference standards shall be the current edition, as of the date of these specifications, of the document indicated.

B. In addition to sources identified in individual sections of the Specifications, standards of the following organizations are referenced by initials only.
   1. ANSI: American National Standards Institute.
   2. ASTM: American Society for Testing and Materials.
   3. IBC: International Building Code of the International Code Council, as amended by the local building authority.
   4. UL: Underwriters Laboratories Inc.
   5. USGBC: United States Green Building Council.
   a. LEED: Leadership in Energy and Environmental Design.

C. Measurements in these Specifications are shown in English inch-pound-second system and in International System of Units (SI) within parentheses ( ) in accordance with ASTM E380. Where products are described using nominal dimensions, these remain in the English system. The Contractor shall provide products which fit together and products shall form complete and working assemblies.

PART 2 -PRODUCTS (NOT USED)

PART 3 -EXECUTION (NOT USED)

END OF SECTION 01 42 00

SECTION 014523 - TESTING AND INSPECTION

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. Work of this Section includes all labor, materials, equipment and services necessary to complete the testing and inspection requirements as specified herein.

1.3 RELATED SECTIONS

A. Requirements for testing and inspection shall be described in various Sections of these Specifications. Where no testing and inspection requirements are described but Nassau County Department of Public Works chooses to have it performed, Nassau County Department of Public Works may require additional testing and inspection to be performed at his own expense.

B. Work Not Included

1. Unless otherwise noted in this Section or other Section of work, Nassau County Department of Public Works will select a pre-qualified independent testing laboratory and inspection professional.

2. Unless otherwise noted in this Section or other Sections of work, Nassau County Department of Public Works will pay for all initial services of the testing laboratory and inspection professionals as further described in Article 2.1 of this Section of these Specifications.

1.4 QUALITY ASSURANCE

A. The testing laboratory will be qualified to the Nassau County Department of Public Works approval in accordance with ASTM E 329- 14a "Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection."

B. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

1.5 PRODUCT HANDLING

A. Promptly process and distribute to the Construction Manager, Architect and Nassau County Department of Public Works all required copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the work.

PART 2 PRODUCTS

2.1 PAYMENTS FOR TESTING AND INSPECTION SERVICES

A. Initial Services: Nassau County Department of Public Works will pay for all initial testing and inspection services.

B. Retesting: When initial tests and inspections indicate non-compliance with local Codes and the Contract Documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and inspectors and the costs thereof will be deducted by the Owner from the Contract Sum.

2.2 CODE COMPLIANCE TESTING AND INSPECTION

A. Inspections and tests required by Codes or Ordinances, or by a plan approval authority, shall be paid by for by Nassau County Department of Public Works unless otherwise noted in this Section or other Sections of work. Retesting or inspection as required shall conform to the requirements of Article 2.1 B of this Section.

2.3 CONTRACTOR'S TESTING

A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

B. Where operating tests are specified, the Contractor shall test his work as it progresses, on his own account, and shall make satisfactory preliminary tests in all cases before applying for official tests.

C. Tests shall be made in the manner specified, for the different branches of the work. Each test shall be made on the entire system for which such test is required, wherever practical. In case it is necessary to test portions of the work independently, the Contractor shall do so without extra compensation. The Contractor shall furnish all labor, material and apparatus, make corrections and conduct the official test. The test will be conducted in the presence of a representative of the Architect.

D. All parts of the mechanical and electrical work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition. All defects disclosed by these tests shall be corrected to the satisfaction of the Construction Manager, Architect and Engineer without any additional cost to Nassau County Department of Public Works. Tests shall be repeated on this repaired or replaced work if deemed necessary by the Construction Manager and Architect. The Construction Manager and Architect shall be notified at least forty-eight (48) hours in advance of all tests and shall be represented at tests that he deems necessary. The Contractor shall furnish all necessary instruments, other equipment, and personnel required for such tests.

E. Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Construction Manager and Architect.

F. If the Construction Manager, Architect or Engineer is to observe the inspections, tests or approvals required by the Contract Documents, he will endeavor to do so promptly and, where practicable, at the source of supply.

PART 3 EXECUTION

3.1 COOPERATION WITH TESTING LABORATORY AND INSPECTORS

A. Representatives of the testing laboratory and inspectors shall have access to the work at all times. Provide facilities for such access in order that they may properly perform their functions.

3.2 SCHEDULES

A. Establishing Schedule: By advance discussions with the inspection service and testing laboratory selected by Nassau County Department of Public Works, determine the time required to perform inspections and tests and to issue each of its findings. Provide all required time within the construction schedule.

B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the inspectors and testing laboratory as required.

C. Adherence to Schedule: When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributable to the delay will be back-charged to the Contractor.

3.3 TAKING SPECIMENS

A. All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; all sampling equipment and personnel will be provided by the testing laboratory; and all deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

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. Work of this Section includes all labor, materials, equipment, and services necessary to complete the temporary facilities and controls as shown on the drawings and specified herein, including, but not limited to, the following:

1. Construction sign.
2. Stairs and ladders.
3. Rodent control.
4. Construction fence.
5. Field office.
6. Fire protection.
7. Temporary utilities.
8. Temporary toilets.
9. Temporary site access.
10. Security.
11. Water and snow control.
12. Environmental controls.

1.3 RELATED SECTIONS

A. Product Requirements - Section 016000.

B. Execution Requirements - Section 017300, for progress cleaning.

PART 2 PRODUCTS

2.1 GENERAL

A. Arrange for and provide temporary facilities and controls as specified herein and as required for the proper and expeditious prosecution of the work. Pay all costs, except as otherwise specified, until final acceptance of the work unless the Owner makes arrangements for the use of completed portions of the work after substantial completion.

B. Make all temporary connections to utilities and services in locations acceptable to the local authorities having jurisdiction thereof; furnish all necessary labor and materials and make all installations in a manner subject to the acceptance of such authorities; maintain such connections; remove the temporary installation and connections when no longer required; restore the services and sources of supply to proper operating condition.

C. Unless otherwise noted, pay all costs for temporary electrical power, temporary water, and temporary heating; provide metering as necessary.

D. A Staging Plan shall be submitted by the Contractor for approval by the Construction Manager, Architect and Nassau County Department of Public Works. The Staging Plan shall locate all temporary facilities and services, including parking for the Contractor's employees, within the limits of the staging areas, and shall allot ground space to Subcontractors for storage of materials, and the erection of sheds and tool houses. Materials and equipment can only be stored in the staging area. No parking for Contractor's or Subcontractors' employees' vehicles will be allowed in undesignated parking areas. The staging area shall be maintained in good repair, free of mud and standing water, and passable at all times. All materials stored within the project site are the responsibility of the Contractor. At the completion of the work, the staging areas shall be restored to their original condition, gravel removed, topsoil replaced and graded and re-seeded.

2.2 PROJECT IDENTIFICATION

A. No signs or advertisements will be allowed to be displayed on the premises without the approval of Nassau County Department of Public Works.

B. One construction sign on the site shall be provided by the Contractor and shall be subject to the review of the Architect and the approval of Nassau County Department of Public Works.

C. Erect the construction sign on the site where directed by the Construction Manager and Nassau County Department of Public Works. Provide sign approximately 4 ft. x 8 ft. in size, of 3/4 in. plywood with structural supports. Use Douglas Fir Overlaid Plywood, Grade B-B high density, exterior, good two sides, complying with PS-1. The sign shall be primed and given two coats of alkyd white paint. Lettering shall be black of a type, size, and lay-out as directed by the Construction Manager and Nassau County Department of Public Works Sign shall contain the name of the Building, Nassau County Department of Public Works, Construction Manager, Architect and Contractor, and such other information as Nassau County Department of Public Works, may require.

2.3 RODENT CONTROL

A. Institute an effective program of rodent control for the entire site within the construction limits. Cooperate with local authorities and provide the regular services of an experienced exterminator who shall visit the site at least once a month for the entire construction period. Provide marked metal containers for all edible rubbish and enforce their use by all employees. Containers shall be emptied, and the contents removed from the site as often as required to maintain an adequate rodent control program. If the program of rodent control used is not effective, take whatever steps are necessary to rid the project of rodents, and such action shall not be the basis of a claim for additional compensation or damages.

2.4 TEMPORARY CONSTRUCTION OPENINGS

A. Provide openings in slabs, walls, and partitions where required for moving in large pieces of equipment of all types. Close and/or restore all openings and finish them after the equipment is in place. Structural modification, if required, shall be subject to review by the Construction Manager and Architect.

2.5 TEMPORARY FENCE

A. Provide and maintain an 8-foot-high temporary chain link fence with fabric mesh to enclose the area at the job site and to guard and close effectively the designated area. Provide gates at locations where required for access to the enclosed area. Gates shall be cross braced, hung on heavy strap hinges, and shall have hasps and padlocks. Submit shop drawings of fence and gates for review of Architect, Construction Manager and Nassau County Department of Public Works.

B. Remove the fence upon completion of the work or at such time before final completion as directed by Nassau County Department of Public Works.

2.6 TEMPORARY FIELD OFFICES

A. Provide and maintain a field office with a internet connection, telephone and fax at the job site with not less than 200 square feet of space. The office shall be complete with light, heat, air conditioning, toilet facilities, electric water cooler, plan racks, four-drawer metal file with lock, shelves for samples, tables, chairs, and janitor service. When it becomes possible to establish an office in the building, office accommodation of approximately the same size as those in the field offices, including the services above, shall be provided and maintained until the issuance of a certificate of substantial completion. Temporary offices shall be removed when no longer required. Provide a internet connection, telephone and fax line with machine and pay all charges for installation and calls, including long distance calls.

2.7 FIRE PROTECTION

A. Provide and maintain adequate fire protection, ready for instant use, distributed around the project.

B. Make arrangements for periodical inspection by local fire protection authorities and insurance underwriter’s inspections. Cooperate with said authorities and promptly carry out their recommendations.

C. Open fire will not be permitted within the building enclosure or on the project site.

2.8 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat as required during construction to protect the work from freezing or frost damage, and as necessary to ensure suitable working conditions for the construction operations of all trades. In areas of the building where work is being conducted, the temperature shall be maintained as specified in the various sections of the Specifications, but not less than 45 degrees Fahrenheit. Under no circumstances shall the temperature be allowed to reach a level that will cause damage to any portion of the work which may be subject to damage by low temperatures.

B. Until the buildings, or any major portion thereof, is enclosed, temporary heating shall be by smokeless portable unit heaters of type listed by Underwriter's Laboratories, Factory Mutual, and the Fire Marshall. Pay for fuel, maintenance, and attendants required in connection with the portable unit heaters. Interior or exterior surfaces damaged by the use of these space heaters shall be replaced by new materials or be refinished.

C. The buildings shall be considered enclosed when it has reached the stage when exterior walls have been erected, the roof substantially completed, exterior openings closed up either by the permanently glazed windows and doors, or by adequate temporary closing, and the building is ready for interior masonry and plastering operations.

D. After the buildings, or any major portion thereof, has been enclosed, the permanent heating system as specified below may be used for temporary heat.

E. When the permanent heating system, or a suitable portion thereof, is in operating condition, the system may be used for temporary heating, provided that the Contractor assumes full responsibility for the entire heating system, and pays all costs for fuel, operation, maintenance, and restoration of the system.

F. Provide adequate ventilation as required to keep the temperature of the building within 10 degrees Fahrenheit of the ambient outdoor temperature when such ambient temperature exceeds 70 degrees Fahrenheit, and to prevent accumulation of excess moisture or to prevent excess thermal movement in the building.

G. When the permanent air circulation system, or a suitable portion thereof, is in operating condition, it may be used without refrigeration or chilling, provided that the Contractor assumes full responsibility for the system which he is using, and pays costs for power, operation, maintenance, and restoration of the system. Provide temporary filters to adequately filter air being distributed through the duct work to the supply outlets; disposable filters shall be placed in front of all exhaust registers to keep construction dirt out of exhaust duct work. The Contractor shall thoroughly clean the interior of the air handling units and duct work prior to acceptance of the work.

H. Upon conclusion of the temporary heating period, remove all temporary piping, temporary heating units, or other equipment and pay all costs in connection with repairing any damage caused by the installation or removal of temporary heating equipment. Thoroughly clean and recondition those parts of permanent heating and air circulation systems used for temporary service.

2.9 TEMPORARY LIGHT AND POWER

A. Make all arrangements with the local electric company for temporary electrical service to the construction site; provide all equipment necessary for temporary power and lighting; and pay all charges for this equipment, the installation thereof, and for current used. The electrical service shall be of 120v and 240v for single phase loads up to 30 amps for all construction tools and equipment without overloading the temporary facilities and shall be made available for power, lighting, and construction operations of all trades.

B. In addition to the electrical service, provide power distribution as required throughout site / structures. The terminations of power distribution shall be at convenient locations on the site and in the buildings. Terminations shall be provided for each voltage supply complete with circuit breakers, disconnect switches, and other electrical devices as required to protect the power supply system.

C. A temporary lighting system shall be furnished, installed, and maintained as required to satisfy minimum requirements of safety and security. The temporary lighting system shall afford general illumination in all building areas and shall supply not less than 150-watt lamps on 30' centers both directions of floor area for illumination in the areas of the building where work is being performed.

D. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the governing codes. All temporary wiring shall be maintained in a safe manner and used so as not to constitute a hazard to persons or property.

E. When the permanent electrical power and lighting systems are in operating condition, they may be used for temporary power and lighting for construction purposes, provided that the Contractor assumes full responsibility for the entire power and lighting system, and pays costs for power, operations, maintenance, and restoration of the system.

2.10 TEMPORARY ACCESS TO SITE

A. Comply with all requirements by Nassau County Department of Public Works and Nassau County Police Department.

B. Construct and maintain in good usable condition all required temporary access to site, and, when no longer required, remove all temporary construction and restore the site.

C. Where streets now in use are within or adjacent to the work, keep the passageways of such streets open to vehicular and pedestrian traffic to building fronting thereon. Maintain constant access for police, fire and ambulance service.

D. Mud carried off the site and into public roads shall be removed immediately by the Contractor.

E. Access to the site for delivery of construction material or equipment shall be made only from locations designated by the Architect.

2.11 TEMPORARY STAIRS, LADDERS, RAMPS

A. Provide and maintain all equipment such as temporary stairs, ladders, ramps, runways, and chutes as required for the proper execution of the work.

B. All such apparatus, equipment, and construction shall meet all requirements of the Labor Law and other state or local laws applicable thereto.

C. As soon as permanent stairs are erected, provide temporary protective treads, handrails, and shaft protection.

2.12 TEMPORARY TOILETS

A. Provide and maintain in a sanitary condition enclosed weathertight toilets for the use of all construction personnel at a location within the contract limits. Upon completion of the work, toilets shall be removed. Installation shall be in accordance with all applicable codes and regulations of authorities having jurisdiction. The number of toilet rooms required shall be in accordance with the ANSI Standard Safety Code for Building Construction or other local authorities.

2.13 TEMPORARY WATER SERVICE

A. Provide at a point within 10 feet of the building (or buildings) all water necessary for construction purposes. Make all temporary connections to existing mains; provide temporary meter; and make arrangements to pay for the temporary water service including cost of installation, maintenance thereof, and water used.

B. Furnish drinking water with suitable containers and cups for use of employees. Drinking water dispensers shall be conveniently located in the building where work is in progress.

C. When the permanent water supply and distribution system has been installed, it may be used as a source of water for construction purposes, provided that the Contractor assumes full responsibility for the entire water distribution system, and pays costs for operation, maintenance, and restoration of the system including the cost of water used.

D. At the completion of the construction work or at such time after the Contractor makes use of the permanent water installation, all temporary water service equipment and piping shall be removed, and all worn or damaged parts of the permanent system shall be replaced and equipment placed in first class condition equal to new.

2.14 SECURITY

A. Provide sufficient watchman service to prevent illegal entry or damage during nights, holidays, or other periods when work is not being executed, and such other control watchmen as required during working hours.

B. Provide all temporary enclosures required for protecting the project from the exterior, for providing passageways, for the protection of openings both exterior and interior, and any other location where temporary enclosures and protection may be required.

C. Take adequate precautions against fire; keep flammable material at an absolute minimum; and ensure that such material is properly handled and stored. Except as otherwise provided herein, do not permit fires to be built or open salamanders to be used in any part of the work.

2.15 WATER AND SNOW CONTROL

A. From the commencement of the construction to the completion of the work, keep all parts of the site and the project free from accumulation of water, and supply, maintain, and operate all necessary pumping and bailing equipment.

B. Remove snow and ice as necessary for the protection and prosecution of the work, and protect the work against weather damage.

C. The Contractor shall take over responsibility for site drainage upon entering the premises and shall maintain such drainage until completion of the work so as not to adversely affect the adjacent areas.

2.16 ENVIRONMENTAL CONTROLS

A. The Contractor shall comply with all applicable Federal, State and local laws, regulations, ordinances, codes and standards concerning environment control. Particular attention shall be given, without limitations, to:

1. Minimization of dust, containment of chemical vapors, control of engine exhaust gases, and control of smoke from temporary heaters.
2. Reduction of water pollution by control of sanitary facilities, proper storage of fuels and other potential contaminants, and prevention of siltation from land erosion.
3. Minimization of noise levels.
4. Proper and legal disposal, off site unless otherwise provided, of waste and spoil resulting from construction activities.

PART 3 EXECUTION

3.1 REMOVAL

A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove all such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Architect.

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

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. Work of this Section includes all labor, materials, equipment and services necessary to complete product requirements as specified herein, including but not limited to, the following:

1. Product delivery, storage and handling.
2. Storage and protection.
3. Identifying markings.
4. Temporary use of equipment.
5. General standards.

1.3 RELATED SECTIONS

A. Execution Requirements - Section 017300.

1.4 TRANSPORTATION AND HANDLING

A. Materials, products, and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.

B. More detailed requirements for transportation and handling are specified under the technical Sections.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.

3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 IDENTIFYING MARKINGS

A. Name plates and other identifying markings shall not be affixed on exposed surfaces of manufactured items installed in finished spaces.

1.7 TEMPORARY USE OF EQUIPMENT

A. No equipment intended for permanent installation shall be operated for temporary purposes without the written permission of the Architect.

B. The temporary or trial usage by Nassau County Department of Public Works (NCDPW) of any mechanical device, machinery, apparatus, equipment or any work or materials supplied under this Contract before final completion and written acceptance by the Construction Manager and Architect, shall not be construed as evidence of the acceptance of same by NCDPW. NCDPW shall have the privilege of such temporary and trial usage, for such reasonable length of time as and when the Construction Manager and Architect shall deem to be proper for making a complete and thorough test of same and no claim for damage shall be made by the Contractor for the injury to or breaking of parts of such work which may be caused by weakness or inaccuracy of structural parts or by defective material or workmanship. If the Contractor so elects, he may at his own expense, place a competent person or persons to make such trial usage; such trial usage shall be under the supervision of the Contractor.

1.8 GENERAL REQUIREMENTS

A. In the event that it is necessary for the Contractor to store any materials offsite, he shall first obtain the approval by Nassau County Department of Public Works (NCDPW). The Contractor shall be responsible for insurance and warehousing charges of any materials stored offsite. The Contractor shall also be responsible for the cost of delivery to the job site of any materials that have been stored offsite.

B. Materials delivered to the job site shall be carefully stored and protected from damage. Damaged material shall not be used in the work. The Contractor shall provide, where directed temporary storage facilities as may be required for the storage of all materials which might be damaged by weather.

C. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the representative manufacturers, unless otherwise specified.

D. Equipment, plant, and appliances, such as hoists, centering, concrete lifts, construction elevators, cranes, rigging, towers, derricks, walks, ramps, chutes, scaffolding, implements, transportation, cartage and other things necessary and required for the adequate execution of the work and as required by law and applicable Union rules shall be provided and shall be maintained in good and safe mechanical working order, be responsible for their safe use, and remove them when no longer required. Applicable requirements of OSHA shall become and form a part of this document.

E. During handling and installation of work at project site clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

F. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

G. Require installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

H. Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation to whatever extent these are more explicit or more stringent than applicable requirements indicated in the Contract Documents.

I. Inspect each item of materials or equipment immediately prior to installation and reject damaged and defective items.

J. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerance if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

K. Recheck measurements and dimensions of the work as an integral step of starting each installation.

L. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.

M. Coordinate enclosure (closing-in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.

N. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. In CMU walls mount units at height closest to manufacturer's recommendation so as to minimize cutting of block coursings. Refer questionable mounting height choices to Architect for final decision.

END OF SECTION

SECTION 017300 - EXECUTION REQUIREMENTS

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. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

1.3 RELATED SECTIONS

A. Cutting and Patching - Section 017329.

B. Closeout Procedures - Section 017700.

1.4 SUBMITTALS

A. Qualification Data: For land surveyor to demonstrate capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by land surveyor.

E. Final Property Survey: Submit AutoCAD, PDF files and 4 copies signed and sealed drawings showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, gas service, and water-service piping and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   a. Description of the Work.
   b. List of detrimental conditions, including substrates.
   c. List of unacceptable installation tolerances.
   d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to the Construction Manager and Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify the Construction Manager and Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify the Construction Manager and Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of the Construction Manager and Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to the Construction Manager and Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation of all buildings, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.

D. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by NYS licensed Engineer / land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg. F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 014000, "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 017329, "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 017329 - CUTTING AND PATCHING

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. This Section includes procedural requirements for cutting and patching.

1.3 RELATED SECTIONS

A. Refer to Divisions 3 through 32 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 22, 23 and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.4 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.5 SUBMITTALS

A. Cutting and Patching: Submit a method describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place 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.
4. Dates: 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, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Construction Manager’s and Architect's Approval: Obtain approval of cutting and patching before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.6 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.

1. Provide a list of additional elements that are structural elements and that require Architect's and Construction Manager's approval of a cutting and patching proposal.

B. Operational Elements: Do not cut and patch the following 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.

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-protection systems.
4. Control systems.
5. Communication systems.
6. Conveying systems.
7. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their 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.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.

6. Noise- and vibration-control elements and systems.

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.

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.

1.7 WARRANTY

A. 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 warranties.

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. In-Place 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 in-place 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.

3.2 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. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place 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.

1. 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.
2. In-Place Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Proceed with patching after construction operations requiring cutting are complete.

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. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the 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.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Work specified in this section is applicable to each Contractor as delineated herein. Where an individual Contractor is not addressed within the context of instruction or designation, such instruction or designation is intended for each and every Contractor.

B. Section Includes:

1. Waste management requirements.
2. Waste management plan.
3. Management plan implementation.
4. Progress reports
5. Special programs.

C. Related Sections:

1. Progress meetings: Elsewhere in Division 1.
2. Construction facilities and services: Elsewhere in Division 1.
3. Construction IAQ Management Plan: Elsewhere in Division 1.
4. All sections of the Specifications involving demolition or construction activities.

1.2 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash debris and rubble resulting from construction, and demolition operations. Hazardous materials are not included.

C. Contractor Waste Documentation Form: A form to be completed by the Contractor documenting construction and packaging materials expected to be brought to the site; the form identifies the estimated quantity, weight and % that can be returned or recycled for each material.

D. Diversion from Landfill: To remove, or have removed, from the Site for recycling, reuse or salvage, material that might otherwise be sent to a landfill. Diversion from landfill does not include using the material as alternative daily cover at a landfill site, nor does it include burning, incinerating or thermally destroying waste.

E. Project Construction Waste Management Plan (or Plan): The combined elements of the Contractor's Waste Management Plans and the Contractor's Waste Documentation Form.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.

G. Recycle (recycling): To sort, separate, process, treat or reconstitute solid waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying waste.

H. Return: To give back reusable items or unused products to vendors.

I. Reuse: To reuse excess or discarded construction material in some manner on the Site.

J. Salvage: To remove a waste material from the Site for resale or reuse.

K. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable and reusable material.

L. Waste Management Plan: Contractor is to prepare a project-related plan for the collection, transportation and disposal of waste generated at the Site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.

1.3 WASTE MANAGEMENT REQUIREMENTS

A. The County has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be returned, reused, salvaged, or recycled. Waste disposal in a land fill shall be minimized.

C. Diversion Requirements: The end-of-project recycling rate shall equal, at minimum, 75% by weight of the total project waste from construction and demolition activities on site. The following waste categories are likely candidates to be diverted from landfill (i.e., reused, recycled, or salvaged) for this project:

1. Concrete.
2. Concrete masonry units (CMU).
3. Metals (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, brass, bronze).
4. Cardboard, paper, packaging.
5. Beverage containers.
6. Reuse items.
7. Clean dimensional wood.
8. Roofing.
9. Drywall.
10. Glass.
11. Plastics.
12. Paint.

D. Fluorescent lamps, HID lamps and mercury-containing thermostats removed from the Site shall be recycled.

E. If conditions do not allow for recycling on site (to be determined by Contractor), the Contractor should include off site opportunities to recycle and reuse removed material in the Waste Management Plan.

F. With regard to these requirements the Contractor shall develop, for the Owner's review, a Waste Management Plan for this Project.

1.4 WASTE MANAGEMENT PLAN

A. The Contractor shall submit to Nassau County Department of Public Works, the Architect and Construction Manager a Waste Management Plan.

B. The Contractor shall be responsible for coordination and implementation of the overall Waste Management Plan. In addition, all trade sub-contractors shall be responsible for coordination with the Contractor with regard to waste recycling relevant to their scope of work.

C. Waste Management Plan: Within 14 days after receipt of the "Notice to Proceed" or prior to waste removal, whichever occurs sooner, the Contractor shall submit to the Construction Manager, a Waste Management Plan. The Plan shall contain the following:

1. List of materials targeted for reuse, salvage, or recycling, and name(s) of receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials.
2. Description of onsite and/or offsite sorting methods for all materials to be removed from site.
3. If mixed construction and demolition waste is to be sorted off-site, provide a letter from the processor stating the average percentage of mixed Construction and Demolition waste they recycle.
4. Landfill Information: Name(s) of1andfi11(s) where waste will be disposed, and applicable tipping fees.
5. Materials Handling Procedures: description of the means by which reused, recycled or salvaged waste materials will be protected from contamination.
6. Transportation: Description of means of transportation and destination for recyclable materials (whether materials will be separated on-site and self-hauled to designated center, or mixed C&D waste will be collected by a waste hauler and removed from the site).
7. Meetings: Description of regular meetings to be held to address waste management.
8. Sample spreadsheet and description of how the plan will be documented on a monthly basis.

1.5 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to Nassau County Department of Public Works, the Architect and Construction Manager

C. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

D. Separation Facilities: If waste sorting will be done on-site, the Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

E. Hazardous Wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations.

F. The Contractor shall provide calculations at the end of the project recycling rates, salvage rates, and landfill rates demonstrating the percentage, by weight or volume, of the construction wastes that were recycled or salvaged (The unit of measure must be consistent for all materials throughout tracking and documentation). The general process is as follows:

1. Record and document the total weight (in tons or cubic feet) of all demolition construction waste materials sent to the landfill.
2. Record and document the material types and the weights (in tons or cubic feet) that were recycled or salvaged.
3. Divide the recycled and salvaged waste (in tons or cubic feet) by the total waste generated (recycled, salvaged, and land filled waste), and multiply by 100 to calculate the percentage, by weight, of the construction wastes that were recycled or salvaged.

1.6 PROGRESS REPORTS

A. The Contractor shall submit monthly a Waste Management Progress Report, containing the following information: Project title, name of company completing report, dates of period covered by the report, percentage of waste recycled during this period and total percentage of waste recycled to date.

B. Progress Report on the disposal of site waste, including:

1. Recycled Materials. For each material, provide the following:
   a. Amount (in tons or cubic feet).
   b. Dates removed from the Site.
   c. Receiving Party.
2. Reused or Salvaged Materials. For each material, provide the following:
   a. Amount (in tons or cubic feet).
   b. Description of intended or actual use.
3. Land Filled Materials. Provide the following:
   a. Amount (in tons or cubic feet).
   b. Dates removed from the Site.
   c. Identity of the transfer station or landfill.

C. At the end of construction, provide legible copies of on-site logs, weight tickets and receipts. Receipts shall be from recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling or disposal. The Contractor shall save such original documents (as above) for the life of the Project plus 3 years.

1.7 SPECIAL PROGRAMS

A. The Contractor shall be responsible for compliance with any Owner's programs involving rebates or similar incentives related to recycling, if applicable to the Project. Revenues or other savings obtained for recycling or returns shall accrue to the Contractor.

1.8 REFERENCES, RESOURCES

A. The Owner encourages the Contractor to seek information from websites and experts in salvage or recycling in order to minimize disposal costs. There may be opportunities to sell or donate salvage and accrue rebates or similar incentives (which would accrue to the Contractor); also there are outlets that will pick up, and in some cases buy recyclable materials. Examples of information resources are as follows:

1. Web Resources (provided for information only; no warranty or endorsement is implied): U.S. Environmental Protection Agency, includes construction and demolition waste issues, and links to other resources (http://www.epa.Nov/enaoswer/non-hw/debris-new/)

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

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. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Warranties.
4. Instruction of Nassau County Department of Public Work's personnel.
5. Final cleaning.

1.3 RELATED SECTIONS

A. Payment Procedures - Section 012900.

B. Construction Progress Documentation - Section 013200.

C. Execution Requirements - Section 017300.

D. Operating and Maintenance Data - Section 017823.

E. Divisions 3 through 32 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.4 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 Nassau County Department of Public Works 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 Nassau County Department of Public Works 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 photographic negatives, damage or settlement surveys, property 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 Nassau County Department of Public Works. 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 Nassau County Department of Public Works of changeover in heat and other utilities.
12. Submit changeover information related to Nassau County Department of Public Works occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup 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, the Construction Manager and Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. The Construction Manager and 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 the Construction Manager and Architect, that must be completed or corrected before certificate will be issued. A sample of the Certificate of Substantial Completion form is attached at the end of this section.

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.

1.5 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.
2. Submit certified copy of Construction Manager’s and Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the Construction Manager and Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Nassau County Department of Public Works personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, the Construction Manager and Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. The Construction Manager and Architect 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.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit digital copy of list. 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.
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 Construction Manager.
   e. Name of Contractor.
   f. Page number.

1.7 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 the Construction Manager's and Architect's reference during normal working hours.

B. Record Drawings: Maintain and submit AutoCAD files of Contract Drawings and PDF files of the Shop Drawings.

1. Mark Record drawing files 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 Drawing files.
   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 in red. 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 file; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable files. Include identification on cover sheets.

C. Record Specifications: Submit PDF file 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 file 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 PDF file of each Product Data submittal. Mark file 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. Provide PDF file for miscellaneous records and identify each, ready for continued use and reference.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties on request of the Construction Manager and Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Nassau County Department of Public Works during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Provide PDF file and 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" x 11" 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 Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Nassau County Department of Public Works 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 Nassau County Department of Public Works with at least seven 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.

3.2 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.

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. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
   p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean ducts, blowers, and coils if units were operated without filters during construction.
r. 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.
s. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Nassau County Department of Public Works property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 017823 - OPERATION AND MAINTENANCE DATA

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. Work of this Section includes all labor, materials, equipment and services necessary to complete the operation and maintenance data as specified herein.

1.3 RELATED SECTIONS

A. Submittal Procedures - Section 013300.

B. Closeout Procedures - Section 017700.

1.4 GENERAL

A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.

1. Subcontractors shall prepare operation and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.

1.5 FORM OF SUBMITTALS

A. Prepare data in the form of an instructional manual for use by Owner's personnel.

B. Format

1. Size: 8-1/2" x 11".

1. Paper: 20 pound minimum, white for typed pages.

2. Text: Manufacturer's printed data, or neatly typewritten.

3. Drawings

a. Provide reinforced punched binder tab, bind in with text.
b. Fold larger drawings to the size of the text pages.

4. Provide fly-leaf for each separate product, or each piece of operating equipment.

a. Provide typed description of product, and major component parts of equipment.
b. Provide indexed tabs.

5. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS." List:

a. Title of Project.
b. Identity of separate structure as applicable.
c. Identity of general subject matter covered in the manual.

C. Binders

1. Commercial quality three-ring binders with durable and cleanable plastic covers.

2. Maximum ring size: 1 inch.

3. When multiple binders are used, correlate the data into related consistent groupings.

1.6 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of complete manual in final form.

B. Content, for architectural products, applied materials and finishes

1. Manufacturer's data, giving full information on products.

a. Catalog number, size, composition.
b. Color and texture designations.
c. Information required for re-ordering special-manufactured products.

2. Instructions for care and maintenance.

a. Manufacturer's recommendation for types of cleaning agents and methods.
b. Cautions against cleaning agents and methods which are detrimental to the product.
c. Recommended schedule for cleaning and maintenance.

C. Content, for moisture-protection and weather-exposed products

1. Manufacturer's data, giving full information on products.

a. Applicable standards.
b. Chemical composition.
c. Details of installation.

2. Instructions for inspection, maintenance, and repair.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit three copies of complete manual in final form.

B. Content, for each unit of equipment and system, as appropriate.

1. Description of unit and component parts.

a. Function, normal operating characteristics, and limiting conditions.
b. Performance curves, engineering data and tests.
c. Complete nomenclature and commercial number of all replaceable parts.

2. Operating procedures

a. Start-up, break-in, routine and normal operating instructions.
b. Regulation, control, stopping, shut-down and emergency instructions.
c. Summer and winter operating instructions.
d. Special operating instructions.

3. Maintenance procedures

a. Routine operations.
b. Guide to "trouble-shooting."
c. Disassembly, repair and reassembly.

d. Alignment, adjusting and checking.

4. Servicing and lubrication schedule.

a. List of lubricants required.

5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.

7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.

a. Predicted life of parts subject to wear.
b. Items recommended to be stocked as spare parts.

8. As-installed control diagrams by controls manufacturer.

9. Each contractor's coordination drawings.

a. As-installed color coded piping diagrams.

10. Charts of valve tag numbers, with the location and function of each valve.

11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

12. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts.

a. Function, normal operating characteristics, and limiting condition.
b. Performance curves, engineering data and tests.
c. Complete nomenclature and commercial number of replaceable parts.

2. Circuit directories of panel boards.

a. Electrical service.
b. Controls.
c. Communications.

3. As-installed color coded wiring diagrams.

4. Operation procedures

a. Routine and normal operating instructions.
b. Sequences required.
c. Special operating instructions.

5. Maintenance procedures

a. Routine operations.
b. Guide to "trouble-shooting."
c. Disassembly, repair and reassembly.
d. Adjustment and checking.

6. Manufacturer's printed operating and maintenance instructions.

7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

8. Other data as required under pertinent sections of specifications.

D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

E. Additional Requirements for Operation and Maintenance Data: The respective sections of Specifications.

END OF SECTION

SECTION 01 78 39 PROJECT RECORD DOCUMENTS

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
   1. Record Drawings.
   2. Record Specifications.

B. Related Sections include the following:
   1. Division 01 Section "Project Management and Coordination" for submitting and distributing electronic project record documents.
   2. Electronic Data Release Form, following Division 01 Section "Submittal Procedures" for the form that must be completed before CAD files will be released to the Contractor.
   3. Division 01 Section "Closeout Procedures" for general closeout procedures.
   4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   5. Divisions 02 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.03 SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit copies of Record Drawings as follows:
      a. Initial Submittal: Submit one set of marked-up Record Prints. Architect will initial and date each drawing and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return prints for organizing into sets, printing, binding, and final submittal.
      b. Final Submittal: Submit three sets of marked-up Record Prints. Print each Drawing, whether or not changes and additional information were recorded.
      c. Final Submittal: Submit one set of marked-up Record Prints, one set of Record CAD Drawing files, one set of Record CAD Drawing plots, and three copies printed from record plots. Plot and print each Drawing, whether or not changes and additional information were recorded. 1) Electronic Media: CD-R.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

2.01 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue-or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: 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 would be difficult to identify or measure and record 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.
2. Content: Types of items requiring marking include, but are not limited to, the following:
   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Depths of foundations below first floor.
   d. Locations and depths of underground utilities.
   e. Revisions to routing of piping and conduits.
   f. Revisions to electrical circuitry.
   g. Actual equipment locations.
   h. Duct size and routing.
   i. Locations of concealed internal utilities.
   j. Changes made by Change Order or Construction Change Directive.
   k. Changes made following Architect's written orders.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
   1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
   2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
   1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
   2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
   3. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.02 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications 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. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
   5. Note related Change Orders and Record Drawings where applicable.

2.03 ELECTRONIC DOCUMENTS RECORD SUBMITTALS

A. Provide copies of all electronic documents issued or transmitted during the course of construction, recorded on DVD-ROM. These documents shall include all submittals, RFIs, payment requests, progress schedules and charts, coordination drawings and models, minutes of meetings, records of telephone calls, e-mails, letters, and transmittals generated by the Construction Manager, all of the contractors, subcontractors, and suppliers, the Architect and the Architect's consultants, and the Owner and the Owner's consultants and other advisors. Only those documents that were distributed using the Construction Manager's project management software or project-specific web site need be provided on DVD-ROM.

2.04 MISCELLANEOUS RECORD SUBMITTALS

A. 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.

3.01 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 DEMONSTRATION AND TRAINING

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Nassau County Department of Public Works personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Demonstration and training videos.

B. See Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.03 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

B. Demonstration and Training Videotapes: Submit two copies within seven days of end of each training module.

1.04 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

DEMONSTRATION

PART 2 -PRODUCTS

2.01 INSTRUCTION PROGRAM

A. 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.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
   1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
   2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
   3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
   4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
   5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
   6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
   7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
   8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 -EXECUTION

3.01 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Nassau County Department of Public Works for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Nassau County Department of Public Works personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Nassau County Department of Public Works will furnish an instructor to describe Nassau County Department of Public Works operational philosophy.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Schedule training with Nassau County Department of Public Works with at least seven days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

3.02 DEMONSTRATION AND TRAINING VIDEOS

A. General: Engage a qualified commercial photographer to record demonstration and training videos. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Format: Provide high-quality color DVDs in full-size DVD cases with descriptive labels on both the discs and the cases.

C. Narration: Describe scenes on video by dubbing audio narration off-site after video is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

END OF SECTION 01 79 00

SECTION 018115 – LIMITS FOR VOLATILE ORGANIC COMPOUND CONTENTS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS

PART 1 GENERAL

SUMMARY

A. Section includes requirements for reduced-emission, reduced-toxicity construction adhesives, sealant and architectural coatings.

B. Material Safety Data Sheets (MSDS) required and readily available on site.

C. RELATED SECTIONS:
1. All sections in the Specifications with interior adhesive or sealant applications.
2. Painting: Division 9.

1.2 REFERENCE STANDARDS / QUALITY ASSURANCE

A. Adhesives (VOC Content): South Coast Air Quality Management District Rule #1168 - "Adhesive and Sealant Applications", amended 1/7/05: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov.

B. Sealants: (VOC Content): Regulation 8 (Organic Compounds), Rule 51 (Adhesive and Sealant Products), amended 5/2/01: Bay Area Air Quality Management District (BAAQMD), State of California, www.baaqmd.gov.

C. Paints: (VOC Content and Prohibited Compounds): "Green Seal Standard for Architectural Coating" (GS-11), plus "Green Seal Standard for Anti-Corrosive Paints" (GC-03).

D. Anticorrosive Paints: "Green Seal Standard for Anti-Corrosive Paints" (GC-03), Second Edition, 1/7/07.

E. Clear Wood Finishes, Floor Coatings, Stains, Sealers, Shellacs (VOC Content): South Coast Air Quality Management District Rule #1113, "Architectural Coatings," 1/1/04.

1.3 DELIVERY AND STORAGE

A. To the extent feasible, do not store adhesives, sealants, paints, and other Architectural coatings with materials that have a high capacity to adsorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, textiles, etc.). Do not store adhesives, sealants, paints, and other Architectural coatings in occupied spaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. VOC Content of Adhesives:

1. The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168, “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California. The VOC limits defined by SCAQMD (based on 1/7/05 amendments) are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U. S. EPA Reference Test Method 24). Unless otherwise specified below, the VOC content of all adhesives, adhesive bonding primers, or adhesive primers shall not be in excess of 250 grams per liter.
2. Architectural Applications:
   a. Wood flooring adhesive: 100.
   b. Subfloor adhesive: 50.
   c. Ceramic tile adhesive: 65.
   d. Drywall and panel adhesive: 50.
   e. Cove base adhesive: 50.
   f. Multipurpose construction adhesive: 70.
   g. Structural glazing adhesives: 100.
3. Specialty Applications:
   a. PVC welding: 510.
   b. CPVC welding: 490.
   c. ABS welding: 400.
   d. Plastic cement welding: 250.
   e. Adhesive primer for plastic: 550.
   f. Contact adhesive: 80.
   g. Special purpose contact adhesive: 250.
   h. Structural wood member adhesive: 140.
   i. Sheet applied rubber lining operations: 850.
   j. Adhesive Primer for Traffic Marking Tape: 150.
4. Substrate specific applications:
   a. Metal to metal: 30.
   b. Plastic foams: 50.
   c. Porous material (except wood): 50.
   d. Wood: 30.
   e. Fiberglass: 80.
5. If an adhesive is used to bond dissimilar substrates together, the adhesive with the highest VOC content shall be allowed.

B. VOC Content of Sealants and Sealant Primers:

1. The volatile organic compound (VOC) content of sealants and sealant primers shall not exceed the limits defined in Rule #1168, “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California. The VOC limits defined by SCAQMD (based on 1/7/05 amendments) are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U. S. EPA Reference Test Method 24).
2. Sealants:
   a. Architectural: 250.

b. Non-membrane Roof: 300.
c. Roadway: 250.
d. Other: 420.

3. Sealant Primers:
   a. Architectural Non-Porous: 250.
   b. Architectural Porous: 775.
   c. Other: 750.

C. VOC Content of Aerosol Adhesives:

1. The volatile organic compound (VOC) content of aerosol adhesives shall not exceed the limits defined in “Green Seal Standard for Commercial Adhesives” (GS-36), 10/19/00. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U. S. EPA Reference Test Method 24).
2. Aerosol Adhesives:
   a. General Purpose Mist Spray - 65% VOCs by weight.
   b. General Purpose Web Spray - 55% VOCs by weight.
   c. Special Purpose Aerosol Adhesives, all types - 70% VOCs by weight.

D. VOC Content of Paints:

1. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the “Green Seal Standard for Architectural Coating” (GS-11) as of 5/20/93. The VOC limits are as follows. All VOC limits are defined in grams per liter, less water.
2. Paint:
   a. Non-flat interior coatings: 150.
   b. Flat interior coatings: 50.

E. VOC Content of Anti-Corrosive Paints:

1. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the “Green Seal Standard for Anti-Corrosive Paints” (GC-03), Second Edition, 1/7/07. All VOC limits are defined in grams per liter, less water.
2. Anti-Corrosive Paints: 250.

F. VOC Content of Clear Wood Finishes, Floor Coatings, Stains, Sealers, Shellacs:

1. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the South Coast Air Quality Management District Rule #1113, “Architectural Coatings,” 1/1/04.
2. Clear Wood Finishes:
   a. Varnish: 350.
   b. Lacquer: 550.
3. Floor Coatings: 100.
4. Sealers:
   a. Waterproofing Sealers: 250.
   b. Sanding Sealers: 275.
   c. Other Sealers: 200.
   d. Stains: 250.

G. Prohibited Compounds in Paints:

1. Paints shall comply with the prohibited compound requirements of the “Green Seal Standard for Architectural Coating” (GS-11), Green Seal, Washington D.C.
2. Prohibited compounds, as defined in the green seal standard, shall include:
   a. Halomethanes: methylene chloride.
   b. Chlorinated ethanes: 1,1,1 trichloroethane.
   c. Aromatic solvents: benzene, toluene (methylbenzene), Ethylbenzene.
   d. Chlorinated ethylenes: vinyl chloride.
   e. Polynuclear aromatics: naphthalene.
   f. Chlorobenzenes: 1.2 dichlorobenzene.
   g. Phthalate esters: di (2-ethylhexyl) phthalate, Butyl Benzyl Phthalate, di-n-butyl
   h. Miscellaneous semi-volatile organics: isophorone.
   i. Metals and their compounds: antimony, cadmium, hexavalent chromium, lead, mercury.
   j. Preservatives (antifouling agents): formaldehyde.
   k. Ketones: methyl ethyl ketone, methyl isobutyl ketone.
   l. Miscellaneous volatile organics: acrolein, acrylonitrile.

PART 3 EXECUTION

3.1 INSTALLATION

A. Coordinate installation of all adhesives, sealants, paints, and coatings with the ventilation and sequencing criteria defined in Specification section 015110 Construction IAQ Management.

B. When installed over concrete slabs, verify compatibility of adhesives with curing compounds, leveling agents, or sealing agents used for slab preparation.

END OF SECTION

SECTION 01 91 13 GENERAL COMMISSIONING

REQUIREMENT'S PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND REFERENCED STANDARDS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. Nassau County Department of Public Works Project Requirements and Basis of Design.

C. Commissioning Plan.

D. ASHRAE Guideline 0-2005-The Commissioning Process.

E. ASHRAE Guideline 1.1-2007-HVAC&R Technical Requirements for The Commissioning Process

1.02 SUMMARY

A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning.

1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Pre-Functional Commissioning Checklists executed by Contractor are utilized to achieve this.
2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Commissioning Checklists executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.

B. Commissioning, including Functional Commissioning Checklists, Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion.

C. The Commissioning Authority is employed by Nassau County Department of Public Works.

1.03 DEFINITIONS

A. BOD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

C. CA: Commissioning Authority.

D. OPR: Nassau County Department of Public Works 's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.04 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of each Contractor, including Project superintendent and Subcontractors, installers, suppliers, and specialists deemed appropriate by the CA.

B. Members Appointed by Nassau County Department of Public Works:
   1. CA: The designated person, company, or entity that coordinates the commissioning team to implement the commissioning process.
   2. Representatives of the facility user and operation and maintenance personnel.
   3. Architect and Engineering design professionals.

1.05 NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS 'S RESPONSIBILITIES

A. Develop the OPR documentation to the CA and each Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

C. Provide the BOD documentation, prepared by Architect, and approved by Nassau County Department of Public Works, to the CA and each Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.06 EACH CONTRACTOR'S RESPONSIBILITIES

A. Each Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

   1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
   2. Cooperate with the CA for resolution of issues recorded in the Issues Log.
   3. Attend commissioning team meetings held on a weekly basis or as determined by CA.
   4. Integrate and coordinate commissioning process activities with construction schedule.
   5. Review and accept construction checklists, Pre-functional and Functional Commissioning Checklist provided by the CA. Provide equipment manufacturers information as requested by CA.
   6. Complete paper construction checklists as Work are completed and provide to the Commissioning Authority on a weekly basis.
   7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
   8. Complete commissioning process test procedures.
   9. Perform commissioning tests at the direction of the CA.
   10. Attend construction phase controls coordination meeting.
   11. Attend testing, adjusting, and balancing review and coordination meeting.
   12. Participate in systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CA.
   13. Provide information requested by the CA for final commissioning documentation.

14. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.
15. Provide commissioning services as outlined in commissioning plan.

1.07 PRE-FUNCTIONAL AND FUNCTIONAL COMMISSIONING CHECKLISTS

A. Pre-Functional Inspections are a systematic set of procedures intended to identify whether individual components of the systems to be commissioned have been installed properly. Pre-Functional Checklists shall be developed to ensure consistency in the inspections and to document the process. The Contractors shall perform, document, and complete all work indicated on the Pre-Functional and Functional Commissioning Checklists. The Contractor that installs the equipment shall also provide the Commissioning. Pre-Functional inspections can discover various installation issues and provide the opportunity to correct uncovered issues prior to Functional Testing.

Functional testing occurs once all system components are installed, energized, programmed, balanced and otherwise ready for operation under part and full load conditions. Testing should include each sequence in the sequence of operations under central and packaged equipment control, including startup, shutdown, capacity modulation, emergency and failure modes, alarms, and interlocks to other equipment. Systems performance testing may use a wide variety of means and methods to simulate and evaluate that the system being tested performs as expected (per the OPR/ BOD - Commissioning Plan, and Contract Documents) in all modes of operation. Systems performance testing shall be performed by the installing Contractor. Systems performance testing may yield minor or significant issues with the performance of the commissioned systems and may require significant follow-up and coordination between members of the Project team to address and resolve these issues. Evaluation of Results Compared to OPR/BOD, at each point in the process of Installation Inspections and Systems Performance Testing the CA and the commissioning team should evaluate whether the installed systems meet the criteria for the Project as set forth by the Nassau County Department of Public Works in the OPR and the designers in the BOD. Any discrepancies or deficiencies should be reported to Nassau County Department of Public Works and the team should work collaboratively to find an appropriate resolution.

The intent of functionally testing the system/building as a whole is to evaluate the ability of the components in a system to work together to achieve the Nassau County Department of Public Works Project Requirements. For functional testing to provide valid results, the individual components and systems have to be verified to be operating properly (Functional Checklists). This includes testing each sequence in the sequence of operations, startup, shutdown, interlocks, capacity modulation, safety items and capacities (testing, adjusting, and balancing).

Checklists will be printed on standard letter paper size and all checklists share the following common attributes.

1. Each checklist is assigned to a specific component (i.e., tag number or area) for checklists.
2. Each checklist contains an equipment tag and number. This equipment tag and number is utilized to track the checklist completion and “No” responses.
3. All checklists contain a region for recording “No” responses. The intent of this section is to provide Contractors with a means to track instances where the Nassau County Department of Public Works requirements are not met for future resolution.

1.08 DEVELOP AND USE PRE-FUNCTIONAL AND FUNCTIONAL CHECKLISTS

A. The Commissioning checklists are developed by the Commissioning Authority and issued to Nassau County Department of Public Works Representative, Construction Manager, General Contractor, Design Team, HVAC Contractor, Plumbing Contractor, and Electrical Contractor. The intent of commissioning checklists is to convey pertinent information to the installers regarding the Nassau County Department of Public Works 's Project Requirements.

The checklists are structured to be short and simple by focusing on key elements. The checklists include testing, adjusting, and balancing (TAB) and control system tuning.

The development of the Functional Checklists takes close coordination between the Commissioning Authority and Contractors to maximize the benefits of the checklists and to tailor the checklists to the Project.

The key steps in the development of the checklists are:

1. CA identifies components and systems for which checklists are required.
2. CA reviews Nassau County Department of Public Works requirements for key success criteria.
3. CA reviews specifications and drawings information for key requirements.
4. CA sets up spreadsheet identifying all equipment to be commissioned.
5. CA develops sample checklists.
6. CA provides sample checklists to Nassau County Department of Public Works Representative, Construction Manager, for review and to forward to General Contractor, HVAC Contractor, Plumbing Contractor and Electrical Contractor for their review and comment.
7. CA finalizes commissioning checklists based upon Nassau County Department of Public Works, Construction Manager's, and Contractor feedback.
8. CA prints commissioning checklists.
9. CA sends commissioning checklists and spreadsheets to Nassau County Department of Public Works Representative and Construction Manager for distribution.
10. The key steps for the contractors who will be using the checklists are:
11. At the start of each workday, Contractors remove the checklists that will be needed for that day from a designated file cabinet.
12. As work is completed, the individual workers fill out the appropriate checklist and describe any "No" responses at the side and bottom of each checklist. At the end of the day:
13. Give the completed checklists to the responsible party designated by the General Contractor to scan the checklists.
14. Return any checklists that were not completed to the file cabinet.
15. The responsible party designated by the General Contractor should scan the completed checklists and email the completed checklists to the CA on a weekly basis.
16. Once the checklists have been developed and provided to the General Contractor, the Commissioning Authority will review the completion of the checklists periodically during their site visits. The results of the review will be included in the site visit report and provided to the Contractors, Nassau County Department of Public Works, and Construction Manager.
17. Two (2) types of commissioning checklists will be developed for this project: Pre-Functional and Functional.

1.09 DEVELOP AND IMPLEMENT A MASTER DEFICIIENCY LOG

A. The CA shall develop a Master Deficiency log to provide a clear way of managing the deficiencies as a single document.

B. The Master Deficiency Log will be updated by the CA. The Contractors shall assist with documenting the deficiencies by notifying the CA of the issues within 72 hours of discovery.

1.10 CA'S RESPONSIBILITIES

A. Provide Project-specific pre-functional and functional commissioning checklists based on Contractor input for actual systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

B. Develop commissioning plan.

C. Develop pre-functional and functional commissioning checklists.

D. Review Contractors completed pre-functional and functional commissioning checklists.

E. Complete a summary commissioning report.

1.11 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing pre-functional and functional commissioning checklists and manufacturer's prestart and startup checklists for systems, assemblies, equipment, and components to be verified, tested (commissioned).
4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
5. Certificate of readiness certifying that systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.

1.12 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, prestart, and startup activities.

C. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.

D. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
1. Manufacturer's product data, cut sheets, and shop drawings.
2. Manufacture's installation instructions.
3. Startup, operating, and troubleshooting procedures.
4. Fan and pump curves.
5. Factory test reports.
6. Warranty information, including details of Nassau County Department of Public Works 's responsibilities in regard to keeping warranties in force.

E. Startup Plans and Reports.

F. Completed Pre-Functional and Functional Commissioning Checklists.

G. Make commissioning submittals on time schedule specified by Commissioning Authority.

H. Submittals indicated as “Draft” are intended for the use of the Commissioning Authority in preparation of Pre-Functional Commissioning Checklists or Functional Commissioning Checklists; submit in editable electronic format, Microsoft Work 2003 preferred.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Nassau County Department of Public Works.

B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply.

1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5-degree F and resolution of plus/minus 0.1-degree F.
2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
3. Calibration: According to the manufacture’s recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Nassau County Department of Public Works; such equipment, tools, and instruments are to become the property of Nassau County Department of Public Works .

D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.

PART 3 - EXECUTION

3.01 COMMISSIONING PLAN

A. Commissioning Authority has prepared the Commissioning Plan.

1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

B. Contractor is responsible for compliance with the Commissioning Plan.

C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.

D. Commissioning Schedule:

1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
3. Pre-functional Commissioning Checklists and Functional Commissioning Checklists are to be performed in sequence from components, to subsystems, to systems.
4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 STARTUP PLANS AND REPORTS

A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.

B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed, and dated by responsible entity.

C. Submit directly to the Commissioning Authority.

3.03 PREFUNCTIONAL CHECKLISTS

A. Pre-functional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.

1. No sampling of identical or near-identical items is allowed.
2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
3. Pre-functional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
   a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
   b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
   c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
   d. Serial number of installed units.
   e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
   f. Sensor and actuator calibration information.

B. Contractor is responsible for filling out Pre-functional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.

1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness checklists are not complete until all line items are initialed and dated complete without deficiencies.
2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.

4. If any Checklist line item is not relevant, record reasons on the form.
5. Contractor may independently perform startup inspections and/or tests, at his option.
6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
7. Submit completed Checklists to Commissioning Authority within two days of completion.

C. Commissioning Authority is responsible for furnishing the Pre-functional Checklists to Contractor.

1. Initial Drafts: Contractor is responsible for initial draft of Pre-functional Checklist where so indicated in the Contract Documents.
2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
4. When asked to review the proposed Checklists, do so in a timely manner.

D. Commissioning Authority Witnessing: Required for:

1. Each piece of primary equipment unless sampling of multiple similar units is allowed by the commissioning plan.
2. A sampling of non-primary equipment, as allowed by the commissioning plan.

E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Nassau County Department of Public Works.

1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.04 FUNCTIONAL TESTS

A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.

B. Contractor is responsible for execution of required Functional Tests, after completion of Pre-functional Checklist and before closeout.

C. Commissioning Authority is responsible for witnessing Functional Tests.

D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Nassau County Department of Public Works; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.

1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.

4. Contractor shall bear the cost of Nassau County Department of Public Works and Commissioning Authority personnel time witnessing re-testing.
5. Contractor shall bear the cost of Nassau County Department of Public Works and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Pre-functional Checklist correctly; if the test failed for reasons that would not have been identified in the Pre-functional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.

E. Functional Commissioning Checklist Procedures:

1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
   a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
   b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
   c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
   d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.

F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.05 SENSOR AND ACTUATOR CALIBRATION

A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

B. Calibrate using the methods described below; alternate methods may be used, if approved by Nassau County Department of Public Works beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Pre-functional Checklist or other suitable forms, documenting initial, intermediate, and final results.

C. All Sensors:
1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
2. Verify that sensors with shielded cable are grounded only at one end.
3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2-degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading of each other.
4. Tolerances for critical applications may be tighter.

D. Sensors Without Transmitters – Standard Application
1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
2. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
3. If not, install offset, calibrate, or replace sensor.

E. Sensors with Transmitters – Standard Application:

1. Disconnect sensor.
2. Connect a signal generator in place of sensor.
3. Connect ammeter in series between transmitter and building automation system control panel.
4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, and P/I reaction.
8. Reconnect sensor.
9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
11. If not, replace sensor and repeat.
12. For pressure sensors, perform a similar process with a suitable signal generator.

F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:

1. Watthour, Voltage, Amperage: 1 percent of design.
2. Pressure, Air, Water, Gas: 3 percent of design.
3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
4. Relative Humidity: 4 percent of design.
5. Barometric Pressure: 0.1 inch of Hg (.
6. Flow Rate, Air: 10 percent of design.
7. Flow Rate, Water: 4 percent of design.
8. AHU Wet Bulb and Dew Point: 2.0 degrees F.

G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

H. Valve/Damper Stroke Setup and Check:

1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
2. Set pump/fan to normal operating mode.
3. Command valve/damper closed: visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper to open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not correspond, replace actuator, or add pilot positioner (for pneumatics).

I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.

1. With full pressure in the system, command valve closed.
2. Use an ultra-sonic flow meter to detect flow or leakage.

3.06 TEST PROCEDURES – GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.

C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:

1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
2. Sampling is not allowed for:
   a. Major equipment.
   b. Life-safety-critical equipment.
   c. Pre-functional Checklist execution.
3. XX = the percent of the group if identical equipment to be included in each sample; defined for specific type of equipment.
4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the “first sample.”
6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
7. If YY percent of the units in the second sample fail, test all remaining identical units.
8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.

D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example, apply hot air to a space sensor using a hair dryer to see the response in a VAV box.

F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.

H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.

I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems: where monitoring of specific points is called for in Functional Test Procedures:

1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority’s request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
2. Other points will be monitored by the Commissioning Authority using dataloggers.
3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.

5. Graphical output is desirable and is required for all output if the system can produce it.
6. Monitoring may be used to augment manual testing.

3.07 TESTING PREPARATION

A. Certify that systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CA.

3.08 TESTING AND BALANCING VERIFICATION

A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CA.

B. Notify the CA at least 10 days in advance of testing and balancing Work and provide access for the CA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of systems at the direction of the CA.

1. The CA will notify testing and balancing subcontractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
2. The testing and balancing Subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
4. Remedy the deficiency and notify the CA so verification of failed portions can be performed.

3.09 GENERAL TESTING AND COMMISSIONING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CA.

B. Scope of testing and commissioning shall include all systems and subsystems in accordance with the LEED New Construction Guidelines. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CA along with the Contractors, testing and balancing Subcontractor, and Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, and checklists for systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CA may direct that set points be altered when simulating conditions is not practical.

H. The CA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the system, document the deficiency and report it to the Nassau County Department of Public Works. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.10 ADDITIONAL TESTING AND COMMISSIONING PROCEDURES FOR HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT

A. Boiler Testing and Acceptance Procedures: Testing requirements are specified in Division 23 boiler Sections. Provide submittals, test data, inspector record, and boiler certification to the CA.

B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CA with preparation of testing plans.

C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.

4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. Energy Supply System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of oil, gas, hot-water and solar systems and equipment at the direction of the CA. The CA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

F. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

G. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

3.11 SYSTEMS, SUBSYSTEMS AND EQUIPMENT TO BE COMMISSINED AT A MINIMUM

A. Systems, subsystems, and equipment to be commissioned at a minimum includes the following:

1. Heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls.
2. Lighting and day lighting controls.
3. Domestic hot water systems.
4. Renewable energy systems (wind, solar, etc.)

B. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

END OF SECTION 011913

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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		ISSUED FOR BID					
DIVISION 02 -	**EXISTING CONDITIONS**						
	NOT USED						

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
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Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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03 10 00	Concrete Formwork	X					
03 20 00	Concrete Reinforcement	X					
03 30 00	Cast-In-Place Concrete	X					

SECTION 03 10 00 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide concrete formwork wherever necessary to confine concrete and shape it to required dimensions in accordance with the Contract Documents, and general provisions of the Contract, including General and Supplementary Conditions.

B. Provide mock-up of smooth and architectural finishes prior to beginning work as described in Section 03 30 00.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Unit Masonry (Dovetail slots) Section 04 20 00

B. Miscellaneous Metal (concrete, inserts) Section 05 50 00

1.03 RELATED SECTIONS

A. Concrete Reinforcement Section 03 20 00

B. Cast-in-Place Concrete Section 03 30 00

1.04 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

B. American Concrete Institute (ACI) standards, latest editions.

1. ACI 301 Specifications for Structural Concrete for Buildings.
2. ACI 347 Guide to Formwork for Concrete.

1.05 DESIGN REQUIREMENTS

A. The design and engineering of the formwork, as well as its construction, is the responsibility of the Contractor.

B. Design formwork in accordance with ACI 347.

1.06 SUBMITTALS

A. Product Data

Submit manufacturers' information for the following:

1. Ties, each type and where to be used
2. Form-release agent. Form-release agent to be submitted for review only.

B. Shop Drawings

1. Exposed concrete indicated on the Drawings as “Architectural Concrete” or “Architectural Finish” shall have the formwork designed and shop drawings submitted for review to ensure tightness and prevention of leakage. Provide smooth form liners as approved by Architect. Formwork is to be designed to limit deflections.
2. Submit method of producing special finish (eg exposed aggregate, sandblast, etc).

C. Quality Control Submittals

1. Contractor Qualifications: Provide proof of Formwork Installer qualifications specified under “Quality Assurance”.

1.07 QUALITY ASSURANCE

A. Qualifications: Company specializing in performing the Work of this Section shall have three years minimum experience.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYS Building Code. Where more severe requirements than those contained in the Building Code are given in this Section and ACI 347, the requirements of this Section and ACI 347 shall govern.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protection

1. Protect formwork materials before, during and after installation.
2. Protect installed work and materials of other trades.

B. Replacement

1. Repair or replace damaged formwork as approved by the Construction Manager and Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Rough Formwork: Shall be Commercial Douglas Fir, DFPA: 5/8" thick minimum or modular metal units.

B. Release Agent: VOC compliant material such as those of the Cresset Chemical Company for coating forms.

C. Form Ties

1. Form ties for exposed concrete shall be adjustable.
2. Form ties for exposed concrete and concrete to receive membranes shall be a break-off type and leave no metal closer than $1^1/_2$" to the surface.
3. Form ties for concrete stated in 2 above shall be free of devices which leave holes or depressions larger than 7/8" back of exposed surface.
4. Wire ties not permitted.

PART 3 - EXECUTION

3.01 PREPARATION OF FORMWORK SURFACES

A. Clean all surfaces of forms and embedded items of any accumulated mortar or grout from previous concreting and other foreign material before concrete is placed in them. Repair or replace any formwork as required.

B. Before placing either reinforcing steel or concrete, cover the surfaces of the rough or overlaid plyform formwork (when used) with an approved form release agent that will effectively prevent absorption of moisture, prevent bond with the concrete, and which will not stain the concrete surfaces. Material shall be carefully applied at the amount recommended by the release agent manufacturer to obtain the desired finish. Do not apply oil or release agents on formwork for concrete to receive coatings such as membrane waterproofing, plaster, or additional concrete (such as at construction joints). Follow manufacturer's recommendations for alternatives. Do not allow excess form coating material to stand in puddles in the forms nor allow coating to come in contact with hardened concrete against which fresh concrete is to be placed.

3.02 CONSTRUCTION AND DETAILS

A. Adequately support and substantially brace formwork to hold lines and shape.

B. Formwork shall be tight jointed to prevent leakage of mortar from the concrete.

C. Place chamfer strips in the corners of forms to produce beveled edges (chamfers) on permanently exposed surfaces (such as exposed columns). Do not provide beveled edge for interior corners of such surfaces and where members are flush with partitions or walls, unless required by Drawings or specified elsewhere.

D. Set slab-forms with camber of 1/4" per 10 feet of span to maintain tolerances. For two way slabs the lesser span dimension shall govern.

E. Provide positive means of adjustment (wedges or jacks) for shores and struts to take up all settlement during concrete placing operations. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check. Securely brace forms against lateral deflection.

F. Provide mud sills where shores rest on compressible materials.

G. Provide temporary openings to permit cleaning and inspection. Provide ample time for proper inspection before placement of concrete.

H. Provide "Rough Form Finish" for surfaces not exposed to view. Use plywood or metal forms coated with a release agent.

I. Provide "Smooth Form Finish" (and/or Architectural Finish", "Textured Finish", if shown on Drawings) for surfaces exposed to view, keeping the number of seams to a practical minimum. Items indicated as "Architectural Concrete" or Architectural Finish" shall use specially designed formwork to attain the desired finish.

J. Form holes for pipes, pipe sleeves, electric outlets, electric conduits, etc. as required. Construct wood-forms for wall forms to facilitate loosening, if necessary, to counteract swelling of forms.

K. Provide runways for moving equipment with struts or legs, which shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

L. Provide for rebates, reglets, grooves keys, pockets, ground nailers, projections and other built-in work prior to placement of concrete. Install reglets as per manufacturer's instructions.

M. Install dovetail slots, concrete inserts, and other metal fabrications. Secure to inside forms and space as specified in Section 05 50 00 or as shown on Drawings.

N. At construction joints, contact surface of the form sheathing for flush surfaces exposed to view shall overlap the hardened concrete in the previous placement by not more than 1". The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint and to maintain a true surface.

O. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. Use of non-fabricated wire is not permitted. Construct form ties so that the ends or end fasteners can be removed without causing appreciable spalling at the faces of the concrete. After the ends or end fasteners of the form ties have been removed, terminate the embedded portion of the ties not less than 2 diameters or twice the minimum dimension of the tie from the formed faces of concrete to be permanently exposed to view, except that in no case shall this distance be less than 3/4". When the formed face of the concrete is not to be permanently exposed to view, form ties may be cut off flush with the formed surfaces.

P. Carefully check all forms before placement of concrete. Give special care to suspended first floor slabs resting on compressible material to prevent settlement.

Q. Notify the Engineer of Record if openings are required but not shown on the Drawings, who will issue instructions accordingly.

3.03 REMOVAL OF FORMS AND SHORING

A. Remove forms in such a manner as to assure the complete safety of the structure. In no case remove forms or shoring supporting the weight of concrete in beams, slabs or structural members until the members have reached the minimum compressive strength specified on the Drawings or as permitted by the Engineer of Record.

B. Formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations and as required by C below. For normal temperature conditions, this shall be a minimum of 12 hours. For cold weather conditions, this shall be increased to 24 hours. Concrete shall remain protected at all times.

C. When repair of surface defects or finishing is required at an early age, remove forms as soon as the concrete has hardened sufficiently to resist damage from removal operations.

D. Remove top forms on sloping surfaces of concrete as soon as the concrete has attained sufficient stiffness to prevent sagging. Perform any needed repairs or treatment required on such sloping surfaces at once and follow it with the specified curing.

E. Loosen wood forms for wall openings as soon as this can be accomplished without damage to the concrete.

F. Proper safe shoring, number of shores, adequacy, size and location of these shores and forms shall be in accordance with acceptable good construction practice and it is the sole responsibility of the Contractor to provide safe conditions at all times during stripping.

3.04 TOLERANCES

A. Construct formwork so that concrete surfaces will conform to the tolerance limits listed in Table 4.3.1 of ACI 301.

B. Establish and maintain in an undisturbed condition and until final completion and acceptance of the project sufficient control points and benchmarks to be used for reference purposes to check tolerances.

C. Regardless of the tolerances listed, do not extend any portion of the concrete work beyond the lot or street line.

D. Formwork for “Architectural” Concrete shall not deflect more than 1/8” over the height of the member.

3.05 INSPECTION

A. Under the requirements of the Building Code, the Authority will designate an Engineer for Controlled Inspection to inspect formwork, including shores, braces, and other supports, to verify the sizes of concrete members being formed. The Engineer will make inspections prior to placement of steel, after placement, and during placement of concrete.

B. During and after concrete placement, check elevations, camber, and vertical alignment of formwork systems using tell-tale devices.

C. Keep a record of all inspections, the name of the persons making them, and the name of the foreman in charge of formwork at the site. Submit to the Authority's representative on the site a copy of the inspection records prior to each concrete placement.

END OF SECTION 03 10 00

SECTION 03 20 00 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide and install all reinforcement and associated items required for cast-in-place in accordance with the Contract Documents. The Contract Documents are as defined in the “AGREEMENT”. The “GENERAL CONDITIONS” shall apply to all work under the Contract.

1.02 RELATED SECTIONS

D. Concrete Formwork: Section 03 10 00

E. Cast-in-Place Concrete: Section 03 30 00

1.03 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. American Society of Testing and Materials (ASTM) standards, latest editions.

A82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
A184 Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
A185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
A496 Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
A497 Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete. A615 Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
A706 Standard Specifications for Low-Alloy Steel Deformed and Plain Bars for Concrete reinforcement
A775 Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
A884 Standard Specifications for Epoxy-coated Wires and Welded Wire Reinforcement.

B. American Concrete Institute (ACI) standards, latest editions.

ACI 301 "Specification for Structural Concrete for Buildings."

ACI 315 "Details and Detailing of Concrete Reinforcement."

ACI 318-11 "Building Code Requirements for Structural Concrete.”

C. "Placing Reinforcing Bars CRSI-WCRSI Recommended Practices”, latest edition Concrete Reinforcing Steel Institute.

D. "Structural Welding Code - Reinforcing Steel" D1.4 - American Welding Society (AWS).

E. "Near-White Blast Cleaning" SSPC-SP10 - Steel Structures Painting Council (SSPC).

1.04 DESIGN REQUIREMENTS

A. In lieu of placing reinforcement bars, the contractor has the option of using welded wire reinforcement (WWR).

1. WWR must be demonstrated to the satisfaction of the engineer of record that they are of equivalent strength to the reinforcing bars that are being substituted.
2. As per ACI 318, yield strength greater than 60,000 psi may be used (for WWR) provided the yield strength is measured at a strain of 0.0035 in./in. in accordance with ACI code requirements.

1.05 SUBMITTALS

A. Product Data: Submit manufacturers' information for the following:

1. Steel welded wire fabric
2. Steel welded wire reinforcement.
3. Supports
4. Mechanical connectors

B. Shop Drawings:

1. Immediately after award of Contract, prepare shop drawings showing all fabrication dimensions and locations for placing of the reinforcing steel and accessories. Shop Drawings are to be prepared by a rebar detailer.
2. Follow detailing recommendations of ACI 315.
3. Submit drawings gradually and not all at the same time so that sufficient time is allowed for checking and approval. Improperly prepared and incomplete shop drawings will be disapproved without review.
4. Shop drawings will be checked for size of material and spacing by the Engineer of Record, which shall not render the Engineer responsible for any errors in construction dimensions, quantities, bends, etc. that have been made in preparation of the shop drawings. The Contractor shall assume full responsibility for the correctness of quantities, dimensions and fit.
5. Do not order or deliver reinforcement to job site prior to approval of drawings.
6. Indicate location of epoxy-coated and/or zinc-coated bars on the drawings.

C. Quality Control Submittals

1. Certificates

a. Submit certificate stating that reinforcement meets or exceeds the specified requirements.

b. Submit certification that properly identifies the number of each batch of epoxy-coated and/or zinc-coated material used on the project, material, quantity represented, date of manufacture, name and address of manufacturer and a statement that the supplied epoxy-coated reinforcing bars meet the requirements of this specification and the requirements of ASTM A775 including Annex A1.

c. If WWR is used, provide certificate from the manufacturer that WWR meets or exceeds the requirements specified in ACI 318 and provide calculations that it is of equivalent strength to the reinforcing bars that are being substituted.

2. Contractor Qualifications

Provide proof of Installer and Detailer qualifications specified under “Quality Assurance”.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Rebar Installer: Company specializing in performing the Work of this Section shall have three years minimum experience on successful projects of similar size.
2. Rebar Detailer: Company shall be specialized in the detailing of reinforcing bar shop drawings with a minimum of three years experience.

B. Regulatory Requirements

1. Building Code: Work of this section shall conform to all requirements of the Building Code "Identification of metal-reinforcement", deliveries will be rejected unless:
   a. All reinforcing bars are identifiable as to point of origin, grade of steel and size.
   b. All bundles or rolls of cold drawn steel wire reinforcement are securely tagged to identify the manufacturer, the grade of steel and the size.
2. Where more severe requirements than those contained in the Building Code are given in this Section and ACI 318, the requirements of this Section and ACI 318 shall govern.
3. Industry Standards: Details of Concrete reinforcement not covered herein shall be in accordance with "Building Code Requirements for Reinforced Concrete" (ACI 318) and "Details and Detailing of Concrete Reinforcement" (ACI 315), latest editions and the Concrete Reinforcing Steel Institute Manual on "Placing Reinforcing Bars" (CRSI).

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store in location to prevent rusting, etc.

B. Protect reinforcement before, during, and after installation.

C. Ensure proper identification after bundles are broken.

D. Epoxy-Coated Reinforcing Bars

1. Equipment for handling epoxy-coated bars shall have protected contact areas. Lift Bundles of coated bars at multiple pick-up points to minimize bar-to-bar abrasion from sags in the bundles.
2. Do not drop or drag coated bars or bundles of coated bars. Store coated bars on protective cribbing.
3. Fading of the color of the coating shall not be cause for rejection of epoxy-coated reinforcing bars. Coating damage due to handling, shipment, and placing need not be repaired in cases where the damaged areas is 0.1 in^2 or smaller. Repair damaged areas larger than 0.1 in^2 in accordance with Article 2.02. The maximum amount of damage, including repaired and un-repaired areas, shall not exceed 2% of the surface area of each bar. Bars with greater than 2% damaged areas will be rejected.

E. WWR is shipped in two forms: rolls or sheets. If the rolls or sheets must be lifted by crane at the job site, the contractor may request the manufacturer to install lifting eyes. At all times during off loading of materials, caution must be exercised, and all safety regulations and practices must be observed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Non-coated Reinforcing Bars

1. All non-coated reinforcing bars, except those to be welded, shall be of deformed type of new billet steel conforming to current requirements of ASTM A615. No rail or re-rolled steel will be permitted. Reinforcement to be welded shall conform to the requirements of ASTM A706.
2. Grade or yield strength of reinforcing bars are indicated on Drawings.

B. Welded Steel Wire Fabric (WWF)

1. Wire Fabric shall conform to the requirements of ASTM A185.
2. Required net area, placement details, and other requirements are indicated on Drawings.
3. Epoxy coating of Welded Wire Fabric shall be in accordance with ASTM A884.

C. Welded Wire Reinforcement (WWR)

1. Welded Wire Reinforcement shall conform to ASTM A497 and shall be made of wire conforming to ASTM A496.
2. Epoxy coating of Welded Wire Reinforcement shall be in accordance with ASTM A884.

D. Epoxy-Coated Reinforcing Bars

1. All steel reinforcing bars to be coated shall be of deformed type of new steel conforming to current requirements of ASTM A615. Bars shall be free of contaminants such as oil, grease or paint. No rail or re-rolled steel will be permitted. Reinforcement to be welded shall conform to the requirements of ASTM A706.
2. Grade or yield strength of reinforcing bars is indicated on Drawings.
3. Bars shall be epoxy-coated in accordance with ASTM A775.
4. The coating material shall be of organic composition meeting the requirements listed in ASTM A775 Annex A1 entitled "Requirements for Organic Coating." Resistance to chemicals, applied voltage, chloride permeability, flexibility, bond strength, abrasion resistance, impact, and hardness shall be tested in accordance with Annex A1.

E. Galvanized Reinforcing Bars: ASTM A 767/A 767M, hot-dip galvanized after fabrication and bending, of reinforcement type and zinc coating as follows:

1. Steel Reinforcement: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
2. Zinc Coating: Class II.
3. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

F. Supports for Reinforcement

1. Non-coated Reinforcement

   a. Supports for reinforcement supported by formwork or deck shall consist of metal bolsters and chairs of adequate strength, size, and number. Provide CRSI Class C supports (plastic tipped) for formed concrete surfaces and Class A (bright basic) for metal deck.
   b. Supports for reinforcement of slabs supported by ground shall consist of above supports with sand plates or horizontal runners. Support for reinforcement of footings/ pile caps shall consist of the above supports or precast concrete block, 4" square, having a compressive strength equal to that of the concrete being placed.

2. Epoxy-coated Reinforcement

   a. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2" from the point of contact with the epoxy-coated reinforcing bars.

b. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars, where specified on the Drawings or shop drawings, shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material.

3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

G. Tie Wire: Tie wire for fastening epoxy-coated reinforcing bars shall be nylon-epoxy, plastic-coated, or other material acceptable to the Authority.

2.02 FABRICATION

A. General: Fabricate reinforcing bars in accordance with fabricating allowances given in ACI 315.

B. Epoxy-Coated Bars

1. Surface Preparation: Clean the surface of the steel reinforcing bars to be coated by abrasive blast cleaning to near- white metal in accordance with SSPC-SP10.
2. Application of Coating (In Shop)
   a. Apply the coating to the cleaned surface as soon as possible after cleaning and before oxidation of the surface discernible to the unaided eye occurs. However, in no case delay application of the coating more than 8 hours after cleaning.
   b. The coating shall be applied by the Electrostatic Spray Method and fully cured in accordance with the recommendations of the manufacturer of the coating material.
   c. Coat ends of bars in accordance with the manufacturer's standards.
3. Thickness of Coating Material
   a. The film thickness of the coating after curing shall be 5 to 12 mils inclusive. Take a minimum of 15 measurements approximately evenly spaced along each side of the test bar. At least 90% of these measurements shall be within the specified limits.
   b. Test the thickness of the film coating in accordance with ASTM G12.
4. Coating Repair: Repair coating damage due to fabrication or handling in cases where damaged area is 0.1 in^2 or greater. Repair all damaged areas larger than 0.1 in^2 with patching material. The maximum amount of damage shall not exceed 24% of the surface area of each bar. Patch in accordance with the patching material manufacturer's recommendations. Repair ends of bars cut in the field with the patching material.
5. Bending of Epoxy-Coated Reinforcement: Bend all epoxy-coated reinforcement cold unless otherwise approved by the Authority. When epoxy coated reinforcement bars are field or shop bent, repair coating damage in accordance with paragraph B.4 above. Rollers of bending apparatus shall have neoprene collars.

2.03 SOURCE QUALITY CONTROL

A. The Authority shall have the right to inspect the material at all times while work on the Contract is being performed. Epoxy-coated reinforcing bars or zinc-coated reinforcement that do not meet the requirements of this Specification will be rejected. Replace all rejected bars at no cost to the Authority.

PART 3 - EXECUTION

3.01 PLACEMENT

A. General

1. Place reinforcement in accordance with CRSI "Placing Reinforcement Bars."

2. Unless otherwise permitted, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.
3. Avoid cutting or puncturing vapor barrier during placement.

B. Supports

1. Support and fasten together all reinforcement to prevent displacement by construction loads or placing of concrete.
2. Provide supports specified in Article 2.01.
3. Provide Continuous High Chair Upper (CHCU) or Continuous Support (CS) for welded wire fabric in the metal deck and place every four feet (4') parallel to the supporting beams.
4. Lifting of bars, welded wire fabric, and welded wire reinforcement into position during placement of concrete is not permitted.
5. Where the concrete surface will be exposed to the weather in the finished structure, the portions of all accessories within 1/2" of the concrete surface shall be non-corrosive or protected against corrosion.
6. The following guidelines for WWR support spacing can be used for supported concrete slabs whether formed or placed on composite metal decks.

Wire Size	Wire Spacing	Support
Spacing W or D9 and larger	12” and greater	4-6 ft.
W or D5 to W or D8	12” and greater	3-4 ft.
W or D9 and larger	Less than 12”	3-4 ft.
W or D4 to W or D8	Less than 12”	2-3 ft.
Less than W or D4	Less than 12”	2-3 ft. or less.

C. Cover: Provide minimum protective cover given in Chapter 7 of ACI 318 if not indicated on Drawings.

D. Splices:

1. All splices not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.
2. Welded splices - Provide where indicated on Drawings. All welding shall conform to AWS D1.4. At these locations, only reinforcement conforming to ASTM A706 shall be used.
   a. Provide suitable ventilation when welding epoxy-coated or zinc-coated reinforcing bars.
   b. After completion of welding on epoxy-coated or zinc-coated reinforcing bars, repair coating damage in accordance with Article 2.02. All welds, and all steel splice members when used to splice bars, shall be coated with the same material used for repair of coating damage.
3. Mechanical Connectors
   a. Provide where indicated on Drawings. Install in accordance with splice device manufacturer's recommendations.
   b. After installing mechanical connectors on epoxy-coated or zinc-coated reinforcing bars, coating damage shall be repaired in accordance with Article 2.02. All parts of mechanical connectors used on coated bars, including steel splice sleeves, bolts, and nuts shall be coated with the same material used for repair of coating damage.

E. Embedment Lengths: All embedment lengths not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.

3.02 FIELD CUTTING

A. When epoxy-coated or zinc-coated reinforcing bars are cut in the field, coat the ends of the bars with the same material used for repair of coating damage.

3.03 TOLERANCES

A. Place reinforcing bars in accordance with the tolerances given in paragraph 5.6.2 of ACI 301.

B. Move bars as necessary to avoid interference with other reinforcement, conduits, or imbedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangements are subject to approval by the Engineer of Record.

3.04 FIELD QUALITY CONTROL

A. Under the requirements of the Building Code, the *Authority* will designate an Engineer for Special Inspection to inspect the size and placement of reinforcement. A record will be made of all inspection of reinforcement at the bending bench and in place.

B. Do not proceed with the completion of wall forms until all reinforcement has been approved and recorded by the Engineer for Special Inspection.

C. Do not proceed with concreting until all reinforcing in place has been approved and recorded.

D. Promptly correct all reinforcement displaced during pouring of concrete.

E. Damaged reinforcement shall not be used.

3.05 CLEANING

A. Steel reinforcement shall be free of all rust, scale, oil, paint, grease, loose mill scale, and all other foreign matter that will prevent bonding of concrete and steel just prior to pouring of concrete.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

EXECUTIVE ORDER 111 GENERAL REQUIREMENTS.

1.1 DESCRIPTION OF WORK

A. Furnish material, equipment, labor, services required to provide for cast-in-place concrete. Work includes but is not limited to structural, sitework, slabs, concrete fire protection, equipment pads, and installation of miscellaneous inserts, waterstops, vapor barriers, toppings, expansion joints and other items listed herein. Allow ample time and facility for the Work of other Divisions to be installed. Grouting is part of the Work of Section 03 60 00.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

Products to be installed include, but are not limited to, the following:

A. Sleeve for pipe and conduit, other items cast into concrete - Divisions 23 & 26

1.3 RELATED SECTIONS

A. Concrete Formwork - Section 03 10 00

B. Concrete Reinforcement - Section 03 20 00

1.4 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. American Society of Testing and Materials (ASTM) standards, latest editions.

C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

C33 - Standard Specifications for Concrete Aggregates.

C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

C78 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Three-point Loading)

C94 - Standard Specification for Ready-Mixed Concrete.

C127 - Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Course Aggregate.

C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angles Machine.

C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.

C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

C150 - Standard Specification for Portland Cement.

C172 - Standard Method of Sampling Freshly Mixed Concrete.

C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

C192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.

C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

C260 - Standard Specifications for Air-Entraining Admixtures for Concrete.

C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.

C387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.

C494 - Standard Specification for Chemical Admixture for Concrete.

C496 - Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

C567 - Standard Test Method for Density of Structural Lightweight Concrete.

C685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems used with Concrete by Slant Shear

E96 - Standard Test Methods for Water Vapor Transmission of Materials

E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs

E329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction

E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

B. American Concrete Institute (ACI) standards, latest editions.

ACI 117 - Standard Tolerances for Concrete Construction and Materials

ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.

ACI 212.3R - Chemical Admixtures for Concrete.

ACI 214 - Evaluation of Results of Tests Used to Determine the Strength of Concrete.

ACI 301 - Specifications for Structural Concrete for Buildings.

ACI 302.1R - Guide for Concrete Floor and Slab Construction.

ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete.

ACI 305R - Hot Weather Concreting.

ACI 306R - Cold Weather Concreting.

ACI 308 - Standard Practice for Curing Concrete.

ACI 309R - Guide for Consolidation of Concrete.

ACI 311.4R - Guide for Concrete Inspection.

ACI 318-05 - Building Code Requirements for Reinforced Concrete.

C. American Association of State Highway and Transportation Officials

T318 - Water Content of Freshly Mixed Concrete Using Microwave Oven Testing

1.5 DEFINITIONS

A. Exposed to view

Situated so that it can be seen from eye level from a public location. A public location is that which is accessible to persons not responsible for operation or maintenance of the building.

B. Lightweight concrete

Concrete intentionally made to have low density by use of lightweight aggregate conforming to ASTM C330 and required to have an air-dry unit weight less than 115 lb/ft3.

C. Normal weight concrete

Concrete for which density is not a controlling attribute, made with aggregates of the types covered by ASTM C33 and usually having unit weights in the range of 135 to 160 lb/ft3.

1.6 DESIGN REQUIREMENTS

A. Performance Characteristics:

1. Interior framed slabs: Normal weight concrete with a minimum compressive strength of 4000 psi, non-air entrained, and a maximum water to cement ratio of 0.45.
2. Exterior framed slabs (pavements, stairs, areaways, etc) exposed to the elements: Normal weight concrete with a minimum compressive strength of 4000 psi, air entrained, and a maximum water to cement ratio of 0.40.

B. Mix design for concrete with smooth form or architectural finish is to contain a high-range water reducer (super plasticizer). Self-consolidating concrete (SCC) with a slump/flow of 20” to 30” and containing the high-range water reducing admixture and a viscosity modifying admixture is required where noted on Drawings.

1.7 SUBMITTALS

A. Product Data: Submit manufacturers' information for the following:

1. Admixtures
2. Hardener
3. Bonding Agent
4. Vapor barrier
5. Waterstop

B. Samples

Submit samples of the following items:

1. Vapor Barrier
2. Waterstop

C. Quality Control Submittals

1. Design Data: Submit design mixes for concrete, including list of admixtures to be used, to the Testing Agency, the Engineer for Special Inspection, and the Engineer of Record. Design mix for lightweight concrete shall include both the dry and saturated (SSD) weights of the aggregate.
2. Test Reports: Strength Test Report (28 day) for preliminary trial mix (with all admixtures).
3. Certificates
   a. Admixture manufacturer's certificate stating that the chloride content of the admixture will not exceed 0.05% by weight.
   c. Concrete laboratory license number and certification of meeting ASTM E329 standards.
   d. Concrete producer’s certificate stating the plant and trucks are NYSDOT approved.
   e. Concrete producer's certificate must be presented at site before concrete is placed in accordance with Chapter 19 of the New York State Building Code
4. Manufactures' Instructions Waterstop manufacturer's instructions for proper installation of waterstop, including manner in which splices are to be made.
5. Contractor Qualifications: Provide proof of Installer and Producer qualifications specified under “Quality Assurance”.

D. Survey: Submit signed and sealed copies of surveys conducted by a Licensed Land Surveyor showing elevations of all finished slab surfaces taken on a 15-foot grid pattern. Indicate discrepancies between contract elevation and actual.

1.8 QUALITY ASSURANCE

A. Qualifications

1. Concrete Installer: Company specializing in performing the Work of this Section shall have three years minimum experience on successful projects of similar size.
2. Concrete Producer: Company specializing in the production of concrete shall have a minimum of five years experience and shall be New York State DOT approved plant and use NYSDOT approved trucks.
3. Concrete Laboratory: Concrete laboratory providing design mixes shall be New York State licensed and shall meet the requirements of ASTM E329.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYS Building Code and all applicable regulations of governmental authorities having jurisdiction including safety, health, noise, and anti-pollution regulations. Where more severe requirements than those contained in the Building Code are given in this Specification, the requirements of this Specification shall govern.
2. Industry Standards: The ACI Standards listed under references apply to Work of this Section. Where more severe requirements then those contained in the Standards are given in this Section or the Building Code, requirements of this Section or the Building Code shall govern. The Contractor shall keep a copy of ACI SP-15 - "Field Reference Manual" at the site.

3. Recommendations or suggestions in the codes and references listed in this Article and under “References” shall be deemed to be mandatory unless they are in violation of the Building Code.

C. Certifications

1. Cast-in-Place Concrete shall comply with Chapter 19 of the Building Code of New York State. Materials shall be readily identifiable for acceptance, certification and inspection requirements of Section 1704.4 of the Building Code of New York State.
2. Cement and aggregate shall be acquired from the same source for all work.

D. Coordination: Coordinate this work with the work of other Divisions so that items to be installed are done so correctly and in proper sequence.

E. Pre-Concrete Conference

1. At least 35 days prior to the start of the concrete construction schedule, conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete quality. The contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
2. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following: Contractor's superintendent - Laboratory responsible for the concrete design mix - Laboratory responsible for field quality control - Concrete subcontractor - Ready-mix concrete producer(s) - Admixture manufacturer(s) - Concrete pumping contractor.
3. Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by him to all parties concerned within five days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Owner's representative - Resident engineer - Engineer of Record.
4. The minutes shall include a statement by the admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these specifications.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect material from the elements and from other damage on the site.

B. Replace and pay for material and work damaged to the satisfaction of the Authority.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Adequately protect concrete placed during rain, sleet, or snow, or when the mean daily temperature falls below 40°F or rises above 90°F as provided in Article 3.05.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Lightweight Aggregate

1. Northeast Solite Corporation,
2. Norlite Corporation,

B. Admixtures

1. Euclid Chemical Company, Cleveland, OH 44110
2. Master Builders,
3. Sika Chemical Corporation,
4. Anti Hydro Company,
5. Chem Masters,
6. W.R. Grace & Co.,
7. St. Lawrence Cement Company,

C. Waterstops

1. BBZ USA-Greenstreak, St. Louis, MO 63122
2. Sika Corp, Lyndhurst NJ 07071
3. DeNeef Construction Chemicals, Waller, TX 77484

D. Vapor Barrier

1. Stego Industries, San Juan Capistrano, CA 92675
2. Reef Industries, Houston, TX 77075

E. Bonding Agent

1. Sto Concrete Restoration Division, Atlanta GA
2. Sika Corp, Lyndhurst NJ
3. Euclid Chemical Company, Cleveland, OH 44110

F. Densifier/Sealer

1. Euclid Chemical Company, Cleveland, OH 44110
2. Curecrete Chemical Company, Inc., Springville, UT 84663

G. Fireproofing Accessories: Equipment Distribution Corporation, Ridgefield Park, N.J., 07660

2.2 MATERIALS

A. Cement

Shall conform to ASTM C150 and shall be of the non air-entrained types:

1. Unless otherwise specified or approved by the Engineer of Record, cement shall be Type I or II.
2. Type II shall be used for exterior pavements.
3. Cement shall not contain ingredients that would result in more than two percent air being entrained in the concrete.
4. Fly Ash is not permitted in concrete mix.

B. Cementitious Materials for Leed Certified Projects

1. Provide composite mix of Portland Cement and Ground Granulated Blast Furnace Slag or Blended Hydraulic Cement and limit percentage, by weight of Portland Cement (ASTM C150) to total cementitious material weight for each design mix to 40 percent less than standard regional concrete mix designs.

2. Limit percentage by weight, of standard Portland cement (C-150), to the following maximum percentages of the cementitious portion of the mix while maintaining the above 40% required reduction in Portland cement across the project's total quantity of concrete:
   a. Framed Slabs : 40 percent
   b. Elevated Slabs: 50 percent

C. Admixtures

1. General
   a. The use of admixtures shall comply with the requirements of Chapter 19 of the 2010 Building Code of New York State.
   b. The final soluble chloride content in concrete, percent by weight of cement, due to the addition of admixtures and other ingredients shall not exceed 0.05 at 28 days. All admixtures shall be non-corrosive.
   c. The amount of cement required by the Building Code may be reduced by 8% as per the code with the use of slag cement that has been reviewed and approved by the Authority.
2. Air-entraining admixture: Shall conform to ASTM C260.
3. Water-reducing admixture: Shall conform to ASTM C494, Type A or D, and contain no more chloride ions than found in drinking water.
   a. Eucon WR-75, Euclid Chemical Company
   b. Pozzolith 200N, Master Builders
   c. Plastocrete 160, Sika Chemical Corporation
4. High range, water-reducing admixture (super- plasticizer): Shall conform to ASTM C494, Type F or G, and contain no more chloride ions than found in drinking water.
   a. Eucon 37, Euclid Chemical Company
   b. Sikament, Sika Chemical Corporation
   c. ADVA 100, Grace Construction Products
5. Water reducing, accelerating admixture: Shall conform to ASTM C494, Type C or E, and contain no more chloride ions than found in drinking water.
   a. Accelguard 80, Euclid Chemical Company or approved equal
6. Water reducing, retarding admixture: Shall conform to ASTM C494, Type D, and contain no more chloride ions than found in drinking water.
7. Slag cement: ASTM C989, Grade 100 or 120. Shall be GranCem slag cement as manufactured by the Holcim USA.

D. Water: Shall be clean potable water free of injurious foreign matter conforming to the requirements for water specified in ASTM C94 and suitable for drinking.

E. Aggregates

1. Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as the combination of sizes when two or more are used, shall conform to the appropriate grading requirements of the applicable ASTM specifications. Maximum size of coarse aggregate shall conform to paragraph 3.3.2 of ACI 318.
2. Aggregates for normal weight concrete shall conform to ASTM C33 and be of the following sizes:
   a. Caisson Caps and Foundation Walls: Size No. 5.
   b. Slabs on Grade: Size No. 67.
   c. Caissons: Size No. 8.

F. Bonding Agent

1. Epoxy/acrylic resin that will not form a vapor barrier with the concrete with the following properties:
   a. Bond strength of 1800 psi in 2 hours when tested in accordance with ASTM C882.
   b. Flexural strength of 2000 psi in 28 days when tested in accordance with ASTM C78.
   c. Tensile strength of 600 psi in 28 days when tested in accordance with ASTM C496.
2. Bonding agent shall be "CR246 Sto Bonding and Anti-corrosion Agent" by Sto Concrete Restoration Division, Armatec 110 by Sika Corp, or Corr-bond by Euclid Chemical Company.

G. Densifier/Sealer

1. The densifier/sealer compound shall be a siliconate-based sealer that penetrates concrete surfaces, increases abrasion resistance and provides a “low-sheen” surface that is easy to clean. The compound shall contain a minimum solids content of 20%, of which 50% is siliconate.
2. Densifiier/Sealer shall be “Euco Diamond Hard” by The Euclid Chemical Co. or “Ashford Formula” by Curecrete Chemical Co.

H. Vapor Barrier

1. Vapor Barrier shall meet the following properties:
   a. Minimum 15-mil polyolefin geomembrane.
   b. Water Vapor Barrier – ASTM E1745, Class A
   c. Permeance Rating – ASTM E96: 0.02 gr/ft2/hr or lower
   d. Puncture Resistance by ASTM E1745: Class A, minimum 2300 grams
   e. Tensile Strength by ASTM E1745: Class A, minimum 45 lbf/in
2. Accessories
   a. High density polyethylene tape with pressure sensitive adhesive
   b. Pipe boot for piping and conduits constructed from vapor barrier and tape shall be:
      i. Stego Wrap 15 mil Vapor Barrier by Stego Industries
      ii. Vaporguard by Reef Industries

J. Waterstops

1. Concrete Joints
   a. Water-swelling acrylate ester resin, hydrophilic rubber, or polyurethane type capable of expanding and contracting over multiple number of wet-dry cycles without reduction in its expansion ratio. If concrete surface is very uneven, provide paste type indicated in 2 below.
   b. Shall be Duroseal Gasket Waterstop by BBZ USA-Greenstreak, Swellseal 8 by DeNeef, or SikaSwell Profile by Sika Corp. Provide approximately 1" x 3/4" chemical resistant type. Attach to concrete and membranes with manufacturer’s recommended adhesive or paste type waterproofing.
2. Steel, pipe and metal penetrations
   a. Water-swelling acrylate ester or polyurethane paste type capable of expanding and contracting over multiple number of wet-dry cycles without reduction in it expansion ratio. Paste is a thixotropic grade material capable of being placed on uneven surfaces.

b. Shall be Duroseal Paste by BBZ USA, Swellseal Mastic by DeNeef, or SikaSwell S by Sika Corp. Provide chemical resistant type. Provide a minimum of 3/8” by 1/2” bead of material.

K. High Density Polyethylene Fill

1. Provide fill with minimum compressive strength of 60 psi and minimum thickness of 2 inches.

2.3 MIXES

A. General: Concrete for all parts of the Work shall be of the specified quality capable of being placed without excessive segregation and, when hardened, of developing all characteristics required by the Specifications and Drawings.

B. Strength: Strength requirements given in Part 1 of this Specification are based on 28-day compressive strength, unless high early strength is specified, in which case required strengths are based on 7-day compressive strength.

C. Method of Proportioning

1. Proportion, batch, and mix concrete in accordance with ACI 318 Section 5.
2. Mix designs are specific to material used, concrete producer, and method of placement. Each mix design must be reviewed by the Engineer of Record and subsequently accepted by the Engineer designated for Special Inspection prior to placement.

D. Normal Weight Concrete

1. Unless otherwise specified, proportion and produce normal weight concrete to have a maximum slump of 4” or less. A tolerance of up to 1" above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. The slump shall be determined by ASTM C143. Concrete containing High Range Water Reducer shall have a slump not exceeding 9”, unless other wise approved by the Engineer of Record. The concrete shall arrive at the job site at a slump of 2" to 3", be verified, and the HRWR admixture added to increase the slump to the approved level.
2. Where Normal weight concrete is indicated to be air-entrained, provide the following air content for the grading size of coarse aggregate as follows:
   a. No.8.- 7 ½ %
   b. No.67.- 6%
3. Tolerance on air content as delivered shall be +1.5%.

E. Structural Lightweight Concrete: Lightweight concrete, including concrete used as roof fill and other locations indicated to receive fill, shall conform to the following requirements:

1. Coarse aggregate shall be 100% lightweight aggregate, expanded clay, shale, or slate produced by the rotary kiln method, conforming to the requirements of ASTM C330. Provide 3/8" maximum size coarse aggregate for beam and/or column encasement.
2. The concrete shall not exceed an air-dry unit weight of 115 lb/ft^3 as measured in accordance with ASTM C567. The wet unit weight of the fresh concrete shall be within ±3 lbs of the wet unit weight which is to be determined and established from the preliminary tests or prequalified mixes.

3. Unless otherwise specified, proportion and produce lightweight concrete to have a slump of 3" or less. A tolerance of up to 1" above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. The slump shall be determined by ASTM C143. Concrete containing High Range Water Reducer shall have a slump not exceeding 9”, unless other wise approved by the Engineer of Record. The concrete shall arrive at the job site at a slump of 3" to 4", be verified, and the HRWR admixture added to increase the slump to the approved level.
4. Provide the following air content for the grading size of coarse aggregate as follows:
   a. 3/8” …4 ½ %
   b. 3/4" …4 %
   c. Do not allow air content of trowel-finished interior floors to exceed 3 percent.
   d. Tolerance on air content as delivered shall be +1.5%.
4. Mix design shall include the dry and saturated (SSD) weights of the lightweight aggregate. The saturated weight shall take into account the internal and surface moisture content that will be in the aggregate at the time of mixing.
5. Mix design shall be based on the recommendations of the lightweight aggregate producer.

2.4 SOURCE QUALITY CONTROL

A. Tests

1. The Authority's Testing Laboratory will review and/or check test proposed materials for compliance with the Specifications prior to construction.
2. The Testing Laboratory will perform field tests as work progresses as listed in "Field Quality Control".

B. Inspection

1. Testing Laboratory
   a. The Authority will engage a Licensed Concrete Testing Laboratory to inspect batching of the concrete and perform all field tests. The Laboratory will perform the following services:
      1) Review and/or check-test the Contractor's proposed materials for compliance with the Specifications.
      2) Review and/or check-test the Contractor's proposed mix design as required by the Engineer for Special Inspection.
      3) Secure production samples of materials at plants or stock-piles during the course of the Work and test for compliance with the Specifications.
      4) Perform tests during construction as required by Section 1905 of the 2015 Building Code of New York State. The Laboratory will obtain samples at the mixer and when directed by the Engineer at the point of placement by the following methods:
         a) Secure composite samples in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.

b) Mold and cure specimens from each sample in accordance with ASTM C31. The minimum number of specimens to be taken daily will conform to ACI 318-05 paragraph 5.6 as modified by the Building Code except that seven (7) test cylinders shall be molded for each 50 cubic yards of each class of concrete placed in any one day's concreting. Specimens will be stored at the site in the insulated curing box provided by the Contractor.

b. The Laboratory will be responsible to and under the supervision of the Engineer designated for "Special Inspection".

2. Engineer for Special Inspection

a. The Authority will assign, under the requirements of Section 1704.4 of the Building Code of New York State, a Licensed Professional Engineer who will supervise the testing of the materials and the inspection of concrete construction. The Engineer is responsible for approval of all design mixes, subject to review by the Engineer of Record, as well as maintaining the Special inspection log book required by the authority.

b. The Engineer will check that all required tests are made and the results submitted. The Engineer will also report to the Building Department Code Enforcement Official any deviation from the requirements of the Code, as indicated by records of inspection and reports of tests.

3. Notification

a. Notify the Authority in writing at least forty-eight hours in advance of each concrete placement. The Authority will notify the Testing Laboratory immediately to order out the necessary concrete technicians to cover the work.

b. Once the concrete technicians are ordered out and a cancellation follows, the Contractor will be charged the agreed upon rate per contract for each technician so ordered to appear, unless a cancellation order is issued to the Laboratory with enough notice prior to the concrete placement as agreed per contract.

c. During the placement of the concrete, notify the Authority immediately of any delay at the concrete plant or at the job site.

4. Contractors Responsibility for Quality Control

a. The Contractor will receive a copy of all reports prepared by the Laboratory and/or Engineer for Special Inspection. Copies of the daily concrete reports prepared by the Engineer will be available for reference.

b. The Contractor will therefore be afforded an opportunity to review all reports and mix data and submit to the Engineer for Special Inspection any recommendations in changing the mixes provided they conform to the Code and Specifications. Any testing required because of changes in materials or proportions of the mix requested by the Contractor, as well as any extra testing of concrete or materials occasioned by the failure to meet Specification requirements shall be at the Contractor's expense. The Contractor, at any time, can arrange to have independent tests made at own expense by an approved laboratory and submit the reports and recommendations to the Engineer.

c. The tests and inspections, as provided in the Code, do not in any way relieve the Contractor of responsibility to construct the Work in accordance with the Drawings and Specifications and to use safe, standard methods of construction at all times, safeguarding the public, workmen, and structure. The Contractor shall be solely responsible for the physical control of the materials and concrete mixes, and shall see that such mix designs, tests, and controls are in accordance with the Code and Specifications.

d. It shall be the Contractor's complete responsibility to adjust, alter, and/or correct any controls necessary in materials and/or concrete operation based upon tests and inspections made by the Authority or the Contractor's independent tests. If, during the course of the concrete operations, a lower water content or more cement is needed per cubic yard above that used in the approved design mix, provide same at no additional cost to the Authority.

e. If the Contractor requests any deviation from the Specifications and Drawings or makes or causes to be made any change of construction from Drawings and Specifications, and such request requires the time and investigation of the Engineer of Record, pay all costs incurred by the Authority relating to such time and investigation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to placement of concrete, verify that the concrete cover over the reinforcement is that specified on Drawings.

B. Verify that anchor bolts, reinforcement, and all other embedded items are provided and held securely, positioned accurately, and will not be a detriment to concrete placement.

C. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Authority any conditions that prevents the performance of this Work.

3.2 PROTECTION

A. Protect concrete members on grade and the subgrade from freezing before and after installation. Provide blankets and other items necessary.

B. Protect adjacent finish materials and previously poured concrete against spatter during concrete placement.

C. Provide and maintain barricades and safeguards around openings, etc. to protect workmen from injury and to comply with all Building Code, OSHA, and other authorities having jurisdiction regulations.

3.3 PREPARATION

A. Remove ice, excess water, trash, and rubbish from forms.

B. Remove hardened concrete from inner surfaces of conveying equipment and all formwork, reinforcement, and dowels.

C. Prepare previously placed concrete to be in contact with new concrete in the manner described under "Construction Joints".

D. Prepare existing concrete to be in contact with new concrete by roughening and cleaning the surface and applying a bonding agent. Surface must be free of laitance. Concrete must be placed after agent cures and within 20 hours of applying bonding agent. If time elapses, apply a new application in accordance with the directions of the manufacturer.

E. In case a conflict arises between concrete as poured and other Work that requires cutting into concrete beams, columns, walls, or slabs, submit requests to the Engineer of Record, who will issue instructions accordingly. Cutting of concrete is otherwise prohibited.

F. Do not place concrete on frozen ground.

3.4 JOINTS AND EMBEDDED ITEMS

A. Construction Joints

1. Make joints not shown on Drawings at locations that will least impair the strength of the structure. Such location is subject to the approval of the Engineer of Record.
2. Continue reinforcement across joints. Provide longitudinal keys at least 1 1/2" deep in walls and provide other keys as required. Drawings indicate keys or roughened surface at interface of walls and footings.
3. Thoroughly clean concrete surface of oil, grease, and other contaminants and remove all laitance prior to placement of adjoining concrete. Roughen surface of the concrete in an approved manner that will expose the aggregate uniformly to a 1/4" amplitude and will not leave laitance, loosened particles of aggregate, or damaged concrete at the surface. Dampen surface immediately prior to placement.
4. Properly install all embedded items where required.

B. Expansion Joints

1. Do not extend reinforcement or other embedded metal items bonded to concrete continuously through expansion joint. Provide smooth dowels greased on one end at the joints with end cap or insert into pvc sleeve of length greater than the dowel length by .75” minimum.
2. Provide joint filler of type specified in Section 07900 at the expansion joint of the sizes indicated on the Drawings or specified herein.

C. Waterstops

1. Provide waterstops at all joints and all penetrations of type indicated in Part 2 of this Section. All surfaces onto which material is placed shall be clean and smooth. Do not let materials come in contact with water by covering waterstop, forms, or other means necessary. Provide minimum clearance from edge of concrete as per manufacturer’s recommendations, typically 3”.
2. Provide maximum practical lengths for each piece so that the number of end joints will be held to a minimum.
3. Make joints in such a manner that they develop effective watertightness fully equal to that of the continuous material. All joints to be lapped as per manufacturer's instructions.
4. Use manufacturer’s adhesive or swelling paste type for applying gasket type to previously poured concrete and/or waterproofing membrane. Surface onto which waterstop is placed shall be smooth.
5. Provide swelling paste type at all pipe penetrations, conduits, drains, steel members, and other areas where items penetrate the concrete foundation system and at uneven concrete surfaces.
6. If water penetrates joints in which waterstops are placed at contract locations or at cracks and cold joints, the Contractor shall remediate the crack with injection material recommended by the Authority that will provide a 5-year labor and material guarantee against water seepage at no cost to the Authority.

D. Other embedded items

1. Place all fence sleeves and shoes, pipe sleeves, inserts, anchors, anchor bolts, and other embedded items required for the Work of other Divisions or for their support prior to concreting. Install Link-seal Watertight Sleeves by Thunderline Corp. through foundation walls and other locations where watertight construction is required and where indicated on Drawings as per manufacturer's instructions. Coordinate with other trades, all Drawings, and manufacturer for sizes, location, and quantity.
2. Provide ample notice and opportunity for items of other Division to be introduced and/or furnished for installation before concrete is placed. Coordinate the Work of the other Divisions so all items are placed in their proper location.
3. Set metal pipe sleeves, sockets, shoes, etc. into concrete to receive fence posts or any other items, all as indicated on details.

E. Placement of Embedded Items: Position expansion joint material, waterstops, and other embedded items accurately and support against displacement. Fill voids in sleeves, anchor slots, and inserts temporarily with readily removable material to prevent the entry of concrete into the voids.

3.5 MIXING AND PLACING CONCRETE

A. General

1. Notify Authority at least 48 hours in advance of each concrete placement. Do not place concrete without approval of the Engineer for Special Inspection.
2. Do not allow rainwater to increase mixing water nor damage surface finish.
3. When placing concrete in cold weather (air temperature below 40oF), concrete shall contain either an accelerating admixture or use Type III cement.

B. Mixing

1. Batch, mix, and transport ready-mixed concrete in accordance with the appropriate sections of ASTM C94. Truck mixers and agitators shall meet the requirements of the Truck Mixers Manufacturer's Bureau or shall comply with Section 8.1.2 of ASTM C94 and shall be NYSDOT approved. All trucks shall have working revolution counters and site gages. Batch all other concretes in accordance with subchapter 7.2 of ACI 301 only if permitted by the Engineer of Record and Engineer designated for Special Inspection.
2. Batch ready-mixed concrete only in plants that are NYSDOT approved. Only plants that are NYSDOT approved with current certification meeting the requirements for certification of the NRMCA for automatic batching and automatic recording will be permitted. Concrete shall be batched by the use of automation.
3. Unless otherwise approved by the Engineer of Record, concrete shall be deposited within 11/2 hours or 300 revolutions of the mixing drum, whichever comes first, after introduction of water to the cement or cement to the aggregate. When the ambient temperature rises above 90°F, the time shall be decreased to 1 hour.
4. Batch lightweight concrete using the saturated weight of aggregate, which shall take into account the internal and surface moisture content.
5. Tempering and control of mixing water
   a. Mix concrete only in quantities for immediate use. Concrete that has started to set shall not be retempered but shall be discarded. Water shall not be added at the site.

b. For concrete containing HRWR (Superplasticizer), if loss of slump occurs, HRWR may be redosed at the site as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Engineer and the admixture manufacturer at the Pre-Concrete Conference.

6. Weather Conditions

a. Cold weather (Air Temperatures below 40°F)

1) Concrete shall have either an accelerating admixture or use Type III cement.

2) The temperature of concrete delivered at the site shall conform to the temperature limitations given in Table 7.6.1.1 of ACI 301.

3) If water or aggregate is heated above 100°F, combine the water with the aggregate in the mixer before cement is added. Cement shall not be mixed with water or with mixtures of water and aggregate having a temperature greater than 100oF.

4) Detailed requirements are given in ACI 306R.

b. Hot Weather (Air Temperatures above 90°F)

1) Cool the ingredients before mixing, or substitute flake ice or well-crushed ice of a size that will melt completely during mixing for all or part of the mixing water if, due to high temperature, low slump, flash set, or cold joints are encountered.

2) Detailed requirements are given in ACI 305.

6. Admixtures - General

a. Add all admixtures prior to mixing unless otherwise specified or directed.

b. Air-entraining admixtures and other chemical admixtures shall be charged into the mixer as solutions and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water. Admixtures that cannot be added in solution may be weighed or may be measured by volume if so recommended by the manufacturer. The accuracy of measurement of any admixture shall be within ±3 percent.

c. If two or more admixtures are used in the concrete, add them separately to avoid possible interaction that might interfere with the efficiency of either admixture or adversely affect the concrete. Do not charge admixtures into the mixer in such a manner that they will come in direct contact with the cement.

d. Use of accelerating admixtures or Type III cement shall not relax cold weather placement requirements.

e. Use of retarding admixtures in hot weather must be approved by the Engineer for Special Inspection. Use of such admixtures will not relax hot weather placement requirements.

C. Placing

1. General: Place concrete in accordance with ACI 304R and ACI 318.

2. Conveying

a. Handle concrete from the mixer to place of final deposit as rapidly as practicable by methods that will prevent separation or loss of ingredients and in a manner that will assure that the required quality of concrete is obtained.

b. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or workday. Conveying equipment and operations shall conform to the following additional requirements:

1) Truck mixers, agitators, and non-agitating units and their manner of operation shall conform to the applicable requirements of ASTM C94.

2) Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An approved arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.

3) Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20' long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

4) Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be Special so that segregation is not apparent in the discharged concrete. The loss of slump in pumping or pneumatic conveying equipment shall not exceed 2". Pumping is permitted only if a pump mix is approved. Concrete shall not be conveyed through pipe made of aluminum or aluminum alloy.

3. Depositing: Detailed recommendations are given in ACI 304R.

a. General

1) Deposit concrete continuously, or in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, locate construction joints at points as provided for in the Drawings, shop drawings, or as approved.

2) Carry out placement at such a rate that the concrete that is being integrated with fresh concrete is still plastic. Do not deposit concrete that has partially hardened or has been contaminated by foreign material.

3) Remove temporary spreaders in forms when the concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained.

4) Placing of concrete in supported elements shall not be started until the concrete previously placed in columns and walls is no longer plastic.

b. Segregation: Deposit concrete as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure that will cause segregation. The maximum drop height shall be five feet. Provide drop tubes for placement in forms and other locations where drop height exceeds the indicated maximum.

c. Consolidation

1) Consolidation of concrete and the use and type of concrete shall be in

2) Where a surface mortar is to be the basis of the finish, the coarse aggregate shall be worked back from the forms with a suitable tool so as to bring a full surface of mortar against the form, without the formation of excessive surface voids.

3) Consolidate all concrete by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items and into corners of forms, eliminating all air or stone pocket or weakness. Internal vibrators shall be the largest size and most powerful that can be used in the Work, as described in Table 5.1.5 of ACI 309R, with a minimum frequency of **8000** revolutions per minute and shall be operated by competent workmen. Over vibrating and use of vibrators to transport concrete within forms is not permitted. Insert and withdraw vibrators at

many points, from 18" to 30" apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation, generally from 5 to 15 sec duration, and shall reach the bottom of the pour. Keep a spare vibrator on the job site during all concrete placing operations. Provide one non-metallic vibrator when consolidating concrete with galvanized reinforcing.

4. Cold Weather Concrete Placement and Protection: Detailed requirements are given in ACI 306. When the mean daily temperature of the atmosphere is less than 40°F during concreting, or within 72 hours there after (or the air temperature is not greater than 50°F for more than one-half of any 24-hr period for a period of 3 consecutive days), follow the procedures outlined in ACI 306R to protect the concrete. Provide a cold weather concreting plan as well as list of equipment and material (e.g. thermometers, blankets) to be used to the Engineer designated for Special Inspection. Temperature of the plastic concrete shall be no lower than 55oF. Heat all forms, reinforcing steel, and surfaces to receive concrete above the freezing point and keep them completely free of frost, snow, and ice. Protection shall consist of insulating boards, blankets, or heated enclosures. Underside of slabs shall be heated during placement and protection period. Initial protection period shall be as indicated in tables 5.1 and 5.3 of ACI 306R. Maximum temperature drop of concrete surface after protection is removed shall follow table 5.5 of ACI 306R.
5. Hot Weather Placement and Protection: When the mean daily temperature of the atmosphere is over 90oF during concreting, follow the procedures outlined in ACI 305R to protect the concrete.
   a. All concrete, at the time it is actually deposited in the forms, shall have a temperature not lower than 50°F but never above 90°.
   b. Cover reinforcement with water-soaked burlap to cool steel so its temperature will not exceed the ambient air temperature immediately before concrete placement.
   c. Dry surfaces that are to receive concrete should be wet down before commencing placement of concrete and the temperature of such surfaces should not exceed the temperature of the concrete being placed.

3.6 FINISHING OF FORMED SURFACES AND REPAIR OF SURFACE DEFECTS

A. General

1. Remove forms as soon as practicable. Refer to Section 03 10 00.
2. Repair surface defects, including tie holes and cracks, immediately after form removal. Patches shall be of quality to match the specified finish.
3. Remove oil, grease, compounds, and other contaminants from surfaces and areas to be repaired, those surfaces in contact with sprayed fireproofing, and those receiving coatings (ie. plaster, waterproofing, paint, and membranes of any kind).
4. Provide finishes specified below immediately after form removal.
5. Provide curing and protection.

B. Repair of Surface Defects

1. Remove all honeycombed and other defective concrete down to sound concrete. If chipping is necessary, the edges shall be perpendicular to the surface or slightly undercut. Undercut all cracks a minimum of 1" x 1". No featheredges will be permitted. Dampen the area to be patched and an area at least 6" wide surrounding it to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.
2. The patching mortar shall be made of the same materials and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 21/2 parts sand by damp loose volume. Substitute white portland cement for a part of the gray portland cement on exposed concrete in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. If the material color cannot be matched properly, the Contractor shall use a specialty repair mortar of the Engineer of Record's choice at the Engineer's discretion. The quantity of mixing water shall be no more than necessary for handling and placing. Mix the patching mortar in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.
3. After surface water has evaporated from the area to be patched, brush the bond coat well into the surface. When the bond coat begins to lose the water sheen, apply the premixed patching mortar. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, leave it undisturbed for at least 1 hr before final finishing. Keep the patched area damp for 7 days. Do not use metal tools for finishing a patch in a formed wall that will be exposed.

C. Tie Holes and Other Repairs

1. Remove ties, nails, and other form accessories below the concrete surface when the surface is exposed to view, the elements, or for surfaces to receive waterproofing. For surfaces not exposed to view or the above-mentioned conditions, remove metal to the surface. Refer to Section 03 10 00.
2. Undercut surfaces of holes. After cleaning and thoroughly dampening the holes, fill them solid with the patching mortar. The mortar shall match the color of the existing concrete for concrete exposed to view as specified in paragraph B.2 above.

D. Formed Finishes

1. Rough Form Finish
   a. Provide for concrete not exposed to view unless otherwise indicated under "Finishing" below.
   b. Formwork material given in Section 03 10 00.
   c. Repair surface as indicated in B. and C. above.
   d. Chip or rub off fins exceeding 1/4" in height.

2. Smooth Form Finish
   a. Provide for concrete exposed to view, concrete receiving sheet membrane waterproofing. Areas exposed to view shall have a CS 3 or better finish as developed by the Cresset Chemical Company.
   b. Formwork material is given in Section 03 10 00.
   c. Repair surfaces as indicated in B. and C. above.
   d. Chip or rub off fins completely and grind smooth.
   e. Provide smooth rubbed finish unless otherwise indicated below.

E. Finishing

1. Smooth Rubbed Finish
   a. Provide for smooth form finish except for those items listed in 2 below.
   b. Produce on newly hardened concrete no later than the day following form removal.
   c. Wet the surfaces and rub with a No. 16 carborundum brick or other equal abrasive to obtain a smooth, even surface of uniform appearance without applying any cement or other coating.
   d. Obtain the final finish by thoroughly rubbing with a No. 30 carborundum brick. The surface shall be wet for a period of 3 days. The Authority shall be the sole judge of whether the finish is proper.
2. Ceiling Surfaces, Beams and Columns
   a. Non-painted Concrete
      1) Locations: See Architectural Drawings or Schedule of Room Finishes on Drawings.
      2) Work Required: Provide smooth form finish without rubbing.
   b. Painted Concrete (CRP)

      1) Locations: See Architectural Drawings or Schedule of Room Finishes on Drawings.

      2) Work Required: In addition to smooth form finish, machine rub with carborundum or other approved abrasive to produce smooth finished surface. Cement wash not permitted.

      3) Option: The Contractor has the option of substituting a white coat of plaster in lieu of providing rubbing for concrete ceilings.

   c. Acoustical Tile Ceiling: When the Drawings indicate that the tile is to be applied directly to the underside of concrete slabs, provide the non-painted concrete finish. However, exposed beam haunches and exposed columns shall be "CRP".
   d. Hung Ceiling: Where hung ceilings are indicated on Drawings or specified, provide a rough form finish.
   e. Columns: Exposed concrete surfaces of columns shall be non-painted concrete finish or "CRP" as determined by the required ceiling finish of the room in which columns are located.

F. Acceptance of Concrete Finish: If the finish produced is not acceptable to the Authority, the Contractor shall be responsible for all costs incurred to produce an acceptable finish by whatever means determined by the Authority.

3.7 SLABS

A. Placement

1. Mixing and placing shall be carefully coordinated with finishing. Do not place concrete on the subgrade or forms more rapidly than it can be spread, straightedged, and darbied or bull floated. Provide leveling, floating, troweling, etc. at the correct time interval after poring to prevent dusting and a non-durable surface as specified in ACI 302.1R. These operations must be performed before bleeding water has an opportunity to collect on the surface.

2. To obtain good surfaces and avoid cold joints, the size of finishing crews shall be planned with due regard for the effects of concrete temperature and atmospheric conditions on the rate of hardening of the concrete.
3. Provide extra concrete as required to make up for any deflections in the metal deck or formed slab in order to provide a level surface. Measure the concrete depth at the beams and screed from beam to beam.

B. Leveling and Finishing

1. FLOOR FLATNESS/LEVELNESS TOLERANCES

a. F_F defines the maximum floor curvature allowed over 24 inches. Computed on the basis of successive 12 in.) elevation differentials F_F is commonly referred to as the "Flatness F-Number."
b. $F_F = 50$
c. F_L defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 ft. (3.05 m) distance.
d. $F_L = 33$
e. All floors shall be measured in accordance with ASTM E-1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number" System (Inch-Pound Units).
f. All trowel finished slabs shall achieve an overall tolerance of F_F25/F_L20 and all float finished surfaces shall achieve an overall F_F20/F_L17 tolerance. The minimum local tolerance (1/2 bay or as designated by the architect) shall be 2/3 of the specified tolerances. All topping slabs shall achieve a tolerance of F_F 50.
g. carefully provide slab depressions as required for the finishes indicated on the Drawings.
h. Unless otherwise indicated on the Drawings or specified herein, make all slabs even and uniform in appearance and, where no slope is required, level within plus or minus 1/8" in ten feet. All float-finished slabs shall achieve a tolerance of 5/16" in 10 feet and all trowel-finished surfaces shall achieve a tolerance of 1/8" in 10 feet. Tolerance is measured by placing a freestanding 10-foot straight edge anywhere on the slab and allowing it to rest upon two high spots within 72 hours after slab concrete placement. The gap between the straight edge and floor shall not exceed the above-specified tolerance.
i. Where floor drains or floor slopes are indicated, slope slabs uniformly to provide even fall for drainage.
j. Follow detailed recommendations for finishing given in ACI 301, Chapter 11, and ACI 302.1R.
k. Protect finishes from contamination from time of placing until time of acceptance, placement of topping, etc.
l. Remove defects of sufficient magnitude to show through floor coverings or that do not meet tolerances by grinding.
m. Prior to placement of concrete, concrete contractor shall perform a survey by a NYS Licensed Surveyor of the underside of all the steel beams and metal deck @ mid spam at support point. After pour within 72 hours the concrete contractor shall perform a survey of the underside of all the beams and metal deck on a 10'-0" grid. At 72 hours after pour concrete contractor shall perform a survey of the top of slab. All surveys must be submitted to the Authority prior to the following pour.

2. Finishes

a. Surfaces which receive bonded applied cementitious applications such as full-set vitreous ceramic tile, concrete fills and toppings, cementitious membrane waterproofing: Strike off and level to the proper elevation. After the topping has stiffened sufficiently to permit the operation, float the surface to a uniform sandy texture. The surface shall then be broomed to a texture as approved by the Architect.

b. Surfaces to receive floor coverings, such as resilient flooring, thin-set terrazzo and vitreous ceramic tile, carpeting, wood floors, or surfaces that are exposed or painted finishes such as at auditorium floors, unless specified otherwise: Steel trowel surface to a smooth dense finish, free of trowel marks, grooves, depressions and ripples with a tolerance no greater than ±1/8" in ten feet. Exposed or painted slabs are to have a “hard trowel” finish. Apply densifier/sealer to slabs exposed or painted, except for those specified below to have no finish. Apply two coats in accordance with the manufacturer's instructions at the proper time.

c. Surfaces intended to receive roofing, water-proofing membranes: Level and wood float surface. Leave surface free from depressions, bulges, rough spots, and other defects.

d. Surfaces with no finishes: Areaways, pipe and duct, and crawl spaces; Level and wood float surface level or toward drains if required.

e. Pavements: Finish surface to a true smooth plane and texture with a toothed roller or float with a wood float. Score concrete pavement in squares of approximately 5'-0" and/or as shown on Drawings. Each rectangular slab shall have all edges neatly rounded with proper tools and be bounded on all sides by a troweled border about 1" in width.

f. Ramps, Driveways, Exterior Concrete Steps: Level and float surface. Follow with a broom finish perpendicular to direction of traffic.

C. Structural Lightweight Concrete Fill

1. Structural lightweight concrete fill is required at the following location:
   a. As a gradient fill on the roof slab to obtain the required slope.
   b. As a gradient fill to receive setting beds where structural slab is more than 2" below finished floor level.
   c. Other areas as indicated on Drawings.
2. Prepare concrete surface to receive fill by cleaning laitance, grease, oil, dust, etc. by mechanical or other acceptable means.
3. Immediately prior to placement of fill, dampen surface (without leaving standing water) and scrub in bonding grout composed of a mix of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream or the bonding agent. Do not allow bonding grout to set or dry before fill is placed.
4. Provide finish as specified in paragraph B of this Article.

3.8 MISCELLANEOUS CONCRETE WORK

A. Provide trap-pits, curbs, walls, retaining walls, ramps, athletic field work and other miscellaneous concrete items.

B. Provide motor, blower, and other mechanical bases. Coordinate with the work of Division 15 and 16. Provide concrete bases as shown on Drawings.

3.09 PATCHING AND BONDING TO EXISTING CONCRETE

A. Provide bonding agent whenever new concrete is to be poured against existing concrete, whenever the time between concrete pours is longer than that allowed for proper bond, and wherever bonding agent is indicated on the Drawings to be applied.

B. Remove loose concrete from surface to be bonded with new concrete and clean. Remove rust from reinforcement and structural steel by power chipping and power driven brushes.

C. Apply bonding agent in accordance with manufacturer's specifications. Pour concrete as soon as bonding agent has cured and within 20 hours after application. If the 20-hour period has elapsed, then the bonding agent must be reapplied.

3.10 CURING AND PROTECTION

A. General

1. Begin curing concrete immediately after placement and finishing. Protect all freshly deposited concrete from premature drying and excessively hot or cold temperatures and maintain it with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete. Detailed procedures are given in ACI 308.
2. Cure floor surfaces in accordance with ACI 308.
3. Do not apply curing compounds to any concrete surfaces, provide wet curing.

B. Procedure

1. Concrete surfaces not in contact with forms:
   a. Ponding or continuous non-manual sprinkling.
   b. Absorptive mat or fabric, sand, or other covering kept continuously wet.
2. Concrete surfaces in contact with forms:
   a. Minimize moisture loss from forms exposed to heating by the sun by keeping forms wet until they are removed.
   b. After form removal, cure with one of the methods listed in 1 above.
3. Continue curing until a total of 7 days has elapsed during which the temperature of the air in contact with concrete has remained above 50°F. Prevent rapid drying during and at the end of the curing period.

C. Cold Weather Curing

1. Concrete must be protected from water loss. This shall be accomplished by the application as soon as possible without harm to the concrete surfaces of either (a) exhaust steam, or vapor- resistant paper or polyethylene film. In all other respects, curing shall conform to applicable provisions of this Section. Concrete temperature shall be maintained between 50°F and 70°F.

D. Hot Weather Curing

1. During the period June 1 to October 1 or when hot weather conditions require it, maintain continuous water curing for a minimum period of twenty-four hours. Provide for windbreaks, shading, and other necessary provisions.

2. After 24 hours, curing shall be by one of the methods specified under B above. In all other respects, curing shall conform to applicable provisions of this Specification. Upon termination of the specified moist curing, every effort should be made to reduce the rate of drying by avoiding air circulation.

E. Protection from mechanical injury: Protect concrete from mechanical disturbances during curing period as described under "Protection and Cleaning".

3.11 FIELD QUALITY CONTROL

A. Tests: Tests to be performed by the Nassau County Department of Public Works Testing Laboratory during construction are as follows:

1. Compliance of materials to Specifications tested from production samples. Use ASTM C712 reference and test for freshly mixed concrete sample. Determination of the slump of the concrete for each sample taken and whenever consistency of the concrete appears to vary using ASTM C143. The Engineer designated for Special Inspection will report any concrete that does not meet the slump requirements to project Construction Manager who shall determine the acceptance of said concrete
2. Determination of water content of freshly mixed normal weight concrete shall be from the batch tickets accompanying the concrete mix. All batch tickets shall be recorded by the Special Inspector including when the truck is not selected for random inspection and testing. The Engineer designated for Special Inspection will report any concrete that does not meet the water-cement ratio (W/C0 requirements to the project Construction Manager who shall determine the acceptance of said concrete.
3. Strength tests on the specimens in accordance with ASTM C39. The minimum number of specimens to be taken daily will conform to ACI 318-89 paragraph 5.6 as modified by the Building Code except that seven (7) test cylinders will be molded for each 50 cubic yards, or portions thereof, of concrete placed in any one day's concreting. Specimens will be stored at the site in the insulated curing box provided by the Contractor. Each group of specimens is considered one strength test. Three cylinders shall be tested at 28 days for acceptance and one at 7 days for information. The three remaining cylinders will be tested only if the 28-day breaks are low and durability of the concrete is not a factor. If one specimen in test manifests evidence of improper sampling, molding, or testing, it shall be discarded and the average strength of the remaining cylinders shall be considered the test result. Should all specimens in a test show any of the above defects, the entire test shall be discarded.
4. Determination of air content and unit weight of normal weight concrete sample for each strength test in accordance with ASTM C173 or C231 and ASTM C138.
5. Determination of air content and unit weight of lightweight concrete sample for each strength test in accordance with ASTM C173 or C231 and ASTM C567.
6. Determination of temperature of concrete sample for each strength test. Use ASTM C1064 to determine temperature of concrete sample.

B. Inspection

1. Refer to "Source Quality Control" for responsibility and procedure.
2. The Contractor shall cooperate in the making of all tests by the Laboratory Technician by:
   a. Providing a well-constructed shanty, to be approved by the Authority, located adjoining the Authority's inspector's office. This shanty shall have an area of not less than 50 sq ft, be well lighted, and provided with a table for mixing concrete, shelves for storage of the Laboratory's equipment, molds, etc., one chair, hinged door with suitable lock.

b. Providing a pre-manufactured field portable curing box with built-in temperature controlled system for humidity, heating and cooling in conformance to ACI 301 and ASTM C31, C192 and C511; curing box of sufficient size and strength to contain all specimens made in any four consecutive working days**,** minimum 22 standard 6” x 12” cylinder molds without stacking cylinders; and controls for which shall automatically raise or lower temperature as needed to maintain 72°F±3°F through -10°F to 100°F temperature gradient.. The Contractor shall furnish an outlet to provide the necessary temperature in the storage box, pending delivery to the Laboratory of the test cylinders.

c. Locate curing box within 30 yards of the concrete sample collection area. Relocate curing box as required due to the progress of the work. Provide additional curing boxes as required to maintain the 30-yard limit if multiple concrete collection areas are scheduled.

d. Providing a microwave of the size specified in AASHTO T318 and a portable generator.

C. Evaluation and Acceptance of Concrete

1. Strength tests on structural concrete will be evaluated according to ACI 318-05, paragraph 5.6 as modified by the Building Code.
2. When the average strength of the test cylinders, as defined in ACI 318-**05** paragraph 5.6 as modified by the Building Code, falls consistently below the specified strength (f'c), the Authority shall have the right to order the Contractor to change the proportions or the water content of the concrete to secure the required strength for the remaining portion of the structure, all at the Contractor's expense. It is the Contractor's complete responsibility to modify the concrete mix design, material controls, and/or concrete operations where necessary to obtain the compressive strength required by the design and Specification.
3. When the average strength of test cylinders for any portion of the structure is less than that required by the design or Specification, or where there is other evidence that the quality of the concrete is below Specification requirements, the adequacy of the concrete will be checked according to the requirements of the Building Code of New York State either by structural analysis or by core or load tests or by any combination of these procedures. The Engineer of Record will determine which procedures to use:
   a. Structural Analysis Computations, which will be performed by the Engineer of Record.
   b. Core Tests– - Performed in accordance with ASTM C42.
   c. Load Tests.
4. Exterior concrete exposed to the elements with low strength test results or other evidence of poor durability will be rejected.
5. Low Strength Tests of Concrete - Results
   a. Pay for additional costs of labor and materials required at the job for all damages resulting from load tests and the taking of cores. Remove and replace concrete work that is not of adequate strength or durability and cannot be made to work by remedial methods acceptable to the Authority at own cost. The Contractor shall be held responsible for all delays and damages to the work of other Divisions that occur as a result of non-conformance.
   b. Pay for all expenses borne by the Nassau County Department of Public Works resulting from low strength test procedures or evidence of poor durability (such as high slump) specified above.

3.12 PROTECTION AND CLEANING

A. General

1. During the curing period, and thereafter as conditions may require, protect the concrete from damaging mechanical disturbances, particularly excessive load stresses, heavy shock, and excess vibration. Protect all finished concrete surfaces from damage caused by construction equipment, materials or methods, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

B. Floors

1. Floors that have received their final finish shall be closed to all traffic for at least 48 hours following the completion of troweling. Avoid damage to the floor and repair, clean, and prep floor for finishes.

3.13 ACCEPTANCE OF CONCRETE WORK

A. General

1. Completed concrete work that meets all applicable requirements will be accepted without qualification.
2. Completed concrete work which fails to meet one or more requirements but which has been repaired to bring it into compliance will be accepted without qualification.
3. Completed concrete work which fails to meet one or more requirements and which cannot be brought into compliance may be accepted or rejected as provided in these Specifications or in the Contract Documents. In this event, modifications may be required to assure that remaining work complies with the requirements.
4. Concrete work judged inadequate by structural analysis, core test, results of load test or deemed unacceptable due to appearance or durability concerns shall be repaired, reinforced with additional construction if so directed by the Engineer of Record, or be replaced if so directed by the Engineer at the Contractor's expense.
5. Pay all costs incurred by the Authority in providing additional testing and/or analysis required by this Section.
6. The Authority will pay all costs of additional testing and analysis made at its own request that is not required by this Section or that shows concrete is in compliance with the Contract Documents.

B. Dimensional Tolerances

1. Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of Section 03 10 00 shall be considered potentially deficient in strength and subject to the provisions of paragraph D below.
2. Formed surfaces resulting in concrete outlines larger than permitted by the tolerances of Section 03 10 00 may be rejected and the excess material subject to removal. If removal of the excess material is permitted, it shall be accomplished in such a manner as to maintain the strength of the section and to meet all other applicable requirements of function and appearance.
3. Concrete members cast in the wrong location may be rejected if the strength, appearance, or function of the structure is adversely affected or if misplaced items interfere with other construction.

4. Inaccurately formed concrete surfaces exceeding the limits on Section 03 10 00 and which are exposed to view may be rejected and shall be repaired or removed and replaced if required.
5. Slab tolerance from theoretical is 1/2" plus or minus in accordance with ACI 117. Finished slabs exceeding the tolerances, including specified levelness tolerances, may be repaired provided that the strength or appearance is not adversely affected. High spots may be removed with a terrazzo grinder, low spots filled with a patching compound, or other remedial measures performed as permitted.

C. Appearance

1. Concrete exposed to view with defects that adversely affect the appearance of the specified finish may be repaired only by approved methods.
2. Concrete not exposed to view is not subject to rejection for defective appearance.

D. Strength of Structure

1. The strength of the structure in place will be considered potentially deficient if it fails to comply with any requirements that control the strength of the structure, including but not necessarily limited to the following conditions:
   a. Low concrete strength as described under "Field Quality Control".
   b. Reinforcing steel size, quantity, strength, position, or arrangement at variance with the requirements of Section 03 20 00 or the Contract Documents.
   c. Concrete that differs from the required dimensions or location in such a manner as to reduce the strength.
   d. Curing less than that specified.
   e. Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.
   f. Mechanical injury as defined under "Protection and Cleaning", construction fires, accidents, or premature removal of formwork likely to result in deficient strength.
2. Structural analysis and/or additional testing may be required when the strength of the structure is considered potentially deficient.
3. Core tests may be required when the strength of the concrete in place is considered potentially deficient.
4. If core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be required and their results evaluated in accordance with Chapter 20 of ACI 318.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:		_____
1. Admixtures		
2. Densifier/Sealer		
3. Bonding agent		
4. Vapor barrier		
5. Waterstop		
Samples:		_____
1. Vapor barrier		
2. Waterstop		
Design Data/Test Report:		_____
1. Foundation concrete mix		
2. Superstructure concrete mix		
Certificates:		_____
1. Admixture chloride content		
2. Concrete laboratories certificate		
3. Concrete producer is NYSDOT Approved		
4. Concrete producers certificate to field rep.		
Manufacturers Instructions:		_____
1. Waterstop		
Qualifications		_____
1. Concrete Installer		
2. Concrete producer		
Survey:		_____
1. Slab survey		

END OF SUBMITTALS

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 042000 - 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 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the unit masonry work as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Concrete block interior partitions.
2. Concrete Block Foundation Walls.
3. Metal joint reinforcing, anchors, and related accessories for masonry.
4. Control joints in masonry, filled with joint fillers.
5. Chases, recesses, pockets and openings in masonry as required for installation of work by others.
6. Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
7. Grouting in of metal items built into masonry work.
8. Protection, pointing and cleaning of masonry.

1.3 RELATED SECTIONS

A. Firestops and Smokeseals - Section 078413.

B. Joint Sealers - Section 079200.

1.4 SUBMITTALS

A. Shop Drawings: Submit for:
1. Anchoring details.
2. Control and expansion joint locations and details.

B. Samples (Submit the following):

1. Joint reinforcing, each type, width and proposed location (labeled).
2. Anchors, each type, width and proposed location (labeled).
3. Joint filler, each type.
4. Mortar color, 12" long cured sample.

C. Manufacturer's Literature: Submit technical and installation information for:

1. Mortar materials, each material and mortar type.
2. Certification of mortar mix.

3. Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.
4. Block manufacturer shall submit certifications of compliance with ASTM C 90, C 331 and UL 618 prior to any job site delivery. Field sample of concrete block may be tested by an Independent Testing Laboratory retained by the Owner according to the requirements of ASTM C140.

D. Construction Procedures: Submit proposed procedures and materials for cleaning masonry work; including certification that cleaner will not adversely affect gaskets, sealants, etc.

1.5 QUALITY ASSURANCE

A. Work of this Section shall conform to the requirements of the following:

1. 2011 "Building Code Requirements for Masonry Structures," (TMS 402- 11/ACI 530-11/ASCE 5-11).
2. 2011 "Specification for Masonry Structures," (TMS 602-11/ACI 530.1- 11/ASCE 6-11).

1.6 PRODUCT HANDLING

A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials

B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.

C. Aggregate: Store with provisions for good drainage.

D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice, loose rust, scale, or other coatings which would destroy or reduce bond with mortar, and will not be disfigured or bent out of shape.

1.7 JOB CONDITIONS

A. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed. Immediately remove grout, mortar, and soil that come in contact with such masonry.

PART 2 PRODUCTS

2.1 MATERIALS

A. Standard Concrete Block

1. Portland cement, ASTM C 150, Type 1, low alkali (less than 0.6%), single source for entire project.
2. Aggregates, ASTM C 331, lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process equal to "Solite," "Norlite," or "Haydite."

3. Concrete Masonry Units: Load bearing lightweight aggregate concrete masonry units conforming to the requirements of ASTM C 90, Type 1.
   a. Block for fire-rated walls shall be 75% solid units.
4. The producer of the concrete masonry units shall furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL 618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E 119). All 4" and" units shall conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.
5. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.
6. Finish: For exposed block surfaces, in addition to ASTM requirements, block shall have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed CMU, surfaces shall be free from deleterious materials that would stain plaster or corrode metal.
7. Curing: All concrete block shall be steam cured, and air dried for not less than thirty (30) days before delivery.
8. Density of concrete block shall not exceed one hundred and five (105) lbs. per cubic foot.
9. Shrinkage: Shrinkage of concrete blocks shall not exceed 0.065% when tested in accordance with ASTM C 426-99.
10. Water Content
    a. At the time of delivery to the job site, concrete masonry units shall have a value, in weight of contained water, of not more than thirty
       (30) percent of the fully saturated content for the unit tested.
    b. Ship all units from the factory, and store at the job site, with all necessary protection to prevent increase of water content from rain and other sources.

B. Joint Reinforcing for Masonry Walls: For interior block walls and partitions, provide standard reinforcing fabricated of 9 ga. side and cross rods, truss or ladder design, no ties, spaced every other block course. Provide prefabricated pieces at corners and intersections of walls or partitions. Reinforcing shall be mill galvanized conforming to ASTM A 641, Class B-1, applied after fabrication.

1. Wire used in assemblies noted above shall be cold drawn steel wire conforming to ASTM A 82.
2. Approved Joint Reinforcing Manufacturers.
   a. Hohmann & Barnard
   b. Dur-O-Wal
   c. Heckmann Building Products
   d. National Wire Products Industries, Inc.

C. Anchors

1. Wire Mesh: Galvanized sixteen (16) gauge steel wire, 1/4" square mesh, width 1/2" less than wall thickness, by length to suit condition.
2. For anchoring masonry to structural steel, provide hot-dip galvanized steel, as listed, or approved equal by manufacturer noted above:

a. Made by Heckmann Building Products. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.

1). No. 195 Column Anchors

2). No. 197 Column Anchors

3). No. 315 Weld-On Anchor Rods with No. 316 Triangle Ties

4). No. 315-B Weld-On Anchor Straps with No. 316 Triangle Ties

b. Made by Hohmann & Barnard or approved equal. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft. 1). No. 355 Column Anchors

2). No. 356 Column Anchors

3). No. 357 Beam Anchors

4). No. 359 F anchor straps with VWT tie.

3. For anchoring CMU interior partitions to underside of steel beams, provide hot dip galvanized steel tube anchors equal to No. 419 and No. 421 made by Heckmann Building Products, No. PTA-420 made by Hohmann & Barnard, or approved equal by manufacturer noted above.

4. For anchoring CMU interior partitions to underside of structural deck, provide 4" x 4" x 1/4" galvanized steel angles (ASTM A 36), 3'-0" long spaced 3'-0" o.c. alternately on each side of partition. Anchor partition securely to structural deck.

D. Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size.

E. Control Joint Fillers

1. Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, which shall provide a force fit in the grooves of the sash block, and shall have 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).

a. Provide the following sizes:

1). 2-5/8" wide control joint fillers for 4" block walls. 2). 4-5/8" wide for 6" block walls.

3). 6-5/8" wide for 8" block walls.

b. Provide backer rod and sealant joint over joint filler as per drawings and Section 079200 of these specifications.

2. Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Acceptable joint filler shall be "Everlastic, Type NN-1" by Williams Products, Inc., or approved equal. Recess joint filler and install backer rod and sealant as per drawings and Section 079200 of these specifications.

F. Neoprene Joint Filler: Provide closed cell neoprene, Type NN-1, conforming to ASTM D 1056, Grade 1, high performance, as manufactured by Williams Products Inc., or equal made by D. S. Brown, Norton, or approved equal.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type 1, standard color, one source.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: Clean, washed, buff colored sand, graded per ASTM C 144.

D. Aggregate for Grout: ASTM C 404.

E. Water: Clean, fresh and suitable for drinking.

2.3 MORTAR MIX

A. Interior Masonry Construction: Provide Portland cement/lime mortar conforming to ASTM C 270, Type N; for load bearing conditions, mortar shall conform to ASTM C 270, Type M.

B. Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270, Type S.

C. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Grout shall have a minimum compressive strength of 3000 psi when tested in accordance with ASTM C 1019.

D. Mixing

1. General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes, not to exceed five (5) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may not be re-tempered. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
3. Acceleration or other admixtures not permitted.
4. Mortar shall have a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C 91.

E. Admixtures

1. No air-entraining admixtures or cementitious materials containing air- entraining admixtures shall be used in the mortar.
2. No antifreeze compounds or other substances shall be used in the mortar to lower the freezing point.
3. Calcium chloride or admixtures containing calcium chloride shall not be used in mortar.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. 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.
2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.

B. Discrepancies: In the event of discrepancy, immediately notify the Architect in writing. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved. Starting of work by the Contractor means acceptance by the Contractor of the substrate.

3.2 COORDINATION

A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

3.3 INSTALLATION

A. General

1. Do not wet concrete block units.
2. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
3. Build chases and recesses as shown or required for the work of other trades.
4. 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.
5. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and off-sets. Avoid the use of less than half size units at corners, jambs and wherever possible.
6. Layup walls plumb and true with courses level, accurately spaced and coordinated with other work.
   Pattern Bond: Lay exposed masonry patterns as noted on drawings. If not shown, provide running bond. Lay concealed concrete block with all units in a wythe bonded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units of less than four (4) inches horizontal face dimensions at corners or jambs.
7. Where possible, masonry walls and partitions shall be built after all overhead ducts, pipes and conduits are in place and tested. Masonry shall be neatly built around the items above. Walls and partitions shall be plumb, true to line and free from defects such as open cells, voids, dry joints and other similar defects. In rooms and spaces scheduled to have concrete block finish, all such surfaces, including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, shall be made suitable for paint application. Cutting of openings in walls and partitions in place shall be done only with the approval of the Architect.

B. Mortar Bedding and Jointing

1. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells.
2. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.
3. Tool exposed joints slightly concave. Concealed joints shall be struck flush.
4. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

C. Built-In Work

1. 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.
2. Mortar in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with mortar as the masonry units are laid up.
3. Grout under lintels, bearing plates, and steel bearing on masonry with solid bed grout. Sleeves, pipes, ducts and all other items which pass through masonry walls shall be caulked with interior grade sealant meeting requirements of Section 079200, so as to be airtight and prevent air leakage. Refer to Section 078413 for packing of voids in rated masonry walls.
4. Fill vertical cells of masonry units solid with grout which have anchoring, reinforcing rods, supporting or hanging devices embedded in the cell, including stone anchors and window or curtain wall anchors.
5. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.
6. Unless otherwise noted, fill vertical cells of masonry units solid with grout which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.
7. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells below.
8. Masonry indicated as being reinforced shall have all voids filled solid with grout. Grout shall be consolidated in place by vibration or other methods which insure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour shall not exceed twelve (12) inches. When the least clear dimension is two (2) inches or more, maximum height of grout pour shall not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1-1/2" below the top of a masonry unit. Vertical bar reinforcing shall be accurately placed and held in position while being grouted, and shall be in place before grouting starts. All such reinforcing shall have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 192 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.

D. Cutting and Patching

1. All exposed masonry which requires cutting or fitting shall be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.
2. Holes made in exposed masonry units for attachment of handrail brackets and similar items shall be neatly drilled to proper size.
3. All masonry which requires patching in exposed work, if approved by Architect, shall be patched neatly with mortar to match appearance of masonry as closely as possible and to the Architect's satisfaction. Rake back joints and use pointing mortar to match as required.

E. Solid Wall Construction

1. Fill the vertical longitudinal joint between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging.
2. Tie wythes with continuous horizontal reinforcement embedded in mortar joints sixteen (16) inches o.c. vertically.

F. Interior Block Partitions

1. Build to full height unless otherwise shown on drawings. At non-rated partitions, fill void between CMU and structural deck with continuous neoprene filler conforming to the requirements of Article 2.4 herein. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 078413. Fasten to structure at top of partition using steel angles as specified herein.
2. Provide continuous horizontal joint reinforcing every other block course, except as otherwise noted. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8". Lap reinforcement a minimum of six (6) inches at ends of units.
3. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
4. Corners
   a. Provide interlocking masonry unit bond in each course at corners.
   b. Provide continuity at corners with prefabricated "L" reinforcement units, in addition to masonry bonding.
5. Intersecting and Abutting Walls
   a. Unless vertical control joints are shown as part of structural frame, provide interlocking masonry bond. Provide starters and special shapes as shown on the drawings to bond these walls.
   b. In addition to masonry bonding, provide horizontal reinforcement using prefabricated "T" units at interior partitions.

G. Anchoring Masonry to Structure: Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.

H. Control Joints

1. Provide vertical control and isolation joints in masonry as shown. Build in related items as the masonry work progresses.
2. CMU Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 20'-0" o.c. In addition, locate joints at points of natural weakness in the masonry work, including the following:
   a. At structural column or joint between bay.
   b. Above control joints in the supporting structure.
   c. Above major openings at end of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 7'-0" wide and at both sides for openings over 6'-0" wide.
   d. At reduction of wall thickness.
   e. Where masonry abuts supporting structure.
   f. If additional joints are required, indicate same on approved shop drawings.

I. Lintels: For concrete block walls, use specially formed U-shaped concrete block lintel units with reinforcing bars in accordance with the following table, filled with grout.

Number and Size of Reinforcing Bars Required at Concrete Block Lintels		
Maximum Clearance Span	Wall Width	Rebar No. - Size
2'-0" to 6'-0" 6'-0" to 8'-0"	6"	2 - #3 2 - #4
2'-0" to 6'-0" 6'-0" to 8'-0"	8"	2 - #3 2 - #4
2'-0" to 6'-0" 6'-0" to 8'-0"	12"	3 - #3 3- #4

3.4 CLEANING, PROTECTION, ADJUSTMENT

A. Protection: The Contractor shall take adequate precautions for the protection of all surfaces against mortar spatter and shall immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.

1. Excess mortar shall be wiped off the masonry surfaces as the work progresses.
2. Wood coverings shall be placed over all such masonry surfaces as are likely to be damaged during the progress of the entire project.
3. Protective measures shall be performed in a manner satisfactory to the Architect.
4. Damaged masonry units shall be replaced to satisfaction of the Architect.

B. Cleaning of Masonry: Upon completion, all exposed masonry shall be thoroughly cleaned following recommendations of the BIA Technical Note No.
20. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 4' x 4' in a location approved by the Architect. No further cleaning work may proceed until the sample area has been approved by the Architect, after which time the same cleaning materials and method shall be used on the remaining wall area. If stiff brushes and water do not suffice, the surface shall be thoroughly saturated with clear water and then scrubbed with a solution of an approved detergent masonry cleaner, equal to "Vana Trol" made by ProSoCo Inc. or equal made by Diedrich or approved equal, mixed as per manufacturer's directions, followed immediately by a thorough rinsing with clear water. All lintels and other corrodible parts shall be thoroughly protected during cleaning.

1. Unless otherwise required by cleaning agent manufacturer use only low pressure device (30 to 50 psi) for application of cleaning agent and water rinsing.

C. Pointing: Point any defective joint with mortar identical with that specified for that joint.

END OF SECTION

SECTION 042113 - BRICK PANEL SYSTEM

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section Includes:

1. Metal grid system for thin brick.
2. Brick.
3. Mortar, ties and anchors.

1.4 REFERENCES

A. ASTM International (ASTM):

1. ASTM C 216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); severe weather grade kiln-fired brick.
2. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; specially formulated mortar mix.
3. ASTM C 577 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
4. ASTM C 1088 - Standard Test Method for Thin Veneer Brick Units Made From Clay or Shale; severe weather grade kiln-fired brick.
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ASTM E 754 - Standard Test Method for Pullout Resistance of Ties and Anchors Embedded in Masonry Mortar Joints.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Manufacturer's installation instructions, showing required preparation and installation procedures.
2. Storage and handling requirements and recommendations.
3. Installation methods.
4. Cleaning and maintenance instructions.

B. Shop Drawings: Provide drawings prepared by the applicator/contractor showing the wall layout, typical details, connections, expansion joints, plus the installation sequence shall be submitted shall be submitted to the architect upon request. Shop drawings shall include the following:

1. Submit elevations, sections and details of assembly components; indicate locations, configurations, large scale plans.

2. Show sequence of installation, attachment details, and weather sealing.
3. Show location of members, other items of work and related work of other Sections to be coordinated with work of this section.
4. Submit detail drawings depicting proper installation and flashing techniques. Coordinate locations with those found on the Contract Drawings.

C. Quality Assurance Submittals:

1. Copies of test reports by independent laboratories verifying the performance of the system shall be submitted to the Architect upon request.
2. The certified applicator/contractor shall submit a copy of his current ' Certificate of Trained Applicator' from Brick-It to the Architect prior to the application of the Brick-It Metal Grid Panel System.

D. Verification Samples: For each finish product specified, two samples, minimum size 12 inches by 12 inches, representing actual products, styles, colors, patterns, and textures.

E. Warranty: Copy of manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Single Source Requirements: Provide primary and secondary components required for installation of thin brick systems from a single source.

B. Manufacturer Qualifications: Minimum 20 years experience manufacturing similar products.

C. Installer Qualifications:

1. Received instruction by manufacturer's personnel in the installation of the Brick-It System and received a ' Certificate of Trained Applicator' from Brick-It.
2. Experienced and competent in the installation of brick type materials.
3. If requested, submit a list of recently completed projects using similar materials.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. The mock-up shall demonstrate the proposed range of color, texture, and workmanship to be expected in completed work.
2. Locate mock-up on site in location as directed by Architect. Clean the sample panel installation using the same materials and tools as planned for the final construction.
3. Obtain Architect's acceptance of mock-up before start of work.
4. Do not proceed with remaining work until workmanship, color, style, pattern, and texture are approved by Architect.
5. Modify mock-up area as required to produce acceptable work.
6. Mock-up may be incorporated into the work.

E. Conduct a pre-installation meeting to verify all products, application procedures, site conditions and warranty terms.

F. All load requirements to meet standards established by New York State Building Code.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to the location in unopened factory containers. Upon arrival, materials shall be inspected for damage and manufacturer informed of any discrepancies. Deficient materials shall not be used.

B. Materials shall be stored in a protected location and safeguarded from damage.

1.8 PROJECT CONDITIONS

A. The ambient air temperature shall remain at 36 degrees F or greater for at least 72 hours after the application of mortar.

B. Provide protection of surrounding areas and adjacent surfaces from application of brick panel systems.

1.9 COORDINATION/SCHEDULING

A. The work in this section requires close coordination with related specifications sections and trades. Sufficient labor and equipment shall be employed to ensure a continuous operation satisfactory to the Architect.

B. Coordinate installation of brick panel systems with related wall elements, including, windows, doors, louvers, ducts, signage, flashings, sealants, supporting wall framing and sheathing, surface mounted objects, and similar items.

1.10 EXTRA MATERIALS

A. At completion of project, deliver to Owner extra stock of materials used on project as follows:

1. Minimum 2 percent of attic stock for each brick type specified.

B. Store in location as directed by Owner. Ensure materials are boxed and identified by manufacturer, type, and color.

1.11 WARRANTY

A. Manufacturer's Warranty: Provide Brick-It standard 20-year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Basis of Design, Brick-it, which is located at: 17 Central Ave. Unit 3; Hauppauge, NY 11788; Tel: 631-244-3993; Fax: 631-348-0300; Email: request info (info@brickit.com); Web: www.brickit.com

2.2 BRICK PANEL SYSTEMS

A. Brick Panel Systems: System for aligning and locking thin brick to a substrate that does not depend on adhesive for its performance.

1. System Type: Brick-It Designer Metal Grid System.

B. Metal Grid System Panels: Galvanized steel metal components formed to align brick courses and to support and ensure a mechanical bond of each brick in place.

1. Panels shall be chem-dry treated and be a minimum 0.014 inch thickness with continuous carrying brick ledges (every course of brick) with minimum thickness per ledge: 0.028 inch.
2. Panels shall have a continuous interlock every third course, minimum thickness, 0.042 inch.

3. Panels shall be able to fold out corners, door and window sections, and have a continuous linear array of holes to receive adhesive and have a continuous array of mortar receptors to lock in mortar mix.
4. Panels shall be designed to carry brick load evenly on entire wall surface without the use of footings, starter angles or special corner sections.
5. Size: As selected by Architect from manufacturer's full range of standard size options.
6. Brick Configuration: Staggered, standard.

C. Brick: Kiln-fired brick 1/2 to 1 inch nominal thickness, meeting ASTM C 216 and ASTM C 1088 severe weather requirements, minimum compression strength of 1000 PSI per ASTM C 513, passes freeze/thaw test per ASTM C 666.

1. Brick Section: As selected by Architect.

D. Mortar: Premixed mortar supplied by manufacturer, ASTM C 270.

1. Mortar Color: As selected by the Architect from manufacturer's full range of standard available mortar color options

E. Fasteners: Non-corrosive ribbed nails, screws or staples, designed for applicable substrate.

F. Adhesives: High solid, solvent based adhesive that remains flexible and unaffected by freeze-thaw cycles, as supplied by Brick-It.

G. Water: Shall be clean, potable, and free of all foreign matter.

H. Cleaner: ProSoCo SureKleen 600 or approved equal.

I. Masonry Sealer: Manufacturer's recommended sealer, applied to brick-and-mortar joints.

J. Sealant Systems: Acceptable to Brick-It, color as selected by Architect. Joint design and surface preparation shall be based on sealant manufacturer's recommendation and project conditions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to installation, examine substrate for conditions including soundness, tightness of connections, crumbling or looseness of surfaces, and projections. Verify substrate is acceptable to authorities having jurisdiction prior to installation of the work of this Section.

B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the installation to the Contractor. Do not start work until deviations are corrected.

3.2 SUBSTRATE PREPARATION

A. Repair damaged or cracked surfaces. Prepare substrate to be flat, within 1/8 inch within any 4-foot square area.

B. Remove surface contaminants on concrete and concrete masonry surfaces, such a form release oils, dust, paint, waterproofing, and similar items. If required by manufacturer, apply conditioner to substrate by sprayer or roller to chalking or excessively absorptive surfaces.

C. Install in accordance with manufacturer's written instructions as applicable to each type of substrate required. Install bricks to specified pattern and mortar.

D. Metal Grid: Apply to substrate surface in the true level rows, interlock at every panel. Install such that panel does not extend 1/4 inch below the face of the brick.

1. Offset vertical grid joints and leave 1/4 inch between joints. Install for brick to extend past grid by 1/2 inch at grid ends.
2. Fasten grid system to a sound substrate or wall with a non-corrosive fastener; minimum penetration of substrate is 1 inch. Concrete and masonry walls require fasteners and adhesive on rear of metal grid.
3. Install fasteners on an average of 3 per square foot and at top and bottom courses vertically and a maximum of 16 inches on center horizontally.

E. Adhesive:

1. Brick shall be spaced to ensure that the head joints do not exceed 5/8 inch or fall below 1/4 inch. The optimum head joint size is 7/16 inch.
2. Use adhesive supplied by manufacturer. For exterior installations, apply 3/8-inch vertical dabs. For interior applications, apply 3/8-inch beads over adhesive holes as shown in manufacturer's literature.
3. Do not use excessive adhesive as this will cause bricks to tilt away from grid. Check periodically and repress to grid.

4. Allow adhesive 24 hours to dry before mortaring.

F. Brick Placement:

1. Applications Requiring Corners:
   a. Start with corner brick, or a corner brick at each corner if there are corners at both ends.
   b. Install bricks adjusting vertical joints for fit or cut brick as required.
2. Applications that do not required corners:
   a. Install bricks in direction of arrows as shown in manufacturer's literature.
   b. Place adhesive on two rows of grid in the middle of wall.
   c. Adjust vertical joints to fit area, 3/8 inch to 1/2 inch, to fit wall space.
   d. Cut end bricks as needed. Install bricks horizontally than vertically.
   e. Draw a plumb vertical line every 48 inches to help maintain spacing.

G. Mortar:

1. Allow adhesive to fully cure before mortaring joints.
2. Use clean, cold water to mix mortar. Flush hoses regularly; especially during warm weather.
3. Slightly dampen bricks before mortaring, especially during hot weather.
4. Mix properly and test a sample area.
5. Do not apply mortar to brick panel system when the ambient outdoor temperature is below 36 degrees F unless temporary protection and heat can be provided for a minimum of 36 hours after installation.
6. Apply mortar into horizontal joints first, then vertical joints. Over fill joints with sufficient mortar to avoid leaving any voids. When mortar attains a firm consistency joint shall be tooled.
7. Use the joint tool supplied with the mortar kit to strike joints. Press the tool against the joint and strike joint to fill and seal mortar to edges of brick. Strike the vertical joints first than horizontal joints. Provide concave finish. Fill voids.

H. Sealer: Apply only after mortar joints are thoroughly cured. Allow a minimum of 2 weeks prior to application.

1. Seal interior applications in accordance with manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

A. Arrange and pay for project inspection by Brick-It or its authorized representative to confirm warranty will be provided. Notify Architect 48 hours in advance of inspection.

3.4 CLEANING AND PROTECTION

A. Cleaning: As recommended by manufacturer. Do not begin cleaning until mortar joints are properly cured. Allow a minimum of 24 to 72 hours. Soak bricks and mortar joints before applying cleaner.

1. Thoroughly flush wall after cleaning.
2. Clean adjacent materials and surfaces of all foreign materials resulting from the work of this Section.

B. Protection:

1. Protect installed materials from water impinging on the visible surface, chinking, sealants joints, and from behind.
2. Protect installed materials from dust, dirt, precipitation, freezing, damaged, spilled materials, and continuous high humidity until they are fully dry.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

Table of Contents Division 05 - Metals

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SECTION 05 12 00 - STRUCTURAL STEEL FRAMING (Delegated Design)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including SUCF Agreement, General Requirements and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Structural steel.

B. Related Requirements:
   1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel fabrications and other steel items not defined as structural steel.
   2. Section 09 91 13 "Exterior Painting" for surface-preparation and priming requirements.
   3. Section 09 91 23 "Interior Painting" for surface-preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

C. Heavy Sections: Rolled and built-up sections as follows:
   1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches.
   2. Welded built-up members with plates thicker than 2 inches.
   3. Column base plates thicker than 2 inches.

D. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

1.4 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.
   1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
   2. Include embedment Drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members and connections of the Seismic-Load-Resisting System.
6. Indicate locations and dimensions of protected zones.
7. Identify demand critical welds.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint qualified by testing, including the following:
1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

D. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional New York State Structural Engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:
1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Non-shrink grout.

F. Survey of existing conditions.

G. Source quality-control reports.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE.

C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint] or to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

E. Comply with applicable provisions of the following specifications and documents:
1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
   1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
   2. Clean and relubricate bolts and nuts that become dry or rusty before use.
   3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator[, including comprehensive engineering analysis by a qualified professional engineer,] to withstand loads indicated and comply with other information and restrictions indicated.
   1. Select and complete connections using AISC 360
   2. Use Allowable Stress Design; data are given at service-load level.

B. Moment Connections: Type PR, partially restrained.

C. Construction: Moment frame

2.2 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than the following:
   1. W-Shapes: 60 percent.
   2. Channels, Angles, M, S-Shapes: 60 percent.
   3. Plate and Bar: 25 percent.
   4. Cold-Formed Hollow Structural Sections: 25 percent.
   5. Steel Pipe: 25 percent.
   6. All Other Steel Materials: 25 percent.

C. W-Shapes: ASTM A 992/A 992M

D. Channels, Angles, M, S-Shapes: ASTM A 36/A 36M

E. Plate and Bar: ASTM A 36/A 36M

F. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50

G. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B structural tubing.

H. Corrosion-Resisting, Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.

I. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.
   1. Weight Class: Standard
   2. Finish: Black

J. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.

K. Steel Forgings: ASTM A 668/A 668M.

L. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
   1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

C. Un-headed Anchor Rods: ASTM A 36/A 36M.
   1. Configuration: Straight
   2. Nuts: ASTM A 563 heavy-hex carbon steel.
   3. Plate Washers: ASTM A 36/A 36M carbon steel.
   4. Washers: ASTM F 436Type 1, hardened carbon steel.
   5. Finish: Plain

D. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

E. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

F. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.4 PRIMER

A. Primer: Comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

2.5 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
   1. Camber structural-steel members where indicated.
   2. Fabricate beams with rolling camber up.
   3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
   4. Mark and match-mark materials for field assembly.
   5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to [SSPC-SP 1, "Solvent Cleaning."

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.

H. Welded Door Frames: Build up welded door frames attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated.

I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces.
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: Pretensioned

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

A. Shop prime steel surfaces except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.
   3. Surfaces of high-strength bolted, slip-critical connections.
   4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
   5. Galvanized surfaces.
   6. Surfaces enclosed in interior construction.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
   1. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Prepare steel and apply a one-coat, non-asphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Nassau County Department of Public Works will engage a qualified testing agency to perform shop tests and inspections.
   1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
   1. Liquid Penetrant 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 are not accepted.
   3. Ultrasonic Inspection: ASTM E 164.
   4. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
   1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
   2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
   1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

   1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.
   2. Weld plate washers to top of baseplate.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Pretensioned

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 PREFABRICATED BUILDING COLUMNS

A. Install prefabricated building columns to comply with AISC 360, manufacturer's written recommendations, and requirements of testing and inspecting agency that apply to the fire-resistance rating indicated.

3.6 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
   1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
      c. Ultrasonic Inspection: ASTM E 164.
      d. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
   1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
   2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

3.7 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

D. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION

SECTION 055000 - MISCELLANEOUS METALS

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. Work of this Section includes all labor, materials, equipment, and services necessary to complete the miscellaneous metal work as indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Rough hardware.
2. Vertical steel ladders.
3. Steel pipe handrails and railings not part of steel pan stair assemblies.
4. Light steel framing and supports not included as part of work of other trades.
5. Countertop supports.
6. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.
7. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
8. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

1.3 RELATED SECTIONS

A. Painting and Finishing - Section 099000.

1.4 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 fabrication might delay work.

B. Shop Assembly: Pre-assemble 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 re-assembly and coordinated installation.

C. Reference Standards: The work is subject to requirements of applicable portions of the following standards:

1. "Manual of Steel Construction," American Institute of Steel Construction.
2. AWS D1-1 "Structural Welding Code," American Welding Society.
3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning," Steel Structures Painting Council.
4. SSPC PA-1 "Painting Application Specification," Steel Structures Painting Council.
5. "Handbook on Bolt, Nut and Rivet Standards," Industrial Fasteners Institute.

D. Steel Materials: For steel to be hot dip-galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.

E. Engage the services of a galvanizer who has demonstrated a minimum of five (5) years' experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coatings within the same facility as outlined herein. The Architect has the right to inspect and approve or reject the galvanizer/galvanizing facility.

F. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program which has been in effect for a minimum of five years and shall provide the Architect with process and final inspection documentation. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.

G. Inspection and testing of hot-dip galvanized coating shall be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."

1.5 PERFORMANCE STANDARDS

A. Stairs and railings shall be constructed to conform to the following performance standards:

1. Stairs and platforms shall support a live load of one hundred (100) psf and a concentrated live load of three hundred (300) lbs. and shall have a live load deflection limited to 1/360 of the span. Loads shall not apply simultaneously.
2. Railings shall be designed to resist loads per the International Building Code, New York edition.

1.6 SUBMITTALS

A. Manufacturer's Literature: Submit manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.

B. Shop Drawings: Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items.

C. Delegated Design Submittals: Engineering Data

1. Before any ladders or railings are fabricated, submit engineering data drawings to the Architect for review indicating how performance standards specified here shall be met. The Contractor is responsible for the structural design and supports for these systems and must show his proposed systems on these drawings.

2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of New York and shall be signed and sealed by this Engineer.

D. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, weld and tack weld are not acceptable.

E. Certification: For items to be hot dip galvanized, identify each item galvanized and to show compliance of application. The Certificate shall be signed by the galvanizer and shall contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Metals

1. 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.
2. Steel Plates, Shapes and Bars: ASTM A 36.
3. Steel Bar Grating: ASTM A 1011 or ASTM A 36.
4. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
5. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
6. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.
7. Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
8. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
11. 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.

B. Grout: Non-shrink, non-metallic grout conforming to the requirements of Section 033000.

C. 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. Anchor Bolts: ASTM F 1554, Grade 36.

4. Lag Bolts: ASME B18.2.1.
5. Machine Screws: ASME B18.6.3.
6. Plain Washers: Round, carbon steel, ASME B18.22.1.
7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
9. Lock Washers: Helical spring type carbon steel, ASME B18.21.1.

D. Shop Paint: Shop prime all non-galvanized miscellaneous metal items using Series 88 Azeron Primer made by Tnemec, ICI Devoe "Rust Guard" quick dry alkyd shop coat No. 41403, or "Interlac 393" by International Protection Coatings.

1. If steel is to receive high performance coating as noted in Section 099000, shop prime using primer noted in Section 099000.

E. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.

F. Galvanizing Repair Coating: For touching up galvanized surfaces after erection, provide repair coating that is V.O.C. compliant, equal to "Silver Galv" made by Z.R.C. Worldwide or approved equal. Apply to a dry film thickness of 1.5 to 3.0 mils.

2.2 PRIME PAINTING

A. Scope: All ferrous metal (except galvanized steel) shall be cleaned and shop painted with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.

B. Cleaning: Conform to Steel Structures Painting Council Surface Preparation Specification SP 3 (latest edition) "Power Tool Cleaning" for cleaning of ferrous metals which are to receive shop prime coat.

1. Steel to get high performance coating as noted in Section 099000 shall be cleaned as per SSPC SP.6 "Commercial Blast Cleaning."

C. Application

1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces shall be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.
2. Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures shall be only as stated in said instructions.
3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall be shipped until the shop prime coat thereon has dried.

D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.

E. 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 GALVANIZING

A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, shall be cleaned and then hot-dipped galvanized after fabrication as provided by Duncan Galvanizing or approved equal.

B. Avoid fabrication techniques that could cause distortion or embrittlement of steel items to be hot dip galvanized. Fabricator shall consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.

C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.

D. Application: Hot-dip galvanizing shall conform to the following:

1. ASTM A 143: Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel.
2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware - Table 1.
4. ASTM A 384: Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
5. ASTM A 385: Practice for Providing High Quality Zinc Coatings.
6. ASTM A 924: Galvanized Coating on Steel Sheets.
7. Minimum weight of galvanized coating shall be two (2) oz. per square foot of surface.

E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.

G. To minimize surface imperfection (eg: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.

H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.

I. Galvanized surfaces, where exposed to view, must have a smooth, level surface finish. Where this does not occur, piece shall be rejected and replaced to the acceptance of the Architect.

2.4 PROTECTIVE COATINGS

A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

2.5 WORKMANSHIP

A. General

1. Miscellaneous metal work shall be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.
2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.
3. All work shall be accurately and neatly fabricated, assembled and erected.

B. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the miscellaneous metal subcontractor to assure himself that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item shall be returned to the shop for correction.

C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.

D. Holes: Drill or cleanly punch holes; do not burn.

E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to weather. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections, bolt or screw field connections. Provide expansion and contraction joints to allow for thermal movement of metal at locations and by methods approved by Architect.

1. Welding
   a. Shall be in accordance with AWS D1.1 Structural Welding Code of the American Welding Society, and shall be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
   b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welds are required to be flush.
   c. All welds on or behind surfaces which will be exposed to view shall be done so as to prevent distortion of finished surface. Remove weld spatter and welding oxides from all welded surfaces.
2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads exposed to view shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent metal.

F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.

G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.

H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.

I. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.

J. Exposed Work

1. In addition to requirements specified herein and shown on drawings, all surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs, and other defects which mar appearance of finished work.
2. Metal work exposed to view shall be straight and true to line or curve, smooth arises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.
3. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.

K. Preparation for Hot-Dip Galvanizing: Fabricator shall correctly prepare assemblies for galvanizing in consultation with galvanizer and in accordance with applicable Reference Standards and applicable AGA publications for the "Design of Products to be Hot-Dip galvanized After Fabrication." Preparation shall include but not be limited to the following:

1. Remove welding flux.
2. Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

2.6 MISCELLANEOUS METALS ITEMS

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 are 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 connections; elsewhere, furnish steel washers.

B. Ladders

1. Vertical steel ladders shall be eighteen (18) inches wide with 3/4" diameter non-slip steel rungs spaced twelve (12) inches o.c. Stringers shall be 3/8" thick by 2-1/2" wide steel bars; rungs welded to bars. Attach ladders to walls six (6) inches from top and bottom and maximum thirty-six (36) inches o.c. from these points.

2. Ladders shall be fabricated to support a live load of one hundred (100) lbs. per square foot and a concentrated load of three hundred (300) lbs. per rung; loads not to act simultaneously.

C. Steel Pipe Handrails: Provide Schedule 40 steel pipe of size shown on Drawings. Fittings shall be flush type, malleable of cast iron. Brackets shall be malleable iron, design as selected by the Architect.

1. Construction: Form direction changes in rails using solid bar stock or elbows. Connections shall be shop welded and ground smooth and flush, except where field connections and expansion joints are required. Field connections may be welded, internal sleeve and plug weld, or internal sleeve and set screw.
2. Secure handrails to walls with wall brackets. Provide brackets of malleable iron castings, with not more than three (3) inches clearance from inside face of handrail to wall surface. Neatly drill wall plate portion of the bracket into concrete or masonry to receive bolts for concealed anchorage. For installation at drywall, Drywall trades shall provide plate to receive wall plate portion of bracket and anchor or bolt wall plate through drywall to supporting steel plate. Locate brackets at not more than 5'-0" o.c. unless otherwise shown
3. Provide wall return fittings of cast iron, flush type, with the same projection as that specified for wall brackets.
4. Longitudinal members shall be parallel with each other and with floor surface or shape of stair to a tolerance of 1/8" in 10'-0" linear feet. Center line of members within each run of railing shall be in the plane.
5. For steel pipe posts where indicated, anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized steel pipe, not less than six (6) inches long and having an inside diameter not less than 1/2" greater than outside diameter of the inserted pipe. Provide steel plate closure secure to bottom of sleeve and of width and length not less than one (1) inch greater than outside diameter of sleeve. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joint with a round steel flange welded to post. Posts shall be set plumb within 1/8" vertical tolerance.
6. Steel pipe handrails shall be capable of resisting a two hundred (200) lb. force applied to rail from any direction and a uniformly distributed load of fifty (50) lbs. per linear foot applied downward or horizontally, loads not to act simultaneously.

D. Miscellaneous Light Steel Framing

1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and shall be provided with all necessary supports and reinforcing such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.
2. All light steel framing steel shall be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction and as specified herein.

E. Countertop Supports: Steel framing as indicated or required to support countertops. Conceal framing under countertops and within wall behind countertops. Provide supports to withstand a concentrated load of not less than three hundred (300) lbs. applied at any point with a deflection not to exceed L/240 for the length of the countertop.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where miscellaneous metal is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 ERECTION

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, plumb, 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. Fitting Connections: 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. 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 2.0 mils.

F. Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 061000 - WOOD FRAME CONSTRUCTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

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. Work of this Section includes all labor, materials, equipment and services necessary to complete the wood frame construction, as shown on the drawings and/or specified herein, including but not limited to the following:

1. Exterior wall framing with plywood sheathing.
2. Interior partition framing, except where metal studs are used.
3. Floor framing with plywood subfloor and underlayment.
4. Ceiling framing.
5. Roof framing with plywood sheathing.
6. Blocking and rough hardware.
7. Refer to Structural Drawings for all structural requirements.

1.3 RELATED SECTIONS

A. Carpentry - Section 062000.

B. Thermal Insulation - Section 072100.

C. Gypsum Drywall - Section 092900.

1.4 REFERENCES

A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products used.

B. Plywood Product Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel specified.

1.5 SUBMITTALS

A. Wood Treatment Data: Submit treatment manufacturer's instructions for proper use of each type of treated material.

1. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards. Include statement that moisture content of treated materials was reduced to a maximum of 19% prior to shipment.

1.6 PRODUCT HANDLING

A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood and provide air circulation within stacks.

1.7 JOB CONDITIONS

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nails, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

A. Lumber, General

1. 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.
2. 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.
3. Provide seasoned lumber with 19% max. moisture content at time of dressing.

B. Framing Lumber and Miscellaneous Lumber (2" through 4" thick and less than 6" wide): For light framing and miscellaneous lumber (furring, grounds, blocking), provide No. 2 grade lumber for stud framing and "Standard" grade for other light framing, any species.

C. Structural Framing (2" through 4" thick and 6" or wider): Refer to Structural Drawings.

D. Engineered Wood Products:

1. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559.
2. Parallel-Strand Lumber: A composite of wood strand elements with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559.
3. Prefabricated Wood I Joists: Stress-graded lumber bonded to APA performance rated panel with exterior type adhesive; design stresses for use intended.
4. Composite Joists and Headers: Laminated lumber veneers; design stresses for use intended.

E. Plywood

1. For roof sheathing, provide APA Structural 1 Rated Sheathing, Exposure 1, with span rating to suit joist or truss spacing; thickness as noted on drawings.
2. For wall sheathing, provide APA Structural 1 Rated Sheathing, Exposure 1, with span rating to suit stud spacing; thickness as noted on drawings.
3. For subflooring, provide tongue and groove APA Sturd-I-Floor, Exposure 1, with span rating to suit joist spacing; thickness as noted on drawings.
4. For underlayment over subflooring, provide APA Underlayment INT with exterior glue, thickness as noted on drawings.

F. Pressure treated wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete, using water-borne preservatives complying with AWPA U1. After treatment, kiln dry to a max. moisture content of 19%.

1. 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.

2.2 MISCELLANEOUS MATERIALS

A. Air Barrier: See Section 072700.

B. Provide metal hangers and framing anchors equal to Simpson Hold-downs, Rafter Anchors, and Joist & Beam Hangers, or approved equal.

C. Fasteners: 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.

D. Where rough carpentry work is exposed to weather or in ground contact, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).

E. Termite Shield: 26 ga. galvanized steel sheet.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where wood frame construction is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General

1. 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.
2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
3. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
   a. 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.

B. Wood Grounds, Nailers, Blocking and Sleepers:

1. 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.
2. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
3. Provide permanent grounds of dressed lumber not less than 1-1.2" wide and of thickness required to bring face of ground to exact thickness of finish material involved.

C. Wood Framing, General

1. Provide framing members of sizes and on spacings shown, and frame openings as shown, or if not shown, comply with "Details for Conventional Wood Frame Construction" of AFPA. Do not splice structural members between supports.

2. Anchor and nail to comply with the following minimum standards:
    a. Blocking to joist bearing: Two 10d toenailed each side
    b. Blocking to joist or stud: Two 10d toenailed each side
    c. One inch brace to stud: Two 8d face nailed
    d. Two inch brace to stud: Two 16d face nailed
    e. Bridging to joint: Two 8d toenailed
    f. Built-up beams 8" or less in depth: 16d at 12" o.c., staggered
    g. Joists and rafters to support: Two 10d toenailed each side
    h. At laps 12" min.: Four 16d face nailed
    i. Multiple joists: 16d at 12" o.c., staggered
    j. Joists to sill or girder: Two 16d toenailed
    k. 1" furring to underside of joints: Two 8d (one straight; one slanted)
    l. 2" furring to underside of joints: Two 16d (one straight; one slanted)
    m. Studs toenailed to plate: Two 10d each side
    n. Studs end nailed to plate: Two 16d at 12" o.c., staggered
    o. Plates: Upper to lower: 16d at 12" o.c., staggered
    p. At splices: Two 16d face nailed
    q. Plate lap at corners: Two 16d face nailed
3. Firestop concealed spaces with wood blocking not less than 2" thick, if not blocked by other framing members. Provide blocking at each building story level and at ends of joist spans.

D. Stud Framing

1. General: Provide stud framing where shown. Unless otherwise shown, use 2" x 4" wood studs spaced 16" o.c. with 4" face perpendicular to direction of wall or partition. Provide single bottom plate and double-top plates 2" thick by width of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction.
2. Construct corners and intersections with not less than 3 studs. Provide miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items and trim.
3. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
    a. For non-bearing partitions, provide double-jamb studs and headers not less than 4" deep for openings 3' and less in width, and not less than 6" deep for wider openings.
    b. For load-bearing partitions, provide double-jamb studs for openings 6'-0" and less in width, and triple-jamb studs for wider openings. Provide headers of depth shown, or if not shown, provide as recommended by N.F.P.A. "Manual for House Framing."

E. Solid Sawn Joist Framing

1. General: Provide framing of sizes and spacings shown. Install with crown edge up and support ends of each member with not less than 1-1/2" of bearing on wood or metal, or 3" on masonry. Attach to wood bearing members by toe nailing or metal connectors; frame to wood supporting members with wood ledgers as shown, or if not shown, with metal connectors. Fire-cut members built into masonry (if any). Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 4'-0". Do not notch in middle third of joists; limit notches to 1/6-depth of joist, 1/3 at ends. Do not bore holes larger than 1/3-depth of joist or locate closer than 2" from top or bottom. Provide solid blocking (2" thick by depth of joist) at ends of joists unless nailed to header or band member.

2. Lap members framing from opposite sides of beams, girders or partitions not less than 4" or securely tie opposing members together. Provide solid blocking (2" thick by depth of joist) over supports.
3. Anchor members paralleling masonry with 1/4" x 1-1/4" metal strap anchors spaced not more than 8'-0" o.c. Extend anchors at least 4" into masonry, turn up 4" and extend over and fasten to 3 joists.
4. Under jamb studs at openings, provide solid blocking between joist.
5. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above. Provide triple-joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures, unless otherwise shown.
6. Provide bridging between joists where nominal depth-to-thickness ratio exceeds 4, at intervals of 8'-0". Use bevel cut 1" x 4" or 2" x 3" wood bracing, double-crossed and nailed both ends to joists, or use solid wood bridging 2" thick by depth of joist, end nailed to joist.

F. Solid Sawn Rafter and Ceiling Joist Framing

1. Ceiling Joists: Provide member size and spacing shown, and as previously specified for joist framing. Face nail to ends of parallel framing members.
2. Rafters: Provide member size and spacing shown. Notch to fit exterior wall plates and toe nail or use special metal framing anchors. Double rafters to form heads and trimmers at openings in roof framing (if any), and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
   a. At valleys, provide valley rafter of size shown, or if not shown, provide rafter twice as thick as regular rafters and 2" deeper. Bevel ends of jack rafters for full bearing against hip rafters.
3. Provide collar beams (ties) as shown, or if not shown, provide 1" x 6" boards between every third pair of framing members. Locate below ridge member, one-third of distance to ceiling joists. Cut ends to fit slope and nail to framing.
4. Provide special framing as shown for eaves, overhangs, dormers and similar conditions, if any.

G. Engineered Framing

1. Install engineered framing members in accordance with the manufacturer’s installation guidelines as shown on the shop drawings.

H. Plywood Roof Sheathing

1. Install plywood roof sheathing with long dimension across supports, using panels continuous over 2 or more spans with end joints between panels staggered and located over center of supports.
   a. Nail 6" o.c. along panel edges and ends and 12" o.c. at intermediate supports for spans less than 48" using 6d common nails for panels 1/2" or less, 8d common nails for panels over 1/2" but less than 1" thick, and 8d ring shank or spiral thread nails or 10d common nails for panels 1" or more thick. For spans 48" or greater, space nails 6" o.c. at all supports.
   b. Provide support at unsupported long edges with "Plyclips" or wood blocking.
2. Allow 1/8" open space between end joints and 1/4" open space between edge joints for expansion and contraction of panels.

I. Plywood Wall Sheathing

1. Install plywood wall sheathing horizontally or vertically using panels continuous over 2 or more spans. Nail edges and ends over supports at 6" o.c. and at 12" o.c. over intermediate studs using 6d nails for panels not more than 1/2" thick and 8d nails for thicker panels. Allow 1/8" spacing at panel ends and 1/4" at panel edges.
2. Over sheathing apply one layer of building paper as specified herein.

J. Plywood Flooring

1. Sub-Floor: Install T & G plywood with the long dimension of the panel across supports and with panel continuous over two or more spans. Panel end joints shall occur over framing. Allow 1/8" spacing at panel ends and edges. Nail 6" o.c. along panel edges and 10" o.c. at intermediate supports with 6d common nails for 1/2" panels, 8d for greater thicknesses. Where panels are 1-1/8" or 1-1/4" thick and supports are 48" o.c., nails shall be 8d ring-shank or 10d common and spaced 6" o.c. at all supports.
2. Underlayment: Panels to receive resilient floor coverings shall have edge joints filled and thoroughly sanded. Apply underlayment just prior to laying finish floor and protect against damage until finish floor is installed. Stagger panel end joints with respect to each other and offset all joints with respect to the joints in the subfloor. Butt panel ends and edges to a close but not tight fit (allow 1/32" space). Nail 6" o.c. along panel edges and 8" o.c. each way throughout remainder of panel with 3d ring-shank nails for thicknesses 1/3" or less, 4d for 5/8" and 3/4", or use 15 ga. staples at 3" o.c. along panel edges and 6" o.c. each way. Staple length must be sufficient to penetrate at least 5/8" into or completely through, subflooring. Lightly sand any surface roughness, particularly at joints and around nails.

END OF SECTION 061000

SECTION 061005 - WOOD STAIR CONSTRUCTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

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. The Work of this Section includes all labor, materials, equipment and services necessary to complete the wood stair construction, as shown on the drawings and/or specified herein, including but not limited to the following:

1. Stair framing and treads.
2. Blocking and rough hardware.

1.3 RELATED SECTIONS

A. Carpentry - Section 06200.

1.4 REFERENCES

A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products used.

B. Plywood Product Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel specified.

1.5 SUBMITTALS

A. Wood Treatment Data: Submit treatment manufacturer's instructions for proper use of each type of treated material.

1. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards. Include statement that moisture content of treated materials was reduced to a maximum of 19% prior to shipment.

1.6 PRODUCT HANDLING

A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

1.7 JOB CONDITIONS

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nails, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

A. Lumber, General

1. 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.
2. 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.
3. Provide seasoned lumber with 19% max. moisture content at time of dressing.

B. Framing Lumber & Miscellaneous Lumber (2" through 4" thick and less than 6" wide):

1. For light framing and miscellaneous lumber (furring, grounds, blocking), provide No. 2 grade lumber for stud framing and "Standard" grade for other light framing, any species.

C. Structural Framing (2" through 4" thick and 6" or wider):

1. For structural framing, provide No. 2 Grade of Hem-Fir or any species which meets or exceeds the property values of No. 2 Hem-Fir.

D. Pressure treated wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete, using water-borne preservatives complying with AWPA U1. After treatment, kiln dry to a max. moisture content of 19%.

1. 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.

2.2 MISCELLANEOUS MATERIALS

A. Wood treads and risers: Solid Select White Oak, single piece, thickness as detailed on drawings.

B. Fasteners: 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.

C. Where rough carpentry work is exposed to weather or in ground contact, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where wood stair construction is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General

1. 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.
2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
3. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
   a. 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.

B. Wood Grounds, Nailers, Blocking and Sleepers:

1. 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.
2. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
3. Provide permanent grounds of dressed lumber not less than 1-1.2" wide and of thickness required to bring face of ground to exact thickness of finish material involved.

C. Wood Framing, General

1. Provide framing members of sizes and on spacings shown, and frame openings as shown, or if not shown, comply with "Details for Conventional Wood Frame Construction" of AFPA. Do not splice structural members between supports.
2. Anchor and nail to comply with the following minimum standards:
   a. Blocking to joist bearing: Two 10d toenailed each side
   b. Blocking to joist or stud: Two 10d toenailed each side
   c. One inch brace to stud: Two 8d face nailed
   d. Two-inch brace to stud: Two 16d face nailed
   e. Bridging to joint: Two 8d toenailed
   f. Built-up beams 8" or less in depth: 16d at 12" o.c., staggered
   g. Joists and rafters to support: Two 10d toenailed each side
   h. At laps 12" min.: Four 16d face nailed
   i. Multiple joists: 16d at 12" o.c., staggered

3. Firestop concealed spaces with wood blocking not less than 2" thick, if not blocked by other framing members. Provide blocking at each building story level and at ends of joist spans.

D. Stair Framing

1. Provide stair framing members as required to support a min. uniform live load of 100 psf and a min. concentrated load of 300 lbs. applied to an area of 4 sq. inches at center of tread. Fabricate stair framing members to provide exact fit with treads and risers with no change in dimensions between landings. Apply Oak treads and risers to frame.

END OF SECTION

SECTION 06 101 - WOOD FASTENINGS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

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. Includes But Not Limited To:

1. Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.

B. Related Requirements:

1. Section 03 1511: 'Concrete Anchors and Inserts' for Quality of Anchors and Inserts.
2. Section 05 0523: 'Metal Fastenings' for Quality of bolts used for Rough Carpentry.
3. Furnishing and installing of other fasteners are specified in individual Sections where installed.

1.3 REFERENCES

C. Reference Standards.

1. ASTM International:
   a. ASTM A153/A153M-16a, ‘Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware’.
   b. ASTM D3498-18, ‘Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems’
   c. ASTM F1667-18a, ‘Standard Specification for Driven Fasteners: Nails, Spikes, and Staples’.

1.4 SUBMITTALS

D. Action Submittals:

1. Product Data:
   a. Manufacturer's literature on framing anchors and powder actuated fasteners.
2. Shop Drawings:
   a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
      1) Adjusted fastener spacing where using proposed fasteners and,
      2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
   b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
   c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description:

1. Nail Terminology:
   a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter
8d Box	2-1/2 inches	0.113 inch
8d Common	2-1/2 inches	0.131 inch
10d Box	3 inches	0.128 inch
10d Common	3 inches	0.148 inch
16d Box	3-1/2 inches	0.135 inch
16d Sinker	3-1/4 inches	0.148 inch
16d Common	3-1/2 inches	0.162 inch

B. Materials:

1. Wood fastener list:
   a. Provide VMR Suppliers with wood fastener list.
2. Fasteners:
   a. General:
      1) Fasteners for preservative treated and fire-retardant-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.
   b. Nails:
      1) Meet requirements of ASTM F1667.
      2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.
   c. Wood Screws:
      1) SDS Screws:
         a) Category Four Approved Products. See Section 01 6200 for definitions of categories.
            (1) SDS Screws by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
      2) All Other: Standard type and make for job requirements.
   d. Powder-Actuated Fasteners:
      1) Type One Quality Standard: Hilti X-DNI 62P8.
      2) Manufacturers:
         a) Hilti, Tulsa, OK www.us.hilti.com.
         b) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON www.itwconstruction.ca.
         c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.
3. Adhesives:
   a. Construction Mastics:
      1) Meet requirements of ‘APA-The Engineered Wood Association’ Specification AFG-01 or ASTM D3498.
      2) Use phenol-resorcinol type for use on pressure treated wood products.
4. Framing Anchors:
   a. Framing anchors and associated fasteners in contact with preservative hot dipped zinc-coated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.

b. Type Two Acceptable Products:
   1) KC Metals Inc, San Jose, CA www.kcmetals.com.
   2) Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
   3) United Steel Products Co Inc (USP), Montgomery, MN www.uspconnectors.com.
   4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 ERECTION

A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.

B. Provide washers with bolt heads and with nuts bearing on wood.

END OF SECTION

SECTION 06 110 - WOOD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install fire retardant wood framing and blocking as described in Contract Documents.
2. Furnish and install blocking and nailers at roofing as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:

1. Hanger brackets with bolts, nuts, and washers.
2. Miscellaneous structural steel elements.
3. Roof related blocking, wood nailers.

C. Related Requirements:

1. Section 061000: Wood Frame Construction.
2. Section 061011: Wood Fastenings.
3. Section 061636: Wood Panel Product Sheathing.
4. Sections in Division 07: Roofing membranes for related blocking, and wood nailers.

1.2 REFERENCES

A. Reference Standards:

1. American Lumber Standard Committee (ALSC) (Maintains NIST standard):
   a. Voluntary Product Standard:
      1) PS 20-15, 'American Softwood Lumber Standard'.
2. National Institute of Standards and Technology (NIST), Technology Administration, U. S. Department of Commerce:
   a. Voluntary Product Standard DOC PS 20-15, 'American Softwood Lumber Standard'.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
   a. Provide product data on lumber.

B. Informational Submittals:

1. Test And Evaluation Reports:
   a. Technical and engineering data on nails to be set by nailing guns for Architect's approval of types proposed to be used as equivalents to specified hand set nails and adjusted number and spacing of pneumatically-driven nails to provide equivalent connection capacity.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Protect lumber and sheathing and keep under cover in transit and at job site.
2. Do not deliver material unduly long before it is required.

B. Storage And Handling Requirements:
   1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
   2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dimension Lumber:

   1. Design Criteria:
      a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
      b. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
      c. Lumber 2 inches or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
      d. Preservative Treated Plates / Sills:
         1) 2x4 Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
         2) 2x6 And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E).

2.2 ACCESSORIES

A. Blocking:

   1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch

B. Sill Sealer:

   1. Closed-cell polyethylene foam, 1/4 inch thick by width of plate.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

   1. Use preservative treated wood for wood members in contact with concrete or masonry.

B. Interface With Other Work:

   1. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.
   2. Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.

C. Floors:

   1. Place with crown side up.
   2. Provide accurately fitted header and trimmer joists of same size as regular joists around floor openings, unless detailed otherwise, and support by steel joist hangers.

D. Accessory / Equipment Mounting And Gypsum Board Back Blocking (nailers):

1. Furnish and install blocking in wall framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.

E. Accessory / Equipment Mounting And Standing & Running Trim Blocking (nailers):

1. Furnish and install blocking in wall framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.
3. Ceiling mounted furring strips:
   a. Attach furring strips to the underside of wood structural elements with #8 wood screws of length to penetrate wood framing 1 inch minimum.

END OF SECTION

SECTION 061500 - COMPOSITE WOOD DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the composite wood decking as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Composite wood decking.

1.2 RELATED SECTIONS

A. Wood Frame Construction – Section 061000.

B. Carpentry -Section - 062000.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. C 177 -Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
2. D 143 - Standard Test Methods for Small Clear Specimens of Timber.
3. D 198 - Standard Test Methods of Static Tests of Lumber in Structural Sizes.
4. D 1037 -Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
5. D 1413 -Standard Test Method for Wood Preservatives by Laboratory Soil-Block Cultures.
6. D 1761 -Standard Test Methods for Mechanical Fasteners in Wood.
7. D 1929 -Standard Test Method for Determining Ignition Temperature of Plastics.
8. D 2047 -Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
9. D 2394 - Standard Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring.
10. D 2395 -Standard Test Methods for Specific Gravity of Wood and Wood-Based Materials.
11. D 4761 -Standard Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material.
12. E 84 -Standard Test Method for Surface Burning Characteristics of Building Materials.
13. F 1679 -Standard Test Method for Using a Variable Incidence Tribometer (VIT).

B. American Wood Preservers Association (AWPA) E1-06 -Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 SUBMITTALS

A. Product Data: Indicate sizes, profiles, surface finishes, and performance characteristics.

B. Samples: 12” long decking and tread samples illustrating size, profile, color, and surface finish.

C. Maintenance Data: Manufacturer's instructions on care and cleaning of composite wood products.

1.6 PRODUCT HANDLING

A. Deliver, store, and handle composite wood materials in accordance with manufacturer's instructions.

B. Store composite wood level and flat, off ground or floor, with supports at each end and maximum 24" on center.

C. Do not stack composite wood over 12-feet high.

D. Cover composite wood with waterproof covering, vented to prevent moisture buildup.

1.7 WARRANTY

A. Furnish manufacturer's 25-year warranty providing coverage against checking, splitting, splintering, rotting, structural damage from termites, and fungal decay of composite wood.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Project design is based on products by Trex Company, Inc., Select Line. Equal products of other manufacturers, as determined by the Architect, may submit their products for approval.

2.2 MATERIALS

A. Composite Wood:

1. Composition: Reclaimed wood and plastic with integral coloring; free from toxic chemicals and preservatives.
2. Profiles:
   a. Decking: Nominally 2 by 6 inches by maximum practical length.
   b. Fascia and Trim: Sizes and profiles as shown on drawings or as required by project conditions; furnish in maximum practical length.
3. Surface Texture: Accents; reversible wood grain and smooth surfaces.
4. Colors: As selected by the Architect.
5. Characteristics:
   a. Abrasion Resistance: 0.01-inch wear per 1000 revolutions, tested to ASTM D 2394.
   b. Hardness: 1124 pounds, tested to ASTM D 143.
   c. Self-ignition Temperature: 743 degrees F, tested to ASTM D 1929.
   d. Flash Ignition Temperature: 698 degrees F, tested to ASTM D 1929.
   e. Flame Spread Rating: 80, tested to ASTM E 84.
   f. Water Absorption, 24-hour immersion, tested to ASTM D 1037:
      1). Sanded surface: 4.3 percent.
      2). Unsanded surface: 1.7 percent.
   g. Thermal expansion coefficient, 36-inch-long samples:
      1). Width: 35.2 x 10-6 to 42.7 x 10-6.
      2). Length: 16.1 x 10-6 to 19.2 x 10-6.
   h. Fastener withdrawal, tested to ASTM D 1761:
      1). Nail: 163 pounds per inch.
      2). Screw: 558 pounds per inch.

i. Static coefficient of friction:
   1). Dry: 0.53 to 0.55, tested to ASTM D 2047.
   2). Dry: 0.59 to 0.70, tested to ASTM F 1679.
   3). Wet: 0.70 to 0.75, tested to ASTM F 1679.
j. Fungus resistance, white and brown rot: No decay, tested to ASTM D 1413.
k. Termite resistance: 9.6 rating, tested to AWPA E-1.
l. Specific gravity: 0.91 to 0.95, tested to ASTM D 2395.
m. Compression:
   1). Parallel: 1806 psi ultimate, 550 psi design, tested to ASTM D 198.
   2). Perpendicular: 1944 psi ultimate, 625 psi design, tested to ASTM D 143.
n. Tensile strength: 854 psi ultimate, 250 psi design, tested to ASTM D 198.
o. Shear strength: 561 psi ultimate, 200 psi design, tested to ASTM D 143.
p. Modulus of rupture: 1423 psi ultimate, 250 psi design, tested to ASTM D 4761.
q. Modulus of elasticity: 175,000 psi ultimate, 100,000 PSI design, tested to ASTM D 4761.
r. Thermal conductivity: 1.57 Btu per inch per hour per square foot at 85 degrees F, tested to ASTM C 177.

2.3 ACCESSORIES

A. Fasteners: Stainless steel composite wood screws of length recommended by composite wood manufacturer for profile being fastened.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where composite wood decking is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install composite wood in accordance with manufacturer's instructions.

B. Cut, drill, and rout composite wood using carbide tipped blades.

C. Pre-drill fastener holes located closer than 1 inch from edges.

D. Cut ends square and true.

E. Do not use composite wood products as structural members.

F. Do not exceed maximum spans recommended by manufacturer.

G. Place boards perpendicular to supports.

H. Stagger end joints in adjacent rows at least one support.

I. Leave expansion spaces between abutting boards and between boards and adjacent construction:
   1. End gaps between boards: 1/8" at ambient temperatures of 60 degrees F and above and 3/16" at ambient temperatures below 60 degrees F.
   2. Side gaps between boards: 1/4" at ambient temperatures of 60 degrees F and above and 3/8" at ambient temperatures below 60 degrees F.

3. Gaps between boards and adjacent construction: 1/4” at ambient temperatures of 60 degrees F and above and 1/2” at ambient temperatures below 60 degrees F.

J. Place boards to span three or more supports.

K. Fasten each board to each support with two fasteners.

L. Install railings in accordance with Building Code and section 062020 – Exterior PVC Railings.

3.3 CLEANING

A. Clean composite wood to remove stains:

1. Mold, Mildew, and Berry and Leaf Stains: Clean surfaces with conventional deck wash containing detergent or sodium hypochlorite.
2. Rust and Ground-in Dirt: Clean surfaces with cleaner containing oxalic or phosphoric acid.
3. Oil and Grease: Clean surfaces with detergent containing degreasing agent.

END OF SECTION

SECTION 06 1636 - WOOD PANEL PRODUCT SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install fire retardant wood panel product sheathing required for floors as described in Contract Documents.

B. Related Requirements:

1. Section 014523: Testing and Inspections.
2. Section 061100: ‘Wood Framing’

1.2 REFERENCES

A. Association Publications:

1. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
   a. Voluntary Product Standard DOC PS 1-09. ‘Structural Plywood'.
   b. Voluntary Product Standard DOC PS 2-04. ‘Performance Standard for Wood-Based Structural-Use Panels'.
2. The Engineered Wood Association (APA), Tacoma, WA www.apawood.org.
   a. Performance Rated Panels, 'Product Guide' (for products bearing the APA trademark) December 2011.
   b. Voluntary Product Standard:
      1) PS 1-09. ‘Structural Plywood'.
      2) PS 2-04. ‘Performance Standard for Wood-Based Structural-Use Panels'.
   c. PRP-108 'Performance Standards and Policies for Structural-Use Panels'.
3. TECO, Cottage Grove, WI www.tecotested.com.
   a. TECO PRP-133: ('Fire Rated Assemblies – OSB substitution for plywood in UL fire-rated assemblies that specify plywood).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:

1. Notify Testing Agency, Construction Manager and Architect twenty-four (24) hours minimum before placing sheathing.

1.4 SUBMITTALS

A. Informational Submittals:

B. Closeout Submittals:

1. Include following in Operations and Maintenance Data specified in Section 017823:
   a. Record Documentation:
      1) Testing and Inspection Reports:
         a) Testing Agency Inspection Reports of sheathing.

1.5 QUALITY ASSURANCE

A. Testing and Inspection:

1. Nassau County Department of Public Works will provide Testing and Inspection for inspection of sheathing:
   a. Nassau County Department of Public Works will employ testing agencies to perform inspection for sheathing as specified in Field Quality Control in Part 3 of this specification.
      1) Nassau County Department of Public Works employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
   b. Nassau County Department of Public Works employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control.
      1) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Do not deliver material unduly long before it is required.
2. Protect sheathing and keep under cover in transit and at job site.

B. Storage And Handling Requirements:

1. Store sheathing on level racks and keep free of ground.
2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Performance:

1. Design Criteria:
   a. Meet requirements of PS 1, PS 2, or PRP-133 (TECO). Except where plywood is specifically indicated on Contract Drawings, oriented strand board (OSB) is acceptable.

B. Sheathing:

1. Sheathing:
   a. Sheathing shall bear grade stamp from American Plywood Association (APA) or equal grading organization.
   b. Sheathing shall not exceed 18 percent moisture content when fabricated or more than 19 percent when installed in Project.
   c. Sheathing 23/32 inch thick and thicker used for single-layer subflooring shall be tongue and groove.
   d. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.
   e. Minimum span ratings for given thicknesses shall be as follows:

Thickness	Span Rating
3/8 inch	24 / 0
7/16 inch nominal	24 / 16

15/32 inch actual	32 / 16
1/2 inch nominal	32 / 16
19/32 inch actual	40 / 20
5/8 inch nominal	40 / 20
23/32 inch actual	48 / 24
3/4 inch nominal	48 / 24

2.2 ACCESSORIES

A. Nails:
1. As indicated on Contract Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Top of nail heads shall be flush with sheathing surface.
2. Use of edge clips to provide spacing between sheathing panels is acceptable.

B. Wall Sheathing:

1. Spacing:
   a. Provide 1/8-inch space between sheets at end and edge joints.
2. Edge Bearing and Blocking:
   a. Panel edges shall bear on framing members and butt along their center lines.
   b. Back block panel edges, which do not bear on framing members, with 2-inch nominal framing.
3. Nail Spacing:
   a. As indicated on Contract Drawings.
   b. Place nails not less than 3/8 inch in from edge.
4. Thickness:
   a. As indicated on Contract Drawings.
5. Do not install any piece of wall sheathing with shortest dimension of less than 12 inches

C. Roof Sheathing:

1. Placing:
   a. Lay face grain at right angles to supports. Provide blocking for support if framing turns at roof overhang.
   b. Provide 1/8-inch space between sheets at end and side joints.
   c. Stagger panel end joints.
   d. Sheathing shall be continuous of two spans minimum.
2. Edge Bearing and Blocking:
   a. As indicated on Contract Drawings.
3. Nail Spacing:
   a. As indicated on Contract Drawings.
   b. Place nails at least 3/8 inch in from edge.
4. Thickness:
   a. As indicated on Contract Drawings.
5. Do not install any piece of roof sheathing with shortest dimension of less than 24 inches unless support is provided under all edges.

D. Floor Sheathing:

1. Floor Sheathing: 1 Layer Subflooring (floors accessible to public).
   a. Apply bead of glue to structural supports. Lay face grain / strength axis across supports and with panel continuous over two supports minimum.
   b. Allow expansion gap of at least 1/2 inch at walls.
   c. Tongue and Groove.
   d. Nail Spacing.
      1) As indicated on Contract Drawings.
   e. Thickness:
      1) As indicated on Contract Drawings.
   f. Do not install any piece of bottom layer floor sheathing with shortest dimension of less than 24 inches
2. Subflooring: 2 Layers Subflooring.
   a. Bottom layer:
      1) Glue subflooring layers together along lines of structural supports.
      2) Leave 1/32-inch gap at side and end joints.
      3) Nail as per floor sheathing nailing requirements.
      4) Thickness:
         a) 19/32-inch actual minimum thickness, except where specifically noted otherwise.
      5) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches
   b. Top layer:
      1) Stagger joints of second layer subflooring so they do not line up with joints of first layer subflooring but do align with intermediate structural member (for example, align with field nailing of bottom subflooring layer).
      2) Glue subflooring layers together along lines of structural supports.
      3) Leave 1/32-inch gap at side and end joints.
      4) Nail at 6-inch centers on ends and 12-inch centers on intermediate structural members.
      5) Thickness:
         a) 19/32-inch actual minimum thickness, except where specifically noted otherwise.
      6) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches

3.2 FIELD QUALITY CONTROL

A. Field Inspections:

1. Sheathing:
   a. General:
      1) Nassau Department of Public Works is responsible for Quality Assurance. Quality assurance performed by Nassau Department of Public Works will be used to validate Quality Control performed by Contractor.
      2) Quality Control is sole responsibility of Contractor as specified in Section 014523 'Testing and Inspections'.
   b. For walls and roof areas where nail spacing is 4 inches and less on center, Inspector shall verify wood panel sheathing, grade, thickness and nominal size of framing members, adjoining panel edges, nail size and spacing, bolting and other fastening of other components.

3.3 PROTECTION

A. Protect roof sheathing from moisture until roofing is installed.

END OF SECTION

SECTION 06 1733 - WOOD 'I' JOISTS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:

1. Plywood web 'I' joists, web stiffeners, and components.

B. Related Requirements:

1. Section 06 1100: 'Wood Framing' for installation, securing, bracing, etc.

1.2 REFERENCES

A. Association Publications:

1. International Code Council (ICC):
   a. ICC, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001, Phone (888) ICC-SAFE (422-7233) www.iccsafe.org.
   b. ICC-ES Evaluation Reports, www.icc-es.org.

1.3 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Include following information on submitted shop drawings:
      1) Show critical dimensions for determining fit and placement in building as well as loads joists are designed to support.
      2) Flange material and sizes.
      3) Size, thickness, and dimension of web.
      4) Lumber species and grades used.
      5) Web stiffener locations, make-up, and installation.
      6) Name and trademark of Manufacturer.

B. Informational Submittals:

1. Test And Evaluation Reports: Copies of ICC reports showing approval of connections and webs.
2. Qualification Statements:
   a. Alternate Supplier(s):
      1) Provide name and contact information.
      2) Provide Qualification documentation as requested.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Suppliers:
   a. VMR Approved Supplier(s):
      1) Approval subject to VMR agreement process approval.
   b. Alternate Supplier(s):
      1) Fabricator Firm specializing in performing work of this section.

2) Provide documentation of the following:
   a) Firm experience in supplying products indicated for this Project.
   b) Financial stability.
   c) Sufficient production capacity to produce required units.
   d) Comply with specifications and Contract Documents.
   e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
3) Submit documentation to Architect or Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:

1. Store joists in vertical position protected from weather.
2. Handle with care to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:

   a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Par Palmer:
      1) Office: (801) 224-0541.
      2) Mobile: (801) 376-9853.
      3) E-Mail: Par.Palmer@BuildWithBMC.com or www.BuildWithBMC.com.
   b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
      1) Office: (800) 962-8780.
      2) FAX : 801-782-9652.
      3) E-Mail : tom@thomasforest.com.
   c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
      1) Office: (800) 662-3612.
      2) Cell: NA.
      3) FAX: (503) 238-2663.
      4) E-Mail: mrunning@shelter-products.com.

B. Acceptable Manufacturers:

1. Boise Cascade Corp, Boise, ID www.bc.com.
2. Georgia-Pacific Corp, Atlanta, GA www.gp.com.
3. Jager Industries Inc, Calgary, AB www.jagerbuildingsystems.com.
4. Louisiana Pacific Corp, Portland, OR www.lpcorp.com.
5. Roseburg Forest Products, Roseburg, OR www.roseburg.com.
6. Trus Joist Corp, Div Weyerhaeuser, Boise, ID www.tjm.com or Surrey, BC (604) 588-7878.
7. Web Joist, Chehalis, WA www.webjoist.com.
8. Weyerhaeuser, Engineered Lumber Products, Boise, ID www.woodbywy.com.
9. Equal as approved by Architect before bidding. See Section 01 6200.

C. Performance:

1. Design Criteria:
   a. Provide joists that meet the load capacity and stiffness requirements shown on Drawings.
   b. Provide joists that meet shear, moment, and stiffness properties shown on Drawings.

c. Custom design joists under supervision of registered professional engineer. Designs shall be in accordance with allowable values assigned by building code approval.
d. Only connections and webs currently approved by Research Committee of ICC or by Canadian Construction Materials Centre (CCMC) are acceptable for use.
e. Materials shall have current ICC-ES Evaluation Report, report approved by International Codes Council, or report issued by Architect approved model code evaluation service and shall comply with requirements of report.

D. Materials:

1. Wood framing list:
   a. Provide Category Three Suppliers with wood framing list.

2.2 FABRICATION

A. Fabrication of joists shall be as approved by ICC, except where requirements of Contract Documents exceed ICC requirements.

END OF SECTION

SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Supplied but Not Installed Under This Section:

1. Metal plate connected wood trusses.
2. Trussed blocking for wood trusses.

B. Related Requirements:

1. Section 014523: 'Testing and Inspections' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
2. Section 061100: 'Wood Framing' for:
   a. Storage and handling of trusses on Project site.
   b. Installing, securing, bracing, etc.
   c. Required blocking other than trussed blocking.

1.2 REFERENCES

A. Association Publications:

1. Structural Building Components Association (SBCA) www.sbcindustry.com.
2. Truss Plate Institute (TPI):
   a. DSB-89, 'Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses'.
3. Truss Plate Institute (TPI) / Structural Building Components Association (SBCA):
   a. TPI/SBCA Structural Building Components Association Components Safety Information BCSI 'Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses' (2013 Edition with 2018 Update).

B. Definitions:

1. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

C. Reference Standards:

1. American National Standards Institute (ANSI) / Truss Plate Institute (TPI):
   a. ANSI/TPI 1-2014, 'National Design Standard for Metal Plate Connected Wood Truss Construction.
2. ASTM International:
   a. ASTM A641M-09a(2014), 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire'.
   b. Drawings.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:

1. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work follow erection of trusses.

1.4 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Truss design drawings:
      1) Base truss design drawings on truss configurations and truss loads and requirements of Contract Documents. Joint configurations may be modified to allow double cut webs. Determine member forces from exact analysis method as defined by TPI.
      2) Include following information:
         a) Allowable loads in lbs per effective nail or lbs per sq inch for lumber and plates used as allowed by ICBO and current ICBO report number.
         b) Stress reduction factors used for plates and lumber.
         c) Top and bottom chord design loads in psf.
         d) Size, thickness, and exact location by dimension of plates.
         e) Lumber species and grades used.
         f) Combine stress index for each member.
         g) Drawings and calculations to be Signed and Sealed by a Licensed New York State Engineer responsible for preparation of drawings and calculations.
         h) Name and trademark of Plate Manufacturer if metal plates are used.
         i) Name and address of Truss Fabricator and Project name and address.

B. Informational Submittals:

1. Certificates:
   a. Complete and provide copy of certification “Truss Plant Certification Requirements Form” to Construction Manager and Architect with bid documents.
   b. Provide attachment copy of truss plant certification with completed “Truss Plant Certification Requirements Form” to Construction Manager and Architect and Testing Agency before commencing fabrication of Wood Trusses.
2. Test And Evaluation Reports:
   a. Copies of previous four quarterly inspection reports verifying compliance with TPI regulations unless the Truss Fabricator provides proof that they are certified and in good standing with the In-Plant WTCA QC program certification.

1.5 QUALITY ASSURANCE

A. Qualifications. Requirements of Section 014000 applies, but is not limited to the following:

1. Metal Connector-Plate Manufacturer Qualifications:
   a. Member of TPI and complies with quality-control procedures in TPI 1 for manufacturer of connector plates.
      1) Fabricator’s responsibility includes providing professional engineering services needed to assume engineering responsibility.
      2) Engineering responsibility: Preparation of shop drawings and comprehensive engineering analysis by qualified professional engineer registered in location of jurisdiction.
2. Fabricator Qualifications:
   a. Fabricator must have a letter providing evidence that they are certified and in good standing with their third-party accredited Quality Assurance business.
   b. Fabricator shall have in place a program requiring fabrication plant to be inspected four times each year by an independent testing laboratory in accordance with TPI regulations.

1.6 DELIVERY, HANDLING, AND STORAGE

A. Delivery And Acceptance Requirements:

1. Notify Construction Manager and General Contractor two (2) days minimum before arrival of trusses to allow for scheduling of truss inspection on site before unloading and for monitoring of unloading procedure.
2. Unload trusses by one of following methods.
   a. As outlined in TPI / SBCA Booklet BCSI, 'Guide to Good Practice For Handling, Installing & Bracing of Metal Plate Connected Wood Trusses'.
   b. Trusses may be unloaded by dumping if trusses are shipped horizontally, are rolled off low profile roller bed trailer, and if no part of any truss is required to drop more than 18 inches
3. After delivery of trusses:
   a. Inspect for damage before installing trusses.
   b. Inspect for "gaps" between framing members.
   c. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Wood Truss Fabricators:

1. Type Two Acceptable Fabricator:
   a. Meet following requirements:
      1) Wood Truss fabricator whose products meet quality requirements of this Section.
      2) Wood Truss fabricator shall be certified and submit copy of the truss plant certification with 'Truss Plant Certification Requirements Form' the Architect and Testing Agency before commencing fabrication of Wood Trusses.

2.2 MANUFACTURED UNITS

A. Performance:

1. Design Criteria:
   a. Top and Bottom Chords and Web Members:
      1) 2 inch by 4-inch nominal minimum size unless noted otherwise by Contract Documents.
      2) Sizes, species, and grades of members shall be as required to provide combined stress indexes of less than one.
      3) Designed in accordance with ANSI/TPI 1 for given design loads.
      4) Of quality to meet or exceed stress grade requirements given in table below for each lumber classification and to meet requirements for dimension lumber in Section 06 1100. Truss members not called out on Drawings shall meet or exceed stresses of classification C.
         a) Of quality to meet minimum stress grade requirements given below:

	Class A, 2x6	Class B, 2x6	Class C, 2x4	Class C, 2x6
Fb Bending	1720	1495	1510	1310
Ft Tension	1010	880	825	725
Fv Shear	75	75	75	75
Fc Perpendicu-lar	405	405	405	405

Fc Parallel	1650	1485	1495	1430
E	$1.6x10^6$	$1.5x10^6$	$1.5x10^6$	$1.5x10^6$

b) Allowable stresses shown are for normal duration of load and repetitive member use.

c) Following machine stress rated lumbers may be substituted for the above lumbers provided the combined stress ratio for each member is less than 1.0 by National Design Specification for Wood formulas, 2001. Total load deflection is less than L/240 and live load deflection is less than L/360.

A	B	C
2100f - 1.8E	1800f - 1.6E	1650f - 1.5E

b. Metal Gusset Plates:
   1) Plate design and manufacture shall be as approved by 'The Research Committee for the ICC'.
   2) Truss plates for symmetrical trusses shall be same size on both sides of truss. Determine size to be used by highest loading value on either side of truss.

B. Materials:

1. Wood framing list:
   a. Provide VMR Suppliers with wood framing list.
2. Top And Bottom Chords and Web Members:
   a. Douglas Fir-Larch #2 or better, Hem Fir #1 or better, MSR 1650F-1.5E or better, Southern Pine #2 or better, or Spruce Pine Fir #2 or better.
3. Metal Gusset Plates:
   a. Connector plates to comply with TPI 1 from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
      1) Use for interior locations.
   b. Manufacturer's name or trademark shall be visible on plates.
   c. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      1) Eagle Metal Products, Dallas, TX www.eaglemetal.com.
      2) ITW Building Components Group, Glenview, IL www.itwbcg.com.
      3) MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc. Chesterfield, MO www.mii.com or MiTek Canada, Bradford ON www.mii.com/canada.
      4) Simpson AS Truss Connector Plates; Simpson Strong-Tie Company Inc. Pleasanton, CA www.strongtie.com.

C. Fabrication:

1. General:
   a. Fabrication of trusses shall be as approved by ICC except that this Specification shall govern when it exceeds ICC requirements.
   b. Fabricate trusses from approved shop drawings.
   c. Fabricate trusses in jigs with members accurately cut to provide good bearing at joints. Joints shall be acceptable if the average opening between ends of members immediately after fabrication is less than 1/16 inch
   d. Each chord section shall be involved in two (2) panel points before being spliced.
2. Metal Gusset Plates:
   a. No panel point shall have more than one (1) plate per truss side.

b. Plates shall have minimum bite of 2-1/2 inches on members. Measure bite along center line of webs and perpendicular to chord axes. Orient plate axis parallel with truss chord axis except where chords change pitch or terminate. Plates may be placed parallel with webs at single web joints.
   1) Minimum bite requirements are waived for non-structural webs parallel to top chords added for insulation backing and for other non-structural members.
   2) Minimum bite requirements are waived for truss blocking.
c. Plate Sizes:
   1) Minimum width of plates shall be 3 inches.
      a) Minimum bite requirements are waived for non-structural webs parallel to top chords added for insulation backing.
      b) Minimum width requirements are waived for truss blocking.
   2) For flat bottom chord trusses, size plates for 110 percent of member forces. For scissor trusses, size plates for 150 percent of member forces. If webs are double cut, plates are to be sized for additional 10 percent of the member forces.
   3) Size plates, nail and steel section for 110 percent of member forces.
   4) No increase in plate values will be allowed for duration of loading or other factors.
d. Press plates into members to obtain full penetration without crushing outer surface of wood. Plate embedment is acceptable if opening between plate and wood surface is less than 1/32 inch
e. Lumber defects and plate misplacement, in combination, shall not reduce plate area or number of effective teeth, prongs, or nails by more than ten percent.
f. Do not apply metal gusset plates after shop fabrication.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Prefabricated Metal Plate Connected Wood Trusses:
   a. Testing Agency will obtain “Truss Plant Certification Requirements Form” attachment copy from Architect as per requirements of Section 06 1753 Shop-Fabricated Wood Trusses: Trusses Rafters.
   b. Where truss clear span is 60 feet or greater, Inspector shall verify that temporary installation restraint/bracing and permanent individual truss member restraint/bracing are installed in accordance with approved truss submittal package.

END OF SECTION

ATTACHMENTS

TRUSS PLANT CERTIFICATION REQUIREMENTS FORM

Metal Plate Connected Wood Truss suppliers shall be certified as evidenced by submittal of a copy of the truss plant certification with this completed form to the Architect and Testing Agency before commencing fabrication of Wood Trusses.

Metal Plate Connected (MPC) wood truss operations must design, manufacture and provide quality control and quality audits that comply with the latest edition of ANSI/TPI-1 promulgated by the Truss Plate Institute.

The truss plant must be certified by an independent third-party accredited Quality Assurance business such as, but not limited to, the Truss Plate Institute (TPI); the Southern Pine Inspection Bureau, the Timber Products Inspection Bureau or the PFS Corp. The third-party accredited Quality Assurance business must be under the auspices of the International Accreditation Services (IAS) or the American National Standards Institute (ANSI) and be ISO/IES Standard 17020 compliant. The inspection/audit process is to be completely independent of the truss manufacturer.

Truss plant shall fulfill the following requirements (see www.sbcindustry.com and www.tpinst.org or www.tpic.ca):

_____ Shall have an independent and accredited third party inspection agency (Quality Assurance business) staff member visit the truss plant for the certification and shall have at least one inspection done quarterly by an independent third-party inspection agency that is itself certified.

_____ Shall meet all necessary in-plant requirements including: The Acceptance Criteria for Quality Documentation (ICC AC-10) by the ICC Evaluation Service, Inc. which shall include the quality control requirements of the Product Standard of ANSI / TPI. Meeting the ANSI / TPI standard includes having an in-plant quality control manual, quality control procedures in place, and meeting the weekly inspection frequency.

_____ Do inspections at the required frequency and of the type established by the certification program. Specifically as a minimum, three trusses per set up location per shift per week.

_____ Not manufacture trusses or use components that do not comply with the requirements of this form and of the Contract Documents.

_____ Provide proof of compliance to the requirements of this form and provide the proof to the General Con- tractor who will forward it to the Architect prior to the truss plant providing a bid.

OR

Truss plant shall be certified and be in good standing with the In-Plant WTCA QC program. This includes the following requirements (see www.sbcindustry.com and www.tpinst.org or www.tpic.ca):

_____ Truss plant has been trained by SBCA on the ANSI/TPI 1 QC standard.

_____ Truss plant has quarterly third-party inspections, and that the third party has been trained by SBCA.

_____ Truss plant has quality control manual that meets the AC-10 requirements.

_____ Truss plant has quality control procedures in place including meeting the weekly inspection frequency, performing detailed inspections, and documenting any inspection problems and how they were resolved.

_____ Truss plant is sending their data quarterly to SBCA for review.

_____ Truss plant shall not manufacture trusses or use components that do not comply with the requirements of this form and of the Contract Documents.

In-Plant WTCA QC certified plants are listed at www.sbcindustry.com/wtcaqccertco.php.

SECTION 062000 - CARPENTRY

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the carpentry work as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Blocking and miscellaneous wood.
2. Rough hardware.
3. Coat closet pole and shelving.
4. Installation only of finish hardware.
5. Installation only of doors and hollow metal frames.
6. Temporary controls furnished by Carpentry trades.

1.3 RELATED SECTIONS

A. Architectural Woodwork - Section 064023.

B. Steel Doors and Frames - Section 081113.

C. Finish hardware - Section 087100.

1.4 QUALITY ASSURANCE

A. Lumber Standard: Comply with PS 20.

B. Plywood Standard: Comply with PS 1 and American Plywood Assoc. (APA).

C. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.

D. Grade Marks: Identify lumber and plywood by official grade mark.

1. Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
   a. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.
   b. MC-15 or KD: Maximum of fifteen (15) percent moisture content.

E. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

1.5 SUBMITTALS

A. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.

1.6 PRODUCT HANDLING

A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.

B. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.

C. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.

D. Do not store seasoned lumber in wet or damp portions of the building.

E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.

F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.

G. All items specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

1.7 JOB CONDITIONS

A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer, Construction Manager and the Architect.

B. 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 proper attachment of other work.

PART 2 PRODUCTS

2.1 WOOD MATERIAL

A. General

1. All wood shall be sound, flat, straight, well-seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.

3. For closet shelving, provide 3/4" thick A-A INT-APA plywood with 1/4" thick hardwood edges, fire retardant treated as specified herein.
4. Plywood and rough carpentry for telephone and electric closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.

B. Wood Treatment

1. For exterior blocking, roofing and sheet metal, pressure treat wood with copper azole, Type B (CA-B); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative shall comply with AWPA Standard U1, (.25 lbs./cubic foot of chemical in wood).
   a. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent. Treatment shall be equal to "Wolmanized Natural Select" made by Arch Wood Protection Inc. or approved equal.
2. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the AWPA Standard M-4.

2.2 HARDWARE

A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.

B. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.

C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:

1. Bolts: ASTM A 307, Grade A.
2. Nuts: ASTM A 563.
3. Lag Screws and Bolts: ASME B 18.2.1.

D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2; use stainless steel for treated woods and exterior use.

E. Wood Screws: ASME B 18.6.1.

F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Architect.

G. In coat closets, provide 1" OD chrome on steel clothes rod with a wall thickness of 0.125", running full width of closet wall, supported at ends with end brackets and supported in the center from shelf above rod using chrome plated rod support.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION OF FINISH HARDWARE

A. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.

B. Unless otherwise noted, mount hardware units at heights established in Section 081113 – Steel Doors and Frames.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.

G. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the Owner.

H. Adjusting and Cleaning

1. Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.3 INSTALLATION OF DOORS AND FRAMES

A. Preparation

1. Remove welded-in shipping spreaders installed at factory.

2. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus, or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus, or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus, or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus, or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

B. Installation

1. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    a. Install frames in accordance with ANSI/SDI A250.11, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
    b. At fire-protection-rated openings, install frames according to NFPA 80.
    c. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    d. Install frames with removable glazing stops located on secure side of opening.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed anchors.
    a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
4. Stud Partitions: Solidly pack mineral-fiber insulation behind frames conforming to the requirements of Section 072100 "Thermal Insulation."
5. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.
8. Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.
    a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
    b. not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

9. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.
10. Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.
    a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
11. Glazing: Comply with installation requirements in Section 088000 "Glass and Glazing" and with standard steel door and frame manufacturer's written instructions.
    a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

C. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

3.4 BLOCKING AND MISCELLANEOUS WOOD

A. General

1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.
2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.
3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

B. Blocking and Miscellaneous Wood

1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous wherever required, whether or not so indicated.
2. Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.
3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

3.5 COAT CLOSET

A. In coat closets provide twelve (12) inches wide plywood shelf running full width of closet, supported on continuous wood pin rail. Below shelf install coat rod as specified herein.

3.6 ROUGH HARDWARE

A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.

B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.

C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.

D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.

E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.

F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.

G. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

3.7 TEMPORARY PROTECTION BY CARPENTER

A. General: Provide temporary protection as follows:

1. Temporary wood doors at exterior entrances and at interior door openings, as required.
2. Temporary protection and enclosures at, stairs, and other shafts, at openings in floor and roof.
3. Temporary sills at door thresholds and other openings.
4. Temporary stair handrails continuously from top to bottom of each stair.

B. Stair Protection: Provide wood protection for stairs: cover finished treads. Protect platforms, treads and risers with dressed planking full stair width; hold in place with continuous edge strips. Erect required handrails and railings for closing in open wells and open sides of stairs. Protect railing from damage. Protect door sills and saddles.

C. Openings in Floors and Roofs: Protect openings in floors and roof slabs with adequate wood railings, substantially framed, braced and nailed. Cover openings not required to be kept open with not less than two (2) inches thick planking, cleat together, brace; make sufficiently strong and secure. Protect openings in floors and roofs immediately after forms are removed.

D. Exterior Openings: Provide temporary enclosures for exterior openings where required, properly secured and maintained until finished work is in place. Provide a sufficient number of temporary doors to give access to the building, all provided with hardware, locks and keys.

E. Maintenance: Maintain all temporary protection in good repair during the construction period. Remove when no longer required.

F. Temporary Locks: Provide temporary locks, including keys, for temporary doors. Use of permanent building hardware in connection with temporary doors is prohibited.

3.8 CLEANING UP

A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.

B. Sweeping

1. At the end of each working day, or more often, if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
2. Remove the refuse to the area of the job site set aside for its storage.
3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

SECTION 062020 - EXTERIOR PVC RAILINGS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural woodwork as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Exterior PVC railings.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, and colors and include construction and application details.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

D. Samples for Verification:

1. For cellular PVC railing components, with half of exposed surface finished; 50 sq. in.

E. Delegated-Design Submittal: For railing systems, including analysis data Signed and Sealed by the qualified professional Licensed New York State Engineer responsible for their preparation.

F. Evaluation Reports: For the following, from ICC-ES:

1. Cellular PVC.

G. Warranties: Provide sample warranties.

1.4 QUALITY ASSURANCE

A. Engineer PVC railing system to withstand design loads according to the 2020 International Building Code, New York edition and as indicated on Drawings. Shop drawings and calculations for cellular PVC railings shall be Signed and Sealed by a professional Engineer in the State of New York.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials flat with spacers between bundles to provide air circulation. Protect materials with waterproof covering.

B. Do not store packaging materials in direct sunlight to prevent heat buildup.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed.

B. Do not install PVC materials that are damaged.

1.7 WARRANTY

A. Manufacturer's Warranty for Cellular PVC Railings Systems: Manufacturer agrees to replace components that fails due to defects in manufacturing within specified warranty period.

1. Warranty Period: Limited Lifetime Warranty. Refer to manufacturer's website for details.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: INTEX Millwork Solutions, LLC; 20 Bogden Blvd., Millville, NJ 08332; Tel: (856) 293-4100, Fax: (856) 293-4102.

B. Or approved equivalent.

2.2 DARTMOUTH EXTRUDED RAIL SYSTEM

A. Cellular PVC: Extruded, expanded PVC with a small-cell microstructure, recommended by manufacturer for exterior use, made from UV- and heat-stabilized, rigid material.

1. Basis of Design Product: Subject to compliance with requirements, provide the following: Intex Millwork Solutions; Dartmouth Extruded Rail System.

B. Top Rail Base: 1-1/2 inch high by 2-15/16-inch-wide extruded rigid cellular PVC contoured rail profile.

C. Bottom Rail: 1-1/2 inch high by 2-15/16-inch-wide extruded rigid cellular PVC contoured rail profile.

D. Aluminum Reinforcing Insert: 1 inch high by 1-3/4 inch wide 6063-T5 extruded aluminum "C" section (0.12-inch-thick web; 0.06 in thick flanges) with four raceway channels running the entire length. Used in top and bottom rail of all systems.

E. Balusters: Model # RS40BAL-42. 1-1/4 in square extruded rigid cellular PVC pickets.

F. Newel Caps and Trim: Model # RS40PYCAP5 (Pyramidal cap), and #RS40BT5-WM75 (Base trim ring).

G. Decorative Panels: Manufacturer's [**standard**] [**custom**] design.

H. Column Wraps: Manufacturer's "Flat Panel" in height and width as indicated on Drawings.

I. Support Block: 1-1/4 in square extruded rigid cellular PVC picket cut to length and secured to the underside of the bottom rail.

J. Rail to Post Connection: Manufacturer's standard.

K. Support Post: Preservative-treated wood (Southern Pine) 4 by 4 inches.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for PVC Railing Components: Provide manufacturer's recommended fasteners.

1. (A) Rail Bracket Screws: #8 x 1-1/4 inches Flat Head Square Drive.
2. (B) Rail Attachment Screws: #10 x 3 inches Slot Hex Washer Head.
3. Top Rail Cap Attachment Screws:
   a. (C) #8 x 1-3/4 inches Flat Head Square Drive (RS40 Flat Cap ONLY).
   b. (D) #8 x 2-1/4 inches Flat Head Square Drive (RS40 Peaked Cap ONLY).
4. (E) Baluster Screws: #8 x 2-1/2 inches Flat Head Square Drive.
5. (F) Baluster Lock Screws: #8 x 1-1/2 inches Flat Head Square Drive.
6. (G) Rail Attachment Screws: #12 x 4 inches Slot Hex Washer Head. For level sections greater than 8 ft. long and all stair rails.

B. Adhesive for Cellular PVC: Product recommended by manufacturer.

C. Sealants: Type as recommended by manufacturer and complying with ASTM C 834 and with applicable requirements in Division 07 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine PVC materials before installation. Reject materials that are damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound or warped.

1. Do not use manufactured units with defective surfaces, sizes, or patterns.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Scribe and cut PVC components to fit adjoining work.
2. Coordinate PVC components with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 INSTALLATION - GENERAL

A. Install PVC railing systems in strict accordance with manufacturer's written installation instructions, and detailed shop drawings.

B. Refer to manufacturer's website for latest information and installation videos.

3.5 INSTALLATION – DARTMOUTH RAILING SYSTEM

A. Horizontal Application.

1. Measure and cut rail sections to length.
   a. Ensure newels or columns to which rail will be mounted are plumb and sturdy enough to support rail. If newel/column covers are used, insure they have blocking at each location where railing will be attached.
   b. Measure span at top and bottom rail locations.
   c. Cut all vinyl portions of rail to required length.
2. Determine baluster layout and assemble rail/baluster section.
   a. For standard baluster spacing (with the variable spaces at the ends of each rail section) use the template provided. Align the template reference edge as indicated to the inside of the bottom rail. Determine best end spacing by either locating a baluster directly at the center of the rail section, or the mid-point between two balusters as the center of the rail section, and tape template in center and at ends. Drill a 1/8-inch hole through the template and bottom rail using the appropriate spacing line marked 'bottom rail'. Repeat this for process for the baluster cap, using the same template, but drill through the spacing line marked 'baluster cap'.
   b. If equal spacing between all balusters and newels/columns is desired, disregard section 'a' above and determine spacing based upon width and number of balusters (Note: check local building codes for maximum spacing allowed).
   c. Secure each baluster with one #8 x 2-1/2-inch Square Drive T17 18-8SS screw through the baluster cap, and one through the bottom rail. Ensure balusters are straight and aligned and secure with one #8 x 1-1/2-inch Square Drive T17 18-8SS screw through the bottom rail (offset from center) to preclude baluster from rotating after installation.
3. Prepare aluminum reinforcements.
   a. Cut aluminum rail reinforcements to length, 1/4 inch shorter than the vinyl rails.

b. Attach mounting brackets to both ends of the upper (mill finish) aluminum rail reinforcement, using four #8 x 1-1/4-inch Square Drive T17 18-8SS screws supplied.
c. Place gaskets provided between the mounting brackets and the reinforcement on the lower (white painted) aluminum rail reinforcement and secure using four #8 x 1-1/4-inch Square Drive T17 18-8SS screws supplied. Lubricate the threads with oil or soap to avoid binding or stripping screws.
d. Locate crush block(s) provided to the bottom (white painted) aluminum rail reinforcement, with spacing no greater than 36" from the end, or between crush blocks.
e. Drill a 3/16-inch hole through the aluminum rail reinforcement, and secure each crush block using one #8 x 2-1/2-inch Square Drive T17 18-8SS screw.
f. Drill additional 3/16-inch holes at each end of aluminum rail reinforcement for drainage.

4. Install rail.
   a. Position bottom aluminum rail reinforcement, with crush blocks attached, between newels or columns, centered in newel or column face, and secure each end with two #10 x 3-inch Slot Hex Washer Head TA 18-8SS screws supplied.
   b. Position vinyl rail/baluster assembly between newels or columns and seat fully down on bottom aluminum rail reinforcement.
   c. Seat remaining aluminum reinforcement into baluster cap.
   d. Ensure rail is centered on face of newel or column and secure each end with three #10 x 3-inch Slot Hex Washer Head TA 18-8SS screws supplied.
   e. Drill a 3/16-inch hole through the aluminum reinforcement over every third baluster (note: offset to avoid the screw which attaches the baluster to the Baluster Cap) and secure the aluminum reinforcement to the rail/baluster assembly using #8 x 2-1/2-inch Square Drive T17 18-8SS screws
   f. Drill a 3/16-inch hole down through the aluminum reinforcement and the baluster cap, plumb, at both ends and near the center of the span (all between balusters). Seat the Rail Cap fully onto Baluster Cap, and use the screws provided to attach Rail Cap, screwing up through the underside of the Baluster Cap. Note: screws provided for RS30350 rail are #8 x 1-7/8 inch Square Drive T17 18-8SS, and screws for RS30400 rail are #8 x 2-1/4 inch Square Drive T17 18-8SS white heads.

B. Stair or Rake Application.

1. Determine angle, measure and cut rail sections to length.
   a. Ensure newels or columns to which rail will be mounted are plumb and sturdy enough to support rail. If newel/column covers are used, insure they have blocking at each location where railing will be attached.
   b. Determine and mark angle.
   c. Determine location and cut Lower Rail and Baluster Cap to required length.
2. Determine baluster layout and assemble rail/baluster section.
   a. Trim Balusters to desired length and angle.
   b. For standard baluster spacing (with the variable spaces at the ends of each rail section) use the template provided. Align the template reference edge as indicated to the inside of the bottom rail. Determine best end spacing by either locating a baluster directly at the center of the rail section, or the mid-point between two balusters as the center of the rail section, and tape template in center and at ends. Drill a 1/8-inch hole through the template and bottom rail using the appropriate spacing line marked 'bottom rail'. Repeat this for process for the baluster cap, using the same template, but drill through the spacing line marked 'baluster cap'

c. If equal spacing between all balusters and newels/columns is desired, disregard section ‘a’ above and determine spacing based upon width and number of balusters (Note: check local building codes for maximum spacing allowed).

d. Secure each baluster with one #8 x 2-1/2-inch Square Drive T17 18-8SS screw through the baluster cap, and one through the bottom rail. Ensure balusters are straight and aligned and secure with one #8 x 1-1/2-inch Square Drive T17 18-8SS screw through the bottom rail (offset from center) to preclude baluster from rotating after installation.

3. Prepare aluminum reinforcements.

a. Attach a lower stair bracket (90-degree bend) using two #8 x 1-1/4-inch Square Drive T17 18-8SS screws supplied to the lower end of each reinforcement. Note: on the bottom (white) rail reinforcement, insert one of the gaskets supplied between the bracket and the aluminum reinforcement. Lubricate the threads with oil or soap to avoid binding or stripping screws. Note: Do not cut this end of the reinforcement to the rail angle.

b. Measure and cut the upper end of both reinforcements to the rail angle determined in Step 1, include the protruding portion of the lower bracket as part of the total length. Attach an upper stair bracket to the angle cut end of the top (mill finish) rail reinforcement, with the bracket flush with the top of the reinforcement, using four #8 x 1-1/4-inch Square Drive T17 18-8SS screws supplied. Attach an upper stair bracket to the angle cut end of the bottom (white) rail reinforcement, with the bracket flush with the bottom of the reinforcement, using four #8 x 1-1/4-inch Square Drive T17 18-8SS screws supplied. Note: on the bottom (white) rail reinforcement, insert one of the gaskets supplied between the bracket and the aluminum reinforcement. Lubricate the threads with oil or soap to avoid binding or stripping screws.

c. Cut one end of crush block to angle of rail and locate to the bottom (white painted) aluminum rail reinforcement, with spacing no greater than 32 inches from the end, or between crush blocks. Ensure that crush block(s) will be located on a stair tread.

d. Drill a 3/16-inch hole through the aluminum rail reinforcement, and secure each crush block using one #8 x 2-1/2-inch Square Drive T17 18-8SS screw.

4. Install rail.

a. Position bottom aluminum rail reinforcement, with crush blocks attached, between newels or columns, centered in newel or column face, and secure each end with two #10 x 3-inch Slot Hex Washer Head TA 18-8SS screws supplied.

b. Position vinyl rail/baluster assembly between newels or columns and seat fully down on bottom aluminum rail reinforcement.

c. Seat remaining aluminum reinforcement into baluster cap.

d. Ensure rail is centered on face of newel or column and secure each end with three #10 x 3-inch Slot Hex Washer Head TA 18-8SS screws supplied.

e. Drill a 3/16-inch hole through the aluminum reinforcement over every third baluster (note: offset to avoid the screw which attaches the baluster to the Baluster Cap) and secure the aluminum reinforcement to the rail/baluster assembly using #8 x 2-1/2-inch Square Drive T17 18-8SS screws

f. Measure and cut Top Cap. Drill a 3/16-inch hole down through the aluminum reinforcement and the baluster cap, plumb, at both ends and near the center of the span (all between balusters). Seat the Rail Cap fully onto Baluster Cap, and use the screws provided to attach Rail Cap, screwing up through the underside of the Baluster Cap. Note: screws provided for RS30350 rail are #8 x 1-7/8 inch Square Drive T17 18-8SS, and screws for RS30400 rail are #8 x 2-1/4 inch Square Drive T17 18-8SS white heads

3.6 ADJUSTING

A. Replace PVC components that is damaged or does not comply with requirements. Adjust joinery for uniform appearance.

3.7 CLEANING

A. Clean exposed and semi-exposed PVC surfaces.

3.8 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace PVC materials that are damaged.

END OF SECTION

SECTION 064023 - ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural woodwork as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Wood trim, moldings, base, and rails.
2. Wood shelving.
3. Fiberglass columns.
4. Solid plastic counters.
5. Wood framing and rough lumber as required for work of this Section.
6. Wood grounds, blocking, nailers, furring as required for work of this Section.
7. All rough hardware and fastenings for work of this Section.
8. Drilling concrete and masonry, drilling and/or tapping metal work, as required, for the installation of work of this Section.
9. Back painting as specified herein.
10. Shop finish of work of this Section, except items indicated herein to be shop primed only.

1.3 RELATED SECTIONS

A. Carpentry - Section 062000.

B. Caulking between architectural woodwork and any wall, floor, or ceiling joints - Section 079200 – Joint Sealants.

C. Field finishing - Section 099000.

1.4 QUALITY STANDARDS

A. The quality standards of the Architectural Woodwork Institute, "Architectural Woodwork Standards," 2nd Edition, dated October 1, 2014, and enhancements 2019 shall apply to all workmanship including materials and installation, for architectural woodwork and by reference are made a part of this specification. All work shall conform to "Premium" grade requirements of the AWI "Architectural Woodwork Standards," unless otherwise modified herein.

B. In the event of a dispute as to the quality grade (or grades), the Contractor shall call upon the Architectural Woodwork Institute for an inspection under AWI's Quality Certification Program which shall include a QCP Inspection and Report. The Contractor agrees to abide by the decision of this Report. The cost of said inspection and report shall be borne by the Contractor

C. Employ only tradesmen experienced in the fabrication and installation of architectural woodwork.

D. Woodworking firm must be accredited by the AWI Quality Certification Program (QCP).

1.5 SUBMITTALS

A. Shop Drawings

1. Submit shop drawings of all woodwork specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.
2. Shop drawings shall show all finish hardware, anchors, fastenings and accessories.
3. Shop drawings shall show all jointing, joint treatment and butt jointing in veneers and plastic laminate.
4. Shop drawings for wood paneling must show complete elevations of rooms to receive paneling as well as panel matching required by these specifications.
5. Shop drawings for cabinet work must show centerline height and horizontal location of all required internal wall blocking.
6. Where architectural woodwork deviates from AWI standards noted herein, shop drawings must identify these deviations.

B. Samples: Submit four (4) samples of each of the following items:

1. Solid Plastic Counters, twelve (12) inches square, including a section of outside corner.
2. Opaque finish wood veneer laminated to particleboard, twelve (12) inches square for each color, gloss and finish specified or shown.
3. Each type and finish of each type of wood cornice, trim, molding, etc., eight (8) inches long, finish as specified.

1.6 QUALIFICATIONS

A. The work of this Section shall be provided by a firm having a minimum of five (5) years' experience on projects of similar size and quality to that specified and shown.

1.7 COORDINATION

A. Coordinate the work of this Section with other appropriate Sections of the specifications to insure proper scheduling for fabrication and installation of the work specified herein

B. Coordinate with partition and finish trades to insure that proper provisions are made for the installation of the work specified herein.

C. Verify all dimensions in the field prior to fabrication of all Architectural Woodwork to assure proper fit.

1.8 PRODUCT HANDLING

A. All materials and work of this Section shall be protected from damage, from time of shipment from shop to final acceptance of work. Cover, ventilate, and protect work of this Section from damage caused by weather, moisture, heat, staining, dirt, abrasions, any other causes which may adversely affect appearance or use, or which may cause deterioration of finish, warping, distortion, twisting, opening of joints and seams, delamination, loosening, etc., of work of this Section.

B. Keep all finish carpentry, millwork, under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection. Remove such protection when directed by the Architect.

C. Deliver finish carpentry, millwork, and cabinet work in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plaster work are thoroughly dry.

D. Damaged or defective items of work of this Section are subject to rejection and replacement with new by Contractor, at no cost to Owner.

1.9 JOB CONDITIONS

A. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.

B. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one (1) percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWI, for method of determining equilibrium moisture content values.

C. Examination of Substrate and Conditions: The installer must examine the substrate and the conditions under which the work of this Section is to be performed and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

D. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior door in place, HVAC systems operational and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.

E. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

PART 2 PRODUCTS

2.1 BASIC REQUIREMENTS

A. Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of nine (9) to twelve (12) percent for exterior work and six (6) to eleven (11) percent for interior work.

B. Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain field measurements and verify all dimensions of shop drawing details as required for accurate fit.

C. Compatibility of Grain and Color: Architect reserves the right to select materials for best compatibility between visually related members and veneers.

D. Machine and sand woodwork to comply with requirements of Standards for specified grade.

E. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.

F. Miter joints by joining, splining and gluing to comply with requirements for the specified grade.

G. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed of otherwise damaged or defective wood.

2.2 GENERAL - MATERIALS

A. Softwood lumber shall conform to the requirements of the latest edition of American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Association having jurisdiction and shall bear the official grade and trademark of the Inspection Bureau of the Association and a mark of mill identification.

B. Framing and Rough Lumber: No. 1 KD grade Southern Pine or Dense Construction grade Douglas Fir, having extreme fiber in bending stress of at least 1700 psi, surfaced four sides (S4S). Provide fire retardant treatment meeting requirements of Section 062000.

C. Grounds, Blocking, Nailers, Furring: Southern Pine, Douglas Fir or Sitka Spruce, grade to suit particular purpose and to be straight, square edged, straight grained, surfaced four sides (S4S), and which will retain nails and screws without splitting. Provide fire retardant treatment.

D. Lumber: AWI Section 3 with the following requirements:

1. Hardwood for Opaque Finish: Any hardwood which, when finished, will not show any grain, imperfection or other surface defects when used with the opaque finish specified.

E. Plywood: AWI Section 4; Veneer core, particleboard, or plywood core unless otherwise specified, and with the following requirements:

1. Hardwood: Premium Grade, face veneers as shown or specified
2. Edges: Banded with hardwood in accordance with Premium Grade Standards.

F. Finishing (Wood)

1. Refer to Section 099000 – Painting and Finishing.

2.3 COLUMNS

A. Fiberglass Columns: As manufactured by:

Royal Corinthian, Inc. 603 Fenton Lane
West Chicago, IL 60185
T. 888-265-8661 F. 888-344-2937
royalcor@royalcorinthian.com
www.royalcorinthian.com

B. or approved equal, in custom shapes and profiles as detailed.

1. Factory fabricate columns from fiberglass-reinforced polymers (FRP); columns shall be 100% sanded. Caps and base plinths shall be manufactured from high-density polyurethane and fit around load-bearing shaft.
2. Shafts shall be classified as NFPA Class A and UBC Class 1 with a smoke density rating below 450 according to ASTM E 84 testing criteria.
3. Columns shall be painted with one coat of primer and two coats of exterior paint, alkyd or oil based as specified in Section 099000 for exterior wood.

2.4 PLASTIC LAMINATE

A. Face Sheets: NEMA Publication LD3, Grade GP50, Type I, 0.05" thick, as manufactured by Formica, Nevamar, Wilson-Art. Color, pattern and finish as selected by the Architect.

B. Backing Sheets: Non-decorative, high-pressure plastic laminate, NEMA LD3, Grade BK20, 0.02" thick.

C. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified.

2.5 METAL

A. Steel

1. Structural Steel Shapes and Plates: ASTM A 36.
2. Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only.
3. Finishes
   a. Primer for Unexposed Metal: Zinc chromate primer.

2.6 MISCELLANEOUS PRODUCTS

A. Fasteners

1. Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
2. Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.
3. Anchors: Type, size, material and finish as required for the condition of use.
4. Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.

B. Adhesives

1. For Laminating Plastic Laminate Surfaces: Urea resin, Type II, as recommended by fabricator.
2. For All Other Uses: polyvinyl acetate resin emulsion or other type as recommended by the fabricator.

2.7 PLASTIC LAMINATE COUNTERTOPS AND VANITIES

A. Grade: Same as AWI grade required for cabinet work; plastic laminate finish.

B. Construction

1. Provide back-splash and end-splash, where detailed; top-mounted square butt joint, fully covered with matching plastic laminate, eased edges.
2. Exposed Counter Edges: Plastic laminate matching surface, except as otherwise indicated. Ease exposed edges of overlap sheet.
3. Cut openings for equipment to be installed. Comply with equipment manufacturer's requirements but provide internal corners of 1/8" minimum radius. Smooth saw cut and ease edges.
4. Seal cut edges of counter at openings for sinks and other "wet" equipment, using waterproofing compound recommended by plastic manufacturer and compatible with laminating adhesive.

2.8 VANITY HARDWARE

A. Architectural Woodwork Hardware: Provide the following items, or their approved equal, as required:

1. Hinges: Hafele concealed hinges.
2. Catches: Magnetic; top and bottom.
3. Pulls: Selected by the Architect.
4. Locks: Directed by the Architect.
5. Drawer Slides (24” maximum width): Accuride, Model 7434, full extension, 100 lb. capacity.
   a. Drawer Slides (16” maximum width) Easy Close: Accuride Model 3832C, full extension, 100 lb. capacity.
6. Shelf Supports: Pin and grommet system equal to No. 282.01.701 pin and 282.50.704 grommet made by Hafele.
7. Finish: Satin Stainless Steel.
8. Closet Hardware: Oval wardrobe rails, chrome plated steel with center bracket and wall support brackets made by Hafele or approved equal.

2.9 WOOD FOR RAILS, CAPS, TRIM, BASES, MOLDINGS

A. Quality Standard: For the following types of interior architectural woodwork, comply with indicated standards as applicable.

1. Standing and Running Trim: AWI Section 6.
2. Miscellaneous Millwork: AWI Section 6.
3. Stair Handrails: AWI Section 7.

B. Woodwork for Transparent Finish: Except as otherwise indicated, comply with the following:

1. Grade: Premium.
2. Species of Solid Wood: Quarter Sawn Species as noted on drawings.

C. Woodwork for Paint Finish: Except as otherwise indicated, comply with the following:

1. Grade: Premium.
2. Species of Solid Wood: Solid, paint grade, sound clear Poplar or Birch.

2.10 SOLID PLASTIC COUNTERS

A. Provide 1/2" thick "Corian" counters with integral bowls as manufactured by E.I. Du Pont or approved equal made by Avonite, Wilson Art or Gilbraltar meeting standards specified herein. Counters to be of color as selected by the Architect.

B. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124-1980, Type Six, and ISS FA-2.01 “Classification and Standards Publication of Solid Surfacing Material” as published by the International Solid Surface Fabricator Association.

C. Counters shall be adhesively joined with no exposed seams, having edge details shown on drawings.

D. Material shall conform to the published performance characteristics of ISSFA-2-01.

E. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints.

F. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in colors matching components.

G. Fabrication

1. Fabricator must be approved by the solid surface manufacturer.
2. Factory fabricate components to custom sizes and shapes indicated, in accordance with approved shop drawings.
3. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints.
4. Provide factory cutouts for plumbing fittings and accessories as indicated on the drawings.
5. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.

H. Warranty: The manufacturer shall warrant to the Nassau County Department of Public Works that Du Pont will at its option repair or replace without charge, such product if it fails due to a manufacturing defect during the first 10 years after initial installation. This includes all labor charges needed to repair or replace the product covered hereunder.

2.11 FABRICATION - GENERAL

A. Provide lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.

B. Do all fabrication from field measurement with provision for scribing as required to meet built-in conditions.

C. Coordinate the work of this Section with the work of other trades.

D. Fabricate units in largest practicable sections. Assemble in the shop for trial fit, disassemble for shipment and reassemble with concealed fasteners.

E. Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.

F. Details indicate the required type and quality of construction. Modifications to conform to manufacturer’s standards will be considered providing they comply with the Contract Documents, maintain the profiles shown and subject to acceptance by the Architect.

G. Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.

H. Factory finish all items where possible. Defer final touch-up, cleaning and polishing until after delivery and installation.

I. Comply with AWI, Premium Grade standards for sanding, filling countersunk fasteners, back priming and similar preparations for the finishing of architectural woodwork, as applicable to each unit of work.

J. Prepare all countersunk wood screw attachments for wood plugs. Wood plugs shall match surrounding species and grain direction; putty filling is not acceptable.

2.12 FABRICATION - SPECIFIC ITEMS

A. Casework

1. Include all preparations for mechanical, electrical, telephone and plumbing work required.
2. Provide cabinet hardware for casework as shown.
3. Provide dust panels in body webs and between drawer units.
4. Provide wood veneers for exposed surfaces as specified herein before.
5. Hollow core doors will not be permitted.
6. Provide matching veneers for edge treatments of case body members where transparent finishes are indicated or specified.
7. Provide drawers with slides as specified. Drawers shall not rest on web body frames.
8. Provide wood veneers for transparent finish, of matching and continuing grain, for drawer and door edges.

B. Closet and Storage Shelving

1. Provide closet and storage shelving in accordance with AWI Section 600, Custom Grade, unless otherwise shown or specified.
2. Exposed edges shall have hardwood edge bands.

C. Standing and Running Trim: Provide standing and running trim of the sizes, profiles, species and finish as specified or shown and complying with AWI Section 6, Premium Grade.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where architectural woodwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 FRAMING

A. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.

B. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

3.3 GROUNDS, BLOCKING, NAILERS AND FURRING

A. Provide all wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit the condition. Install grounds, blocking, nailers, furring, etc., rigidly, in proper alignment, trued with a long straight edge.

3.4 ROUGH HARDWARE

A. Provide all rough hardware, such as nails, screws, bolts, anchors, hangers, clips and similar items. Hardware shall be of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner. Use galvanized hardware at exterior walls, and at other locations where subject to moisture or where water will be present.

B. Secure wood to concrete and to solid masonry with countersunk bolts in expansion sleeves or other approved manner, to steel with countersunk bolts, to hollow masonry and to drywall with heavy duty countersunk toggle bolts. Space fastenings not more than sixteen (16) inches apart. Hardened cut nails, power-driven fastenings, or other suitable devices may be used where approved by the Architect.

C. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage and shall permit the work to remain permanently in place without any splitting or opening of joints.

3.5 INSTALLATION OF COLUMNS

A. Follow manufacturers detailed installation guidelines. They are available online or by request.

B. Recommend Caulk for all joints is a high-end construction adhesive that is paintable and flexible.

C. Fiberglass Columns are recommended to be sanded, primed, and painted.

3.6 INSTALLATION OF VANITY FINISH HARDWARE

A. All items of finish hardware furnished under this Section shall be carefully fitted and secured in place as part of the work of this Section. Locations and positioning of hardware shall be subject to the Architect's approval. Care shall be taken not to mar or damage hardware, or other work. Install doors plumb and true. Hardware shall be fitted to assure operation without forcing.

B. After preliminary fitting of hardware, the Contractor shall remove trim for painting and finishing work; after which he shall reinstall the hardware in a permanent manner.

C. Upon completion of the work, before final acceptance of the building by Nassau County Department of Public Works, the Contractor shall, in the presence of the Architect, show that all hardware is in satisfactory working order; fit all keys in their respective locks and, upon acceptance of the work, shall tag and deliver all keys to the Architect and Nassau County Department of Public Works.

D. When directed by Nassau County Department of Public Works at any time during the first year after the completion of the Contract, the Contractor shall return to the building and adjust and refit the work and hardware, and leave such items in satisfactory working order.

3.7 GENERAL INSTALLATION

A. Wall anchorage and general installation procedures for cabinetry work shall conform to AWI Section 10, Article entitled "EXECUTION", Sub-Article 6.1 with all related sub-paragraphs.

B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

3.8 TRIM, MOLDINGS, ETC.

A. Install with minimum number of joints possible, using full-length pieces for each run. Stagger joints in adjacent and related members. Cope at returns, miter corner.

B. Joints of all trim and/or moldings shall be set tight, miter exterior angles and cope interior angles. Joints, except end joints less than twelve (12) feet apart, will not be permitted in straight runs of trim and/or moldings and rails.

C. Secure all trim and/or moldings with glue and blind nail with finishing nails. Set exposed nail heads in finished work and putty. Sand all work to remove any tool marks and irregularities.

D. Wood shall receive finish as specified in Section 099000 - Painting.

3.9 WOOD RAILS

A. Wood shall be planed straight, square and level, then sanded smooth with flush finished surfaces. Joints shall occur over supports. Right angle joints shall be mitered.

B. All exposed fastening devices shall be countersunk and set below finished wood surfaces and fitted with matching wood plugs; sand plugs and finish smooth and flush with exposed surfaces.

C. Handrails shall be capable of withstanding a force of two hundred (200) lbs. applied to rail at any point from any direction.

D. Provide all hardware and metal supports required for complete installation as detailed on drawings.

3.10 CLOSET AND STORAGE SHELVING

A. Provide closet and storage shelving at the locations shown. Provide hang rods where shown. Set adjustable center hangers.

3.11 WOOD BASES

A. Provide plywood backing, toggle bolted to substrate, if substrate not suitable for securing wood base.

B. Machine wood bases from specified wood to profiles indicated on drawings.

C. Set base level and plumb. Where indicated on drawings, face of wood base shall be flush with wall above. Glue wood base to substrate or to plywood backing, and screw or nail wood base to substrate or to plywood backing with countersunk wood screws or with finishing nails, recess wood screw heads, and spackle with wood putty, set and spackle nails with wood putty. Do not nail or fasten wood base to floor. Ends of wood base shall be either splined or ship lapped.

D. Where no wood backing occurs, screw apply base at each stud with screw countersunk and wood putty applied and sanded smooth and flush with base.

3.12 PAINTING AND FINISHING

A. General: All painting and finishing work of this Section shall be shop applied, unless otherwise noted, as specified below. All painting and finishing shall match approved samples. Field finish painting, where specified below, shall be by painting Subcontractor, as specified for in Painting Section.

B. Schedule of Painting and Finishing

1. Shop Primer On:
   a. Wood bases.
   b. Wood trim and moldings to be field finish painted.
   c. Ferrous metal work.

2. Shop Natural Finish On:
   a. Wood paneling.
   b. Wood cabinets with wood veneers.

C. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one (1) coat of oil-based paint prior to installation, shop applied where practicable.

D. Field Touch-Up: Field touch-up shall be the responsibility of the installing Subcontractor and shall include the filling and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and mars, and final cleaning up of the finished surfaces.

3.13 CLEAN UP AND PROTECTION

A. Clean Up: At regular intervals during the course of the work, all debris and excess material shall be cleaned up and removed from the site. Upon completion of installation, clean all spaces of debris caused by woodwork installation.

B. Protection: Protect all woodwork from marring, defacement of other damage until final completion and acceptance of the project by the Nassau County Department of Public Works. Repair or replace all defective units prior to final inspection as directed by the Construction Manager and Architect. Any units that cannot be satisfactorily repaired in the opinion of the Architect shall be replaced with new units of same original design, at no additional cost to the Nassau County Department of Public Works.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 072100 - THERMAL INSULATION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the thermal insulation as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Foundation Wall Insulation.
2. Under-Slab Insulation.
3. Blanket Insulation.
4. Closed cell spray foam insulation at tight spaces.
5. Attachment devices.

1.3 RELATED SECTIONS

A. Section 033000 – Cast-in-Place Concrete

B. Section 078413 - Firestops and Smoke Seals

C. Division 31 - Earthwork

1.4 SUBMITTALS

A. Submit product data for each type of product indicated, including re-cycled content.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

1.5 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 “Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-load-bearing Wall Assemblies Containing Combustible Components.” The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test. The basis of design product listed below is a component of the design test assembly selected by the Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 PRODUCTS

2.1 FOUNDATION WALL INSULATION, UNDERSLAB INSULATION

A. Provide extruded polystyrene board insulation equal to "Styrofoam" manufactured by Dow Chemical Co. or approved equal made by Owens Corning or PACTIV Building Products, conforming to ASTM C 578, Type IV, with a maximum flame spread and smoke developed indices of 75 and 450 respectively.

B. Insulation shall have an aged R value of not less than 5/inch; shall be 2" thick unless otherwise noted on the drawings.

2.2 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.
6. Mason Insulation Products

B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 30 percent.

C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

D. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

2.3 SPRAY INSULATION

A. Spray Insulation at Tight Spaces: Provide polyurethane foam insulation product to fill gaps, joints, etc. that both seals and insulates, equal to "Great Stuff Professional Foam" as manufactured by the Dow Chemical Company or approved equal.

2.4 ACCESSORIES

A. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.

1. For bonding rigid polystyrene insulation to masonry or concrete, provide adhesive equal to "Foamgrab PS" made by Dacor Products Co. or equal made by ChemRex Inc. or Miracle Adhesives.

B. Protection Board: Pre-molded, semi-rigid asphalt/fiber composition board, 1/4" thick, formed under heat and pressure, standard sizes.

2.5 INSULATION FASTENERS

A. Insulation Fastening System at CMU and Concrete: Provide Ramset Insulfast system or approved mechanically fastening system.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where thermal insulation is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION, GENERAL

A. Clean substrates of substances that are harmful to insulation including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

B. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 INSTALLATION OF BLANKET INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
   a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
   b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
   a. Exterior Walls: Set units with facing placed toward interior of construction as indicated on Drawings.

3.5 INSTALLATION OF SPRAY FOAM INSULATION

A. Apply self-supported, spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it flush with face of studs by using method recommended by insulation manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 072500 - WEATHER BARRIER

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the weather barrier as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Weather barrier applied over sheathing board and cold formed metal framing.
2. Materials and installation to bridge and seal the following air leakage pathways and gaps:
   a. Connections of the walls to the roof.
   b. Connections of the walls to the foundations.
   c. Openings and penetrations of window frames, storefront.
   d. Door frames.
   e. Piping, conduit, duct and similar penetrations.
   f. Screws, bolts and similar penetrations.
   g. All other air leakage pathways in the building envelope.

1.3 RELATED SECTIONS

A. Section 061000 - Wood Framed Construction

1.4 SUBMITTALS

A. Submit shop drawings showing locations and extent of weather barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.

B. Submit manufacturer's product data sheets, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.

C. Submit manufacturer's installation instructions.

D. Submit certification of compatibility by weather barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it, including sealant as for caulking joints between sheathing panels.

E. Submit samples, 8-1/2” by 11” minimum size, of weather barrier material.

F. Quality Assurance Submittals

1. Manufacturer’s Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

1.5 GENERAL PERFORMANCE REQUIREMENTS

A. Provide weather barrier constructed to perform as a continuous air/weather barrier, and as a water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Entity with a minimum of 5 years of successful experience in the installation of the specified weather barrier system.

B. Single-Source Responsibility: Obtain weather barrier materials from a single manufacturer regularly engaged in manufacturing the product.

C. Mock-Up

1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
   a. Mock-up size: 10 feet by 10 feet.
   b. Mock-up Substrate: Match wall assembly construction, including window opening.
   c. Mock-up may [not] remain as part of the work.
2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store weather barrier materials as recommended by weather barrier manufacturer.

1.8 WARRANTY

A. Special Warranty

1. Weather barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® HomeWrap® and related assembly components.

B. Performance Characteristics:

1. Air Penetration Resistance: <0.004 cfm/ft2 at 1.57 psf, when tested in accordance with ASTM E2178.
2. Type I Air Barrier Material when tested in accordance with ASTM E1677.
3. Type II Water Resistive Barrier when tested in accordance with ASTM E2556

4. Water Vapor Transmission: 56 perms, when tested in accordance with ASTM E96-05, Method A.
5. Water Penetration Resistance: 250 cm when tested in accordance with AATCC Test Method 127.
6. Basis Weight: 1.8 oz/yd2, when tested in accordance with TAPPI Test Method T-410.
7. Air Resistance: 1200 seconds, when tested in accordance with TAPPI Test Method T-460.
8. Breaking Strength: 30/30 lbs/in., when tested in accordance with ASTM D882.
9. Tear Resistance: 8/6 lbs, when tested in accordance with ASTM D1117.
10. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Developed: 15.

2.2 ACCESSORIES

A. Seam Tape: 3” DuPont Tyvek Tape as distributed by DuPont.

B. Fasteners: Manufacturer’s standard recommended fasteners for substrate indicated.

C. Sealants: Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions. Provide products recommended by weather barrier manufacturer.

D. Adhesives: Provide adhesive recommended by weather barrier manufacturer

E. Primer: Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

F. Flashing

1. DuPont FlexWrap NF: Flexible membrane flashing materials for window openings and penetrations.
2. DuPont Flashing Tape.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where weather barrier is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Cover exposed exterior surface of sheathing with weather barrier securely fastened to framing immediately after sheathing is installed. Comply with manufacturer's written instructions and warranty requirements.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

B. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches (100 mm) except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.

5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.3 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.4 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 072616 - BELOW-SLAB VAPOR RETARDER

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the below-slab vapor retarder as shown on the drawings and/or specified herein, including but not limited to the following:

1. Confirm that the substrates for the below-slab vapor retarder are acceptable.
2. Provide a below-slab vapor retarder below slab on grade.
3. Integrate the vapor retarder with all surrounding work; coordinate all work with related trades.
4. Provide all necessary permits and fees for this work, including building permits, inspection fees, police detail, etc.

1.3 RELATED SECTIONS

A. Review specifications for related work for purposes of coordination.

B. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so that the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over unprotected roof areas.

1.4 SUBMITTALS

A. Submit the following items in time to allow for review by the Architect and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Architect's written approval.

1. Shop drawings of all conditions and details, including connection to all surrounding work and isometric (3D) details of complex conditions. Include work sequence for conditions between work of this Section and surrounding work, coordinate with related trades.
2. Contractor's qualifications.
3. Samples and/or manufacturer's literature for all materials specified or proposed for use on the project, properly labeled and referenced to the appropriate specification section. Samples required include, but are not limited to, the following:
   a. Vapor retarder.
   b. Seam tape.
   c. Protection layer.
   d. Any product or material proposed for substitution.
4. Certifications (in time for review to prevent delay in the work) by the producers of all materials stating that the materials supplied comply with all the requirements of the referenced standards and that all materials are suitable for the use specified herein.
5. Material Safety Data Sheets (MSDS) for each material where appropriate.
6. Project Schedule and Sequencing. Submit updated project schedule weekly throughout the project to reflect current status and project schedule.
7. Vapor retarder manufacturer's sample guarantees.

1.5 QUALITY ASSURANCE

A. Conduct a quality control program that includes the following as a minimum:

1. Inspect conditions and materials to ensure conformity to the contract requirements.
2. Continuously inspect substrate conditions and coordinate with the Architect to ensure proper substrate preparation in conformance with the contract requirements.
3. The Contractor shall arrange with the vapor retarder manufacturer to have a competent field representative visit the site to inspect the workmanship and the quality of the work. The manufacturer should visit the site as required to observe the progress of the work, but at least three times during the course of the project. The field representatives shall issue written reports of their findings and recommendations for corrective work, if any, to the Architect. The Contractor shall include all costs for the field representative, including all expenses, in the project bid price.
   a. The representative shall review and approve the condition of substrates prior to application of vapor retarder.
   b. The representative shall observe the first one to two days of application of vapor retarder.
   c. Representative shall review and approve below-slab-vapor-retarder conditions prior to pouring concrete.
4. Inspect work in progress and during inclement weather to ensure that the work is in compliance with approved procedures.
5. Inspect all completed and any corrected work for compliance with the Contract Documents and the vapor retarder manufacturers' recommendations.

B. The vapor retarder system shall be applied by an approved contractor authorized by the vapor retarder manufacturer to perform the work.

C. Attend a preconstruction conference to be held with representatives of the Owner, Contractor, Architect, and all other involved trades and parties to discuss the work covered under this Section.

D. Attend job meetings during the course of the work as required by the Construction Manager.

E. The Contractor/Subcontractor and its site superintendent(s) and Foreman shall have at least five years' experience with similar vapor retarder and flashing work with success.

1.6 DELIVERY, STORAGE, AND HANDLING

A. The Contractor is responsible for protecting all materials and equipment stored on the site.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not polyethylene) to cover all stored materials top to bottom.

C. Deliver materials clearly marked with legible and intact labels with manufacturer's name and brand name and identifying contents of containers.

D. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life.

E. Protect all materials in original unopened labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

F. Promptly remove from the site all materials rejected by the Architect or exposed to any moisture anywhere, at any time, during transportation, storage, handling, and installation.

G. Do not stockpile materials or equipment to overload any building or site component.

H. Protect materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed when not in use and away from open flames. Protect liquid components from freezing.

I. Store rolled goods on ends only. Discard rolls that have been flattened, creased, or otherwise damaged. Unroll sheets and allow them to “relax” prior to use.

J. Do not dilute primers, waterproofing cements, adhesives, coatings, or sealants. Keep containers closed, except when removing materials. Do not use equipment that is contaminated with materials that may be incompatible with the work.

K. Dispose of debris as required by state and local ordinances. All debris shall be removed from the site and the site returned to its original condition upon completion of the project.

L. Do not allow wrappers, packaging materials, or any other debris to be included in the vapor retarder system.

1.7 PROJECT CONDITIONS

A. Coordinate the work, use of the site, storage areas, and staging areas with the Contractor. Limit use of the site and working hours to dates, times, and locations approved by the Contractor.

B. All equipment used on the project shall comply with all applicable municipal and safety regulations – including OSHA guidelines – and be suitable for reasonable access for inspection of the Owner’s representative, who shall have free access to the work via the Contractor’s equipment.

C. Compliance with OSHA and all other safety laws and regulations is the exclusive responsibility of the Contractor, its Subcontractors, suppliers, consultants, and servants.

1.8 WARRANTY/GUARANTEE

A. Guarantee all work under this Section in a document stating that if, within two years after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Contractor shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Construction Manager or Nassau County Department of Public Works to do so, unless the Construction Manager or Nassau County Department of Public Works has previously given the Contractor a written acceptance of such condition. Also, state that the Contractor shall bear all costs incurred by Nassau County Department of Public Works, including reasonable attorney’s fees, court costs, and expert witness and consultant fees, to enforce Contractor’s compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to Nassau County Department of Public Works and its successors and assigns and may be enforced by the Nassau County Department of Public Works and its successors and assigns against the Contractor, shall survive the termination of the Contract, and shall not be limited by conditions other than this Contract.

PART 2 PRODUCTS

2.1 GENERAL

A. Check the availability of all specified items early and report any long lead times that may impact the intended schedule to the Owner promptly to prevent delays in the work.

B. All materials are to be new. Handle, store, and install materials as recommended by the manufacturer. Materials shall be delivered to the job site in their original containers with the manufacturer's name, grade, number, and batch identification on the container or packaging.

2.2 MATERIALS

A. Unless approved by the Architect, obtain all vapor retarder materials from the same manufacturer. All components of the vapor retarder system shall be as manufactured by, or approved by, the vapor retarder manufacturer and will be included in the vapor retarder system manufacturer's warranty.

2.3 MATERIALS

A. Unless approved by the Architect, obtain all vapor retarder materials from the same manufacturer. All components of the vapor retarder system shall be as manufactured by, or approved by, the vapor retarder manufacturer.

B. At under slab conditions, provide moisture barrier cover over prepared base material where indicated in accordance with ASTM E1643. Use only materials which are resistant to decay when tested in accordance with ASTM E154, as follows:

1. Vapor Retarder: Polyethylene sheet not less than 10 mils thick, which complies with ASTM E1745, Class B. Include manufacturer's recommended adhesive or pressure sensitive tape. Acceptable products include:
   a. Permeance Rating: Less than 0.1 Perms (ASTM F1249) as tested after mandatory conditioning (ASTM E1745, Paras. 7.1.2-5).
2. Approved Manufacturers:
   a. Stego Industries, LLC; Stego Wrap, 10 mil. (alternate 15 mil)
   b. Or approved equal.

C. Joint Sealer Tape: Stego Tape by Stego Industries, LLC., by one of manufacturers listed above or approved equal.

D. Mastic: Stego Mastic by Stego Industries, LLC. by one of manufacturers listed above or approved equal.

E. Termination Bar: 14 ga galvanized steel bar with stiffening ribs along outer edges, 1 in. wide, prepunched bar stock, spacing of holes as indicated in Drawings; Sarnabar by Sarnafil, Inc., by one of manufacturers listed above or approved equal.

1. Fasteners for Termination Bar: 1/4 in. diameter Tapcons with Stalgard corrosion resistant finish (color blue).

F. Hose Clamp: Stainless steel, worm drive.

PART 3 EXECUTION

3.1 GENERAL WORKMANSHIP

A. Vapor retarder systems shall be installed by contractors specifically authorized by the appropriate manufacturer prior to bid. Perform all work with trained personnel.

B. Arrange work sequence to avoid use of newly constructed vapor retarder for storage, walking surface, and equipment movement. Where access is absolutely required, protect surfaces with smooth 1/2 in. thick plywood runways to ensure full protection of vapor retarder surfaces and all other work against mechanical damage. Provide additional protection if needed to prevent damage. Move equipment and ground storage areas as work progresses to avoid abuse of completed vapor retarder.

C. Replace any new materials scheduled to remain that are damaged due to weather or other causes during the period of the work at no additional cost to Nassau County Department of Public Works. If water causes damage, remove and replace all wet materials at no additional cost to Nassau County Department of Public Works.

D. Do not work in temperatures below 40°F. Comply with applicable recommendations by manufacturers of all materials and workmanship and handling, except as modified in this Section.

E. Promptly remove from the site all damaged, defective, or rejected materials. Remove from the site all materials rejected by the Construction Manager or Nassau County Department of Public Works or the Architect.

F. Components of the vapor retarder system may be toxic and flammable. Heed all manufacturer's cautions and warnings concerning their use. Completed vapor retarder is slippery when wet or frost covered. Take proper precautions.

G. Do not use equipment for vapor retarder installation that is contaminated with materials that may be incompatible.

H. Workers and all others that walk on the waterproofing membrane shall wear clean, soft-soled shoes so as not to damage vapor retarder and related materials.

3.2 REPAIR AND PREPARATION OF SURFACES TO RECEIVE VAPOR RETARDER

A. General

1. Examine all surfaces scheduled to receive vapor retarder for roughness, contaminants, unsound structural substrates, or other conditions that may impair the vapor retarder application. Notify the Construction Manager and Architect in writing of any such conditions; do not commence work until all defects are remedied.
2. Clean all substrates of all foreign substances and remove loose materials, grease, oil, and other contaminants. The vapor retarder contractor and manufacturer shall inspect and approve the substrates before application of the vapor retarder system.

B. For horizontal surfaces to receive vapor retarder, the earth and crushed stone substrates shall be compacted to produce an even, sound substrate. Loose aggregate, sharp protrusions, and standing water shall be removed.

3.3 VAPOR RETARDER INSTALLATION

A. General

1. Conform to recommendations and published specifications of the manufacturer, including environmental requirements.
2. Do not allow water to pond on vapor retarder. Promptly remove water that collects on vapor retarder with vacuum or other method acceptable to the Construction Manager and the Architect.

B. Installation of Below-Slab Vapor Retarder

1. Install a continuous protection layer over the substrate immediately before installing the vapor retarder. Overlap sheets of protection layer approximately 4 in. Stagger laps between protection layer and vapor retarder. The vapor barrier can be placed above or below the slab insulation.

2. Vapor Retarder Installation: Below-slab vapor retarder shall be applied horizontally over the substrate. Minimize joints between sheets of vapor retarder to the greatest extent practical, without inhibiting the work. Overlap ends of sheets a minimum of 6 in. Overlap subsequent sheets 6 in. The below-slab vapor retarder sheets shall extend minimum 24 in. (or more if required on Drawings) past the future edge of the slab to allow for effective joining of the below-slab vapor retarder with foundation waterproofing.
3. Cleaning Edges and Seams: All lap/seam areas shall be fully cleaned prior to taping. If contaminated by dust, debris, water, or other contaminants, fully clean the seam with the cleaner recommended by the manufacturer and allow the seam area to fully dry before completing the seam.
4. Sealing Seams and Edges: Install seam tape within all seams. Provide a continuous unbroken seal. Roll seams with a rubber roller with moderate pressure; achieve continuous adhesion.
5. Sealing Penetrations: Penetrations shall be flashed with prefabricated pipe boots to the greatest extent practicable. Other penetrations shall be fully wrapped with vapor retarder material. Seal all seams and edges with seam tape. Provide stainless steel hose clamps at round penetrations.
6. T-Joints: Take extra care at T-joints to ensure that pinhole tunnels are not created. Install an additional patch of seam tape if needed.
7. Inside Corner Forming: Vapor retarder at inside corners shall be folded and creased (not cut) to the greatest extent practicable. The folded flap shall be taped in place with seam tape.
8. Joining and Sealing Below-Slab Vapor Retarder with Foundation Wall Waterproofing: Follow Drawings and manufacturer's installation instructions and ensure that all joints are fully and continuously sealed.
    a. After concrete is poured, secure and seal top of below-slab vapor retarder to foundation with two rows of seam tape and termination bar (fastened 8 in. o.c.) installed 2 in. below the top edge; seal the top edge. Foundation wall waterproofing shall shingle over vapor retarder a minimum of 12 in.; seal edge.

3.4 VAPOR RETARDER INSPECTION AND REPAIR

A. Inspection and repair of the below-slab vapor retarder system shall occur before installation of the reinforcement steel, before installation of formwork, and prior to placement of the concrete. Punctures shall be repaired as follows:

1. Clean surface with damp cloth, or water jet if required. Allow to dry.
2. For pinholes, apply repair tape, centered over puncture, roll firmly, remembering to remove release liner.
3. For damage other than pinholes, apply vapor retarder patch that extends 6 in. beyond opening; seal edges with seam tape.
4. Remove and reinstall concrete reinforcement if required for installation of patch.

3.5 CLEAN-UP

A. Upon completion of the vapor retarder system, the General Contactor shall remove all equipment, material, and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

B. All water shall be removed from the vapor retarder before placement of concrete.

END OF SECTION

SECTION 07 27 29 – AIR BARRIER COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid-applied, vapor-permeable silicone air barrier assembly.

B. Related Sections:
1. Section 061100 – “Wood Framing”
2. Section 061636 "Wood Panel Product Sheathing" for air barrier coating substrate.
3. Section 079200 "Joint Sealants" for installation requirements for elastomeric joint sealants applied in conjunction with work of this Section.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site. Review air barrier assembly installation requirements including substrate condition inspection, testing requirements, environmental conditions, mockups, details, and scheduling and inspection of work.

1.3 ACTION SUBMITTALS

A. Product Data: For specified products, including:
1. Substrate preparation instructions and recommendations.
2. Recommended primers and accessories.
3. Standard details illustrating applications of air barrier assembly products required for Project.
4. Product test reports.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified applicator.
1. Provide list of ABAA-certified air barrier installation personnel performing work on Project.

B. Preconstruction compatibility and adhesion test reports.

C. Manufacturer’s instructions for installation and field quality control testing.

D. Field quality control adhesion test reports.

E. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Employer of experienced applicators trained by manufacturer for application of air barrier products required for this Project with record of successful completion of projects of similar scope.

B. Mock-Up: Prior to installation of air barrier assembly, apply air barrier products to integrated exterior wall mockup to portion of wall construction designated by Architect to verify details under product data submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as application and execution specifics.
1. Apply air barrier assembly to mock-up components, including back-up wall substrates, window and door frames and sills, insulation, flashing, corner condition, junctions with roof system and foundation wall, and typical penetrations and gaps, illustrating materials interfaces and seals.
2. Retain mock-ups during application of the work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in original packaging with seals unbroken, labeled with manufacturer's name, product, date of manufacture and/or use-by date, and directions for storage.

B. Store materials in their original undamaged packages in a clean, dry, protected location at a temperature not above 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

A. Do not apply air barrier products during inclement weather or when such conditions are expected. Do not apply when relative humidity is greater than 90 percent or when there is a possibility of rain within 8 hours.
   1. Allow wet substrates to dry before applying products.

B. Do not apply air barrier products when air or substrate temperatures will be above 100 deg F (38 deg C) or below 20 deg F (-6 deg C) at time of product application.

1.8 WARRANTY

A. Special Warranty, General: Manufacturer's standard project-specific form in which manufacturer agrees to repair or replace air barrier coatings and accessory products that demonstrate deterioration or failure within warranty period specified due to material failure under normal use. Failure includes water or air penetration through air barrier assembly.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Products: Provide air barrier coatings and accessory products manufactured by Dow Corning Corp., DefendAir 200 Silicone Liquid-Applied Air and Weather Barrier. or comparable products of other manufacturers as listed;
   1. Henry Company, Air-Bloc 31MR
   2. W.R. Meadows, Air Shield LM

2.2 MATERIALS, GENERAL

A Single Source Responsibility: Provide air barrier coatings and accessory products of a single manufacturer through a single source.

B. VOC Content: Provide products complying with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and in accordance with VOC limitations of authorities having jurisdiction.
   1. Coatings: 250 g/L.
   2. Coating Primers: 200 g/L.
   3. Sealants: 250 g/L.
   4. Sealant Primers for Nonporous Substrates: 250 g/L.
   5. Sealant Primers for Porous Substrates: 775 g/L.

C. Low-Emitting Materials: Provide products complying with testing and product requirements of California DHCS.

2.3 PERFORMANCE REQUIREMENTS

A. Air Barrier Assembly, General: Provide air barrier assembly consisting of fluid-applied coating, molded transition strips, and liquid sealants that together perform as a continuous vapor-permeable air barrier, capable of accommodating normal structural movement, transitions

between coating substrate materials, penetrations of coating substrates, and tie-ins to framed openings, waterproofing systems, and roofing systems, without deterioration or air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Not more than 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa) when tested according to ASTM E 2357.

C. Allowable UV Exposure Time: Not less than 12 months.

D. Surface-Burning Characteristics: Provide air barrier coatings that achieve flame-spread index of 25 or less and smoke-developed index of 450 or less per ASTM E 84.

2.4 SILICONE AIR BARRIER ASSEMBLY

A. Air Barrier Coatings: Fluid-applied, water-based, vapor-permeable, one-component silicone elastomeric coating.
   1. Product: Silicone Liquid-Applied Air and Weather Barrier.
   2. Air Permeance, ASTM E 2178: Not more than 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa).
   3. Volatile Organic Compound (VOC) Content: <19 g/L maximum.
   4. Vapor Permeance, ASTM E 96, Method A: Not less than 10 perms.
   5. Ultimate Elongation, ASTM D 412: Not less than 600 percent.
   6. UV Exposure and Resistance, ASTM G 154: Not less than 5,000 hour exposure.

B. Silicone Elastomer Weather Barrier Transition Strips: Highly-flexible clear flashing and transition sheet with pre-molded corner accessory pieces for bonding to weather barrier substrates and to adjacent curtain wall, storefront, and window frames and other transition substrates using silicone sealant.
   1. Product: Silicone Transition Strip.
   2. Air Infiltration, ASTM E 283: Maximum 0.025 cfm/sq. ft. (0.127 L/s per sq. m) at 6.24 lbf/sq. ft. (300 Pa).
   3. Water Penetration under Static Pressure, ASTM E 331: None at 15 lbf/sq. ft. (720 Pa).
   4. Movement Capability: Not less than plus 200, minus 75 percent.
   5. Tensile Strength, ASTM D 412: Not less than 800 psi (5.5 MPa).
   6. Tear Strength, ASTM D 624: Not less than 200 psi (16 kN/m).
   7. Elongation, ASTM D 412: Not less than 400 percent.
   8. Hardness, ASTM D 412: 50 - 60 durometer Shore A.

C. Silicone Elastomer Seals: Highly flexible low-modulus flashing and transition material for bonding to substrates with silicone sealant. SWRI validated.
   1. Product: Silicone Seal.
   2. Bonding Sealant: Manufacturer's recommended neutral-curing silicone.
   3. Hardness, ASTM D 2240: 25 durometer Shore A, minimum.

D. Detail Joint and Bonding Sealant: ASTM C 920, single-component, neutral-curing silicone, Grade NS, SWRI-validated, of Class indicated, compatible with adjacent materials. Provide products recommended by air barrier manufacturer for application.

E. Detail Joint and Bonding Sealant: Single-component, neutral-curing silicone, Grade NS, of Class indicated, compatible with adjacent materials. Provide products recommended by air barrier manufacturer for application.
   1. Class 25: Product: Liquid Flashing Sealant.

2.5 ACCESSORY MATERIALS

A. Crack Fillers: Substrate manufacturer's recommended crack fillers or sealants compatible with air barrier assembly components and adjacent materials.

B. Primer: Air barrier coating manufacturer's recommended, factory-formulated, alkali-resistant primer compatible with substrate and adjacent materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to determine if work is ready to receive air barrier system. Verify that surfaces are clean, dry, and free of frost, dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, mildew, excess alkalinity, and other conditions affecting performance of work.

B. Preinstallation Testing: Prior to application of air barrier coatings, perform the following tests to verify condition of substrate in accordance with manufacturer’s instructions:
   1. Adhesion: Perform substrate field adhesion tests on each substrate to determine if primer is required to satisfactorily adhere air barrier coatings to substrates.
   2. Alkalinity: Verify substrate is within alkalinity range acceptable to manufacturer.
   3. Moisture Level: Verify substrate moisture content is acceptable to manufacturer. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

C. Proceed with air barrier coating work once conditions meet air barrier coating manufacturer's recommendations.

3.2 PREPARATION

A. General: Comply with air barrier coating manufacturer's written instructions for preparation of substrates. Protect work of other trades against damage from application of air barrier coatings.

B. Cleaning: Clean substrates to remove contaminants and foreign material by pressure cleaning, wire brushing, grinding or other method recommended by air barrier coatings manufacturer.

C. Substrate Repair: Repair deteriorated or damaged substrates, fill cracks, voids, and other defects using materials as recommended in writing by air barrier coating manufacturer.

D. Protection: Protect adjacent surfaces not designated to receive air barrier coatings. Provide protection for pedestrians, vehicles, landscaping, and surrounding areas to prevent contact with coating materials.

E. Primer: Apply primer to substrates where required based upon preinstallation testing and air barrier coating manufacturer's recommendations, using application methods and rate of application recommended by manufacturer. Allow to dry prior to application of air barrier coating.

3.3 AIR BARRIER APPLICATION

A. Transition Strips and Elastomer Seals: Install with approved sealants in accordance with manufacturer’s written instructions.
   1. Form tie-in to storefront, and curtain wall frames, door frames, louver frames, roofing system perimeters, and at interface of other adjacent materials utilizing compatible accessory materials forming part of air barrier assembly.
   2. Promptly adhere laps and bonds to substrates.

B. Air Barrier Coating: Apply air barrier coating using application methods and rate of application recommended by manufacturer. Apply using nap roller or airless sprayer, as allowed by authorities having jurisdiction.
   1. Provide wet application of not less than 0.030 inch (0.76 mm) thickness or more as required by substrate conditions in order to provide finished dry film thickness of not less than 0.015 inch (0.38 mm).
   2. Apply additional coats when required to provide uniform, continuous cured airtight and watertight film.

3.4 FIELD QUALITY CONTROL

A. may retain testing agency to perform the following tests:
   1. Verification that substrate preparation meets requirements.

2. Testing and certification that coating materials comply with requirements for thickness and continuity.
3. Testing of application for compliance with adhesion and film thickness requirements.

B. If testing indicates products or work do not meet requirements, Owner may stop work and require Contractor to remove non-complying materials and materials applied over non-complying substrates, and otherwise correct application.

3.5 CLEANING AND PROTECTION

A. Curing and Protection: Allow air barrier coatings to cure before exposure to traffic or other construction operations. Prevent damage to coatings resulting from construction operations or other causes. Replace damaged air barrier coatings prior to concealment behind subsequent construction.

B. Cleaning: Remove overspray and excess material as work progresses, using materials and methods approved by manufacturer that will not damage adjacent materials.

C. Remove temporary coverings and protection upon completion. Clean and repair adjacent surfaces damaged by air barrier coating application.

END OF SECTION

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the asphalt shingles as shown on the Drawings and specified herein, including, but not limited to, the following:

1. Asphalt roofing shingles.
2. Underlayments.
3. Metal flashing.
4. Roofing accessories.

1.3 RELATED SECTIONS

A. Wood Framed Construction – Section 061000.

B. Carpentry - Section 062000.

C. Sheet metal work - Section 076200.

1.4 SUBMITTALS

A. Product data for each type of product specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.

B. Four (4) Samples for initial selection purposes in form of manufacturer's sample finishes showing full range of colors and profiles available.

1.5 QUALITY ASSURANCE

A. Fire Performance Characteristics: Provide products that are identical to those tested for the specified fire performance characteristics by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspection organization.

1. Fire Resistance Ratings: As indicated by reference to design designations in UL "Fire Resistance Directory."

B. Wind Load Criteria: Refer to the structural drawings.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site in manufacturer's unopened bundles or containers with labels intact.

B. Handle and store materials at site to prevent water damage, staining, or other physical damage. Store roll goods on end. Comply with manufacturer's recommendations for job site storage, handling and protection.

1.7 PROJECT CONDITIONS

A. Weather Conditions: Proceed with work only when existing and forecasted weather conditions will permit work to be installed in compliance with manufacturer's recommendations and when substrate is completely dry.

1.8 WARRANTY

A. Special Project Warranty: Submit a written warranty, executed by manufacturer, agreeing to repair or replace asphalt shingles that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, deformation or deterioration of shingles beyond normal weathering. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

1. Warranty period is 25 years after project acceptance by Nassau County Department of Public Works.
2. Include all elements of roof assembly in 25-year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following manufacturers:

1. Basis of Design:
   a. Roof Shingles: GAF Timberline HDZ Architectural Shingles.
   b. Hip/Ridge: TimberTex; TimberCrest; Seal-A-Ridge; Z Ridge; Ridglass 5.
   c. Starter: Pro-Start; QuickStart; WeatherBlocker
2. Other Manufactures as approved by Architect
   a. Certainteed Corp.
   b. Owens Corning Corp.
   c. Tamko.

2.2 ASPHALT ROOFING SHINGLES

A. Shingles, UL Class "A" Heavy Weight: Mineral-surfaced, 5 5/8" exposure, self-sealing asphalt fiberglass strip shingles complying with ASTM D7158 Class H, ASTM D 3018 Type 1, ASTM D 3161 Class F, and ASTM D 3462. Provide shingles bearing UL 790 Class "A" external fire exposure label and UL 997 "Wind Resistant" label.

1. Color: As selected by Architect from manufacturer's full range.
   a. See Architectural drawings for color selection for each building.

B. Hip and Ridge Shingles: Manufacturer's standard factory precut units to match shingles.

2.3 ACCESSORIES

A. Felt Underlayment: No. 30; unperforated organic felt complying with ASTM D 226, Type I, 36" wide; or GAF "DeckArmor."

B. Asphalt Plastic Cement: Non-asbestos fibrated asphalt cement complying with ASTM D 4586, designed for trowel application.

C. Shingling Nails: Aluminum or hot dip galvanized steel, 10 or 12 gauge, sharp-pointed, conventional roofing nails with barbed shanks, minimum 3/8" diameter head, and of sufficient length to penetrate 3/4" into solid decking or to penetrate through plywood sheathing. Material of nails in contact with flashing shall match materials selected for flashing to prevent galvanic action.

D. Metal Drip Edge: Minimum 0.032" aluminum sheet, brake-formed to provide 3" roof deck flange and 1-1/2" fascia flange with 3/8" drip at lower edge. Furnish in lengths of 8 or 10 feet.
E. Sheet Metal Flashing: As specified in Section 076200.

F. Self-Adhering Roof Underlayment: Minimum 40 mil thick, self-adhering, polymer modified bituminous sheet membrane, complying with ASTM D 1970. Provide primer when recommended by underlayment manufacturer. Provide "Vycor Ice and Water Shield" made by W. R. Grace or GAF "StormGuard" or "Weather Watch."

1. Install underlayment 3'-0" up roof from interior face of exterior wall around perimeter and at
2. all eaves, valleys, low-pitch roofs, rake edges, confined rake edges, and where shown.

G. Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene ridge vent with snow screen design; for use under ridge shingles. Provide V-400E ridge vent as manufactured by Cor-A-Vent, Inc.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where asphalt shingle roofing is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application. Cover knot holes or other minor voids in substrate with sheet metal flashing secured with non-corrosive roofing nails.

B. Coordinate installation with flashings and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roofing have been installed and are securely fastened against movement.

3.3 INSTALLATION

A. Comply with manufacturer's installation instructions and recommendations, but not less than recommended by "The NRCA Steep Roofing Manual."

B. Felt Underlayment: Apply one ply of felt underlayment horizontally over entire surface to receive asphalt shingles, lapping courses a minimum of 2", end laps a minimum of 4", and hips a minimum of 6". Fasten felt with sufficient number of roofing nails or non-corrosive staples to hold underlayment in place until asphalt shingle application. Provide double layer of felt at roof slopes between 2:12 and 4:12.

C. Waterproof Underlayment: Apply waterproof underlayment at eaves and as shown on drawings. Cover deck from eaves at least 36" inside exterior wall line.

D. Install asphalt shingles beginning at lower end with a starter strip of roll roofing or inverted shingles with tabs removed. Fasten shingles in pattern, with weather exposure, and using number of fasteners per shingle as recommended by manufacturer. Use vertical and horizontal chalk lines or premarked underlayment to ensure straight coursing.

1. Cut and fit asphalt shingles at ridges and edges to provide maximum weather protection. Provide same weather exposure at ridges as specified for roof. Lap shingles at ridges to shed water away from direction of prevailing wind. Fasteners at ridges shall be of sufficient length to penetrate sheathing as specified.

2. Set shingle pattern as recommended by shingle manufacturer for shingle selected.

E. Flashing: Install metal flashing in accordance with details and recommendations of the "Asphalt Roofing" section of "The NRCA Steep Roofing Manual."

F. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

3.4 ADJUSTING

A. Replace any damaged materials installed under this Section with new materials meeting specified requirements.

END OF SECTION

SECTION 074633 VINYL SIDING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the vinyl siding as shown on the drawings and/or specified herein, including the following:

1. Solid vinyl exterior siding.
2. Vinyl soffit.
3. Related trim, flashings, accessories, and fastenings.

1.3 RELATED SECTIONS

A. Wood Frame Construction - Section 061000.

B. Joint Sealers - Section 079200.

1.4 REFERENCES

A. ASTM D 3679 - Standard Specification for PVC Siding.

1.5 SUBMITTALS

A. Submit the following supporting data:

1. Product Data: For each type of product specified. Include identification of materials; dimensions of individual components; installation instructions; and available profiles, textures, and colors.
2. Research/Evaluation Reports: Evidence of siding's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

B. Samples for Verification: Submit four (4) Full-size units of each type of siding and trim indicated in sets for each color, texture, and pattern.

1. 12 inch long-by-actual width sample of each siding and trim.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed siding installations similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Siding and Accessories: Obtain each color, texture, pattern, and type of siding and related accessories from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Manufacturer to certify that vinyl siding meets or exceeds the VS (Vinyl Siding Institute) certification standards.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store siding flat, off the ground, away from dirt, moisture, and direct heat, and under a waterproof cover draped to permit air circulation.

B. Do not allow siding cartons to crease.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation only if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions and if substrate is completely dry.

1.9 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 Project Warranty: Submit a written warranty, executed by siding manufacturer, agreeing to repair or replace siding that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering. Fading is defined as loss of color, after cleaning with product recommended by manufacturer, of more than 4 color-difference units as measured according to ASTM D 2244.

1. Warranty Period: 50 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 VINYL SIDING

A. Basis of Design: CertainTeed LLC, Siding Products Group, 20 Moores Road, Malvern, Pennsylvania 19355. Tel: (800) 233-8990; Email: salessupportgroup@certainteed.com; Web: www.certainteed.com, or approved equal by Architect.

1. Basis of Design Vinyl Siding Restoration Classic D5 (cedar grain):
   a. Design: Double 5-inch (127 mm) clapboard, select cedar finish with STUDfinder Installation System.
   b. Nail Hem: RigidForm 200 Technology Roll Over Nail Hem.
   c. Lock: DuraLock post formed lock design.
   d. Width: 10 inches (254 mm) plus or minus .062 inch (1.57 mm).
   e. Length: 12 feet (3.66 m) plus or minus .025 inch (6 mm).
   f. Average Thickness: 0.044 inch (1.1 mm).
   g. Panel Projection: 5/8 inch (15.9 mm).
   h. Exposure: 5 inches (127 mm) single nailing hem with patented stabilizer reinforcement.
   i. Maximum Warp (per 2 panels): 0.250 inch (6 mm).
   j. Color: as indicated on Architectural Drawings as selected by Architect from manufacturer’s standards.
2. Vinyl Siding, Soffit and Components: Provide products made of extruded polyvinyl chloride as specified in this section and manufactured to comply with requirements of ASTM D 3679.
   a. Provide elongated nailing slots on nailing flanges to allow for movement.
   b. Factory-notch ends of horizontal panels to form overlapping joints.
   c. Provide products that meet weathering requirements of ASTM D 3679.

2.2 ACCESSORIES

A. Provide matching vinyl trim, channels, corner boards in locations shown on Drawings and as required for complete installation.

B. Provide lineal trim, corner inserts (square and cove type), window and door head trim, and other trim pieces necessary to complete installation. Include the following pieces where needed: Drip cap, starter strip, frieze runner and wall mounting, “J” channel, and splice pieces.

C. Fasteners: Noncorrosive aluminum siding nails, in sufficient length to penetrate a minimum of 1 inch into substrate. Provide prefinished fasteners in color to match siding where face nailing is unavoidable.

D. Weather Barrier: Section 072500.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for substrates, installation tolerances, and other conditions effecting performance of siding. Do not proceed with installation until satisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

3.3 INSTALLATION - SIDING

A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply. Center nails in elongated nailing slots without binding siding to allow for thermal movement. Overlap joints to shed water away from direction of prevailing wind.

B. Install vinyl siding, soffit, and accessories according to ASTM D 4756.

C. Apply air and vapor barrier to all surfaces, lapping ends and edges 6".

D. Provide for expansion and contraction of siding.

E. Joints or laps shall be in accordance with manufacturer’s printed instructions. Locate end joints over center lines of framing. Stagger end joints and separate by at least two courses.

F. Hold siding 1/4" away from floors, soffits, doors, windows, and louver frames for sealant application as specified in Section 079200.

G. Provide sealant applications at all locations as recommended by the siding manufacturer.

H. Install flashings at sills and head of wall openings.

I. Arrange components to encourage watershed. Securely fasten in place, aligned, level, and plumb. Cut board ends over bearing surfaces.

J. Install corner strips, closures, and trim.

K. All corners shall be mitered.

L. Exercise care when site cutting. Ensure cuttings or burred edges do not remain on finish surfaces.

M. Use concealed fasteners except where approved by the Architect. Place sealant or gaskets to arrest weather penetration. Maintain neat appearance.

3.4 INSTALLATION - SOFFITS

A. Install soffits and accessories in accordance with manufacturer's standard published details and installation instructions.

B. Installation of materials specified within this Section shall be in accordance with the best practice, with all joint members true and plumb.

C. Provide for expansion and contraction.

D. Provide sealant applications at all locations as recommended by the soffit manufacturer.

3.5 ADJUSTING AND CLEANING

A. Remove and replace damaged, improperly installed, or otherwise defective siding materials with new materials complying with specified requirements.

B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

C. Upon completion of the siding application, the entire area is to be cleaned, removing all scraps, packaging, and unused building materials remaining from this installation.

END OF SECTION

SECTION 075200 - MODIFIED BITUMIN ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. SBS-modified bituminous membrane roofing.

B. Cover board.

C. Roof insulation.

D. Vapor retarder.

E. Substrate board.

1.2 RELATED SECTIONS

A. Division 06 Section "Carpentry" for wood nailers, cants, curbs, and blocking and for wood-based, structural-use roof deck panels.

B. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter flashings.

C. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:

1. ASTM D 1079 “Standard Terminology Relating to Roofing and Waterproofing.”
2. Glossary of NRCA’s “The NRCA Roofing and Waterproofing Manual.”
3. Roof Consultants Institute “Glossary of Building Envelope Terms.”

B. Sheet Metal Terminology and Techniques: SMACNA “Architectural Sheet Metal Manual.”

C. Hot Roofing Asphalt: Roofing asphalt heated to temperature recommended by roofing manufacturer to flux modified roofing membrane, measured at the mop cart or mechanical spreader immediately before application.

1.4 DESIGN CRITERIA

A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. Installer shall comply with current code requirements based on authority having jurisdiction.

D. Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test- response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

1.5 SUBMITTALS

A. Product Data: Manufacturer’s data sheets for each product to be provided.

B. Detail Drawings: Provide roofing system plans, elevations, sections, details, and details of attachment to other Work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening and adhesive patterns.

C. Verification Samples: Provide four (4) samples for each product specified.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Maintenance Data: Provide latest published documents by roofing manufacturer.

F. Guarantees: Provide manufacturer’s current guarantee specimen.

G. Prior to beginning the work of this section, roofing sub-contractor shall provide a copy of the final System Assembly Letter issued by Roofing manufacturer indicating that the products and system to be installed) shall be eligible to receive the specified manufacturer's guarantee when installed by a certified contractor in accordance with the application requirements, inspected and approved by the roofing manufacturer’s Technical Representative.

H. Prior to roofing system installation, roofing sub-contractor shall provide a copy of the Guarantee Application Confirmation document issued by Roofing manufacturer’s Roofing Systems indicating that the project has been reviewed for eligibility to receive the specified guarantee and registered.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's guarantee.

B. Manufacturer Qualifications: Qualified manufacturer that has UL listing for roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.

D. Test Reports:

1. Roof drain and leader test or submit plumber's verification.
2. Roof deck fastener pullout test.

E. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system shall be labeled by the single source roofing manufacturer issuing the guarantee.

F. Provide evidence of CERTA training for any installer of torch-applied modified bitumen membrane. Copies of certifications are required prior to award and shall be maintained on the jobsite for inspection at any time.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 GUARANTEE

A. Provide manufacturer's system guarantee.

1. Single-Source special guarantee includes roofing plies, base flashings, liquid applied flashing, roofing membrane accessories, granule surfaced roofing membrane, roof insulation, fasteners, cover board, substrate board, vapor retarder, walkway products, manufacturer's expansion joints, manufacturer's edge metal products, and other single-source components of roofing system marketed by the manufacturer.
2. Guarantee Period: 20 years from date of Substantial Completion.

B. Installer’s Guarantee: Submit roofing Installer's guarantee, signed by Installer, covering Work of this Section, including all components of roofing system, for the following guarantee period:

1. Guarantee Period: Two years from date of Substantial Completion.

C. Existing Guarantees: Guarantees on existing building elements should not be affected by scope of work.

1. Installer is responsible for coordinating with building Nassau County Department of Public Works representative to verify compliance.

PART 2 - PRODUCTS

2.1 BASE PLY AND CAP-SHEET MATERIALS

A. Roofing Membrane Sheet: ASTM D 6163, Grade S, Type I, glass-fiber-reinforced, SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified. Basis of Design: DynaWeld Base

B. Roofing Membrane Cap Sheet: ASTM D 6163, Grade G, Type I, glass-fiber-reinforced, SBS-modified asphalt sheet; granular surfaced; suitable for application method specified. Basis of Design: DynaWeld Cap FR

2.2 FLASHING SHEET MATERIALS

A. Backer Sheet: ASTM D 6163, Grade S, Type I, glass-fiber-reinforced, SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified. Basis of Design: DynaWeld Base

B. Flashing Sheet: ASTM D 6163, Grade G, Type I, glass-fiber-reinforced, SBS-modified asphalt sheet; granular surfaced; suitable for application method specified. Basis of Design: DynaWeld Cap FR

C. Liquid Applied Flashing: A liquid and fabric reinforced flashing system created with a stitch bonded polyester scrim and a two-component, moisture cured, elastomeric, liquid applied flashing material, consisting of an asphalt extended urethane base material and an activator. Basis of Design: PermaFlash System

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

B. Mastic Sealant: As required by Basis of Design manufacturer: Johns Manville.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and provided by the roofing system manufacturer. Basis of Design: UltraFast Fasteners and Plates

D. Roofing Granules: Ceramic-coated roofing granules matching specified cap sheet, provided by roofing system manufacturer. Roofing Granules

E. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

F. Cold-Applied Flashing Adhesive: Roofing system manufacturer's asphalt-based, two-component, asbestos-free, trowel-grade, cold-applied adhesive specially formulated for compatibility and use with flashing applications. Basis of Design: MBR Utility Cement

2.4 WALKWAYS

A. Walkway Pads: Mineral-granule-surfaced, reinforced modified asphalt composition, slip-resisting pads, manufactured as a traffic pad for foot traffic provided by roofing system manufacturer, with a pad size of 32-inch x 32 inch. Basis of Design: DynaTred Walkway

2.5 COVER BOARD

A. Gypsum Board: ASTM C 1278, non-faced, gypsum and cellulose fiber substrate, 1/4 inch (6 mm) thick. Basis of Design: JM Securock Gypsum-Fiber Roof Board

2.6 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1 , Grade 2 (20 psi) , Basis of Design: ENRGY 3.

1. Provide insulation package with minimum R Value: 3.3”.
2. Provide insulation package in multiple layers.
3. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.
   a. Determined in accordance with CAN/ULC S770 at 75ºF (24ºC)

2.7 TAPERED INSULATION

A. Tapered Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) , provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated. Basis of Design: Tapered ENRGY 3

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Basis of Design: DiamondBack Pre-Cut Crickets DiamondBack Pre-Cut Miters Tapered Fesco Edge Strip

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Basis of Design: All Purpose Fasteners and Flat-Bottom Plates

D. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate. Basis of Design: JM Two-Part Urethane Insulation Adhesive (UIA)

E. Insulation Cant Strips: ASTM C 728, perlite insulation board. Basis of Design: FesCant Plus

F. Wood Nailer Strips: Comply with requirements in Division 06 Section " Carpentry."

2.9 VAPOR RETARDER

A. Self-Adhered SBS Vapor Retarder: Tri-laminate woven polyethylene, nonslip UV protected top surface; suitable for application method specified. Basis of Design: JM Vapor Barrier SA.

B. Self-Adhered Primer: One-part penetrating primer solution to enhance the adhesion of self-adhering membranes. SA Primer

2.10 SUBSTRATE BOARD

A. Substrate Board: ASTM C 1278, non-faced, gypsum and cellulose fiber substrate, 1/2 inch thick. Basis of Design: JM Securock Gypsum-Fiber Roof Board

2.11 SHEATHING PAPER

A. Sheathing Paper: Red-rosin type, minimum 3 lb./100 sq. ft. (0.16 kg/sq. m).

2.12 AUXILIARY ROOFING SYSTEM COMPONENTS

A. Expansion Joints: Provide factory fabricated weatherproof, exterior covers for expansion joint openings consisting of flexible rubber membrane, supported by a closed cell foam to form flexible bellows, with two metal flanges, adhesively and mechanically combined to the bellows by a bifurcation process. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of Design: Expand-O-Flash

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.

1. General:
   a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
   b. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

2. Ensure general rigidity and proper slope for drainage.
3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

B. Unacceptable panels should be brought to the attention of the General Contractor and Construction Manager and shall be corrected prior to installation of roofing system.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

C. If applicable, prime surface of deck with asphalt primer at a rate recommended by roofing manufacturer and allow primer to dry.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 RE-ROOF PREPARATION

A. Remove all roofing membrane, surfacing, coverboards, insulation, fasteners, asphalt, pitch, adhesives, etc.

1. Remove an area no larger than can be re-roofed in one day.

B. Tear out all base flashings, counter-flashings, pitch pans, pipe flashings, vents and like components necessary for application of new membrane.

C. Remove abandoned equipment curbs, skylights, smoke hatches, and penetrations.

1. Install decking to match existing as directed by Owner's Representative.

D. Raise (disconnect by licensed craftsmen, if necessary) all HVAC units and other equipment supported by curbs to conform with the following:

1. Modify curbs as required to provide a minimum 8" base flashing height measured from the surface of the new membrane to the top of the flashing membrane.
2. Secure of flashing and install new metal counterflashing prior to re-installation of unit.
3. Perimeter nailers shall be elevated to match elevation of new roof insulation.

E. Immediately remove all debris from roof surface. Demolished roof system may not be stored on the roof surface.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof per roofing system manufacturer's written instructions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 VAPOR-RETARDER INSTALLATION

A. Install modified bituminous vapor retarder sheet per roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

1. Self-adhere vapor retarder to substrate per roofing system manufacturer’s instructions.
2. Unroll roofing membrane sheets and allow them to relax for minimum time required by manufacturer.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.

C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.

E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Adhered Insulation: Adhere each layer of insulation to substrate as follows:

1. Install each layer in a two-part urethane adhesive according to roofing system manufacturer’s instruction.
2. Install each layer to resist uplift pressure at corners, perimeter, and field of roof.

I. Proceed with installation only after unsatisfactory conditions have been corrected.

3.7 COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with cover board.

1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.

D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.

1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

E. Adhered Cover Board: Adhere cover board to substrate as follows:

1. Install in a two-part urethane adhesive according to roofing system manufacturer’s instruction.
2. Install to resist uplift pressure at corners, perimeter, and field of roof.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.8 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

C. Where roof slope exceeds 1/2 inch per 12 inches (1:24), contact the membrane manufacturer for installation instructions regarding installation direction and back-nailing

D. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.9 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install one modified bituminous roofing membrane sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, with the following installation method:

1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.
2. Heat weld modified bituminous roofing membrane sheets to substrate according to roofing system manufacturer’s instruction.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.
2. Apply roofing granules to cover exuded bead at laps while bead is hot.

C. Install roofing membrane sheets so side and end laps shed water.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.10 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Backer Sheet Application: Install backer sheet and heat weld to substrate as required by roofing system manufacturer.
3. Flashing Sheet Application: Heat weld flashing sheet to substrate as required by roofing system manufacturer.

B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. Seal top termination of base flashing with a strip of glass-fiber fabric set in MBR Flashing cement.

D. Roof Drains: Flash drain using liquid applied flashing (PermaFlash) system. Clamp roofing membrane, flashing, and stripping into roof-drain clamping ring.

1. Install stripping according to roofing system manufacturer's written instructions.

E. Flash all penetrations using liquid applied flashing (PermaFlash) system.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.11 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.

1. Sweep away loose aggregate surfacing and set walkway pads in additional cold applied adhesive.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.12 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's Registered Roof Observer (RRO) to inspect roofing installation on completion and submit report to Construction Manager and Architect.

1. Notify Construction Manager and Architect 48 hours in advance of date and time of inspection.

B. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.13 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 076200 SHEET METAL FLASHING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet metal flashing as indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Stainless steel flashing.
2. Aluminum flashing.
3. Field fabricating (including bending, cutting, soldering, etc.), if required, of flashing.
4. Separation of contacting surfaces of dissimilar metals.

1.3 RELATED SECTIONS

A. Roofing - Division 7.

1.4 SUBMITTALS

A. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction and relation to adjoining construction.

B. Samples: Submit four (4) 12" x 12" samples of flashing materials and finishes.

1.5 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Nassau County Department of Public Works.

1.6 WARRANTY

A. The Contractor shall warrant that all Metal Flashing Work executed under this Section will be free from defects in materials and workmanship for a period of ten (10) years from date of acceptance of the Project, and he shall remedy any defects in the Metal Flashing Work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stainless Steel Materials

1. Stainless Steel Flashing: ASTM A 240, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, or Washington Steel Corp. Thickness of stainless steel shall be as listed below.

a. Concealed Flashings: 0.012" thick, thirty (30) gauge (U.S. Standard).
b. Exposed Flashings: 0.015" thick, twenty-eight (28) gauge (U.S. Standard).
c. Edge Strips: 0.025" thick, twenty-four (24) gauge (U.S. Standard).

2. Through-wall flashing shall have sawtooth ribs at three (3) inch intervals, as manufactured by Keystone Flashing Co., or approved equal.
3. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.
4. Solder: Composed of sixty (60) percent block tin and forty (40) percent pig lead, except that solder at seams exposed to public view shall be eighty (80) percent tin and twenty (20) percent lead.
5. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.

B. Aluminum Flashing: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; mill finish for concealed flashing; 0.040" thick.

1. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel, or aluminum.
2. High-Performance Organic 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 written instructions.
   a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.
   b. Color: As selected by the Architect.

C. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where sheet metal flashing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 METAL FLASHING INSTALLATION

A. Reference Standard: Conform to the requirements of 7th Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.

B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.

C. Nailing: Confine to sheets twelve (12) inches or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use one (1) inch long masonry nails for nailing to concrete. Space nails four (4) inches o.c. maximum.

D. Cleating: Use cleats where sheets are more than twelve (12) inches in width. Space cleats approximately twelve (12) inches o.c. Cleats two (2) inches wide by three (3) inches long, of the same material and weight as the metal flashing being installed. Secure one end of the cleat with two (2) nails and fold edge back over the nail heads. Lock other end into seam or into folded edge of metal flashing sheets. Pre-tin cleats for soldered seams.

E. Joining: Join metal flashings with one (1) inch locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.

F. Soldering

1. Stainless Steel and Aluminum: Mechanically clean all metal surfaces to be soldered with steel wool. Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.

G. Slip Joints: Locate slip joints not more than twenty-four (24) feet apart and not more than eight (8) feet from corners. Form slip joints as three (3) inch wide joints with cover piece behind flashing and fill locked ends neatly with sealant.

H. Cap Flashing: Install over base flashings, in eight (8) to ten (10) foot lengths, lapped six (6) inches at ends. Cap flashing shall be increased longitudinally to produce spring action to hold bottom edge of cap flashing firmly against base flashing. Cap flashing shall lap base flashing at least four (4) inches, with exposed bottom edge at a forty-five (45) degree angle downward and folded back on underside at least 1/2" to form drip. Make cap flashing continuous at corners and angles.

I. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein but indicated on drawings and/or required to provide a watertight installation.

J. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.

K. Reglets.

1. Provide watertight reglets in masonry and concrete work to receive cap flashing. Form reglets of copper or stainless steel, as indicated, using same thickness as sheet metal specified.
2. In masonry work use open or closed slot reglets with slat at least one (1) inch deep and 3/16" wide. Provide hook dams or turn-ups for anchoring securely into mortar joints. Insert cap flashing into slot full depth using button punch or lead wedges to lock in place.
3. In concrete work, use open or closed slot reglets with slot sloped upward at forty-five (45) degrees, at least one (1) inch deep and 3/16" wide. For fastening reglets to concrete forms use double-head stainless steel nails spaced twelve (12) inches apart maximum.

4. Insert cap flashing full depth into reglet slot, and wedge in place using lead strips spaced on twelve (12) inch centers maximum or lead caulking rope. When lead strips are used for continuous caulked reglets, use approved weather-resistant fibrous compounds.

L. Through-Wall Flashings: Provide through-wall flashings as shown. Form bonding features so as not to puddle water on surface. Lap cross joints to interlock design pattern at least three (3) inches. Stop typical flashings in mortar joint 1/2" from exterior face of wall.

END OF SECTION

SECTION 077100 - ROOF SPECIALTIES AND ACCESSORIES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the roof specialties and accessories as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Aluminum gravel stops and copings.
2. Prefabricated roof curbs.
3. Vinyl Gutters.

1.3 RELATED SECTIONS

A. Roofing - Division 07.

B. Sheet metal flashing - Section 076200.

1.4 SUBMITTALS

A. Before any roof specialties and accessories are delivered to the job site, submit shop drawings showing profiles and anchoring devices.

1.5 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 ALUMINUM GRAVEL STOPS AND COPINGS

A. Fabricate of .063" thick aluminum alloy 5005-H154, smooth, no pattern.

B. Provide concealed splice plates 12'-0" o.c. fabricated of .050" thick aluminum to match exposed aluminum; finished to match exposed aluminum.

C. Provide prefabricated mitered and welded corner units.

D. For gravel stops, provide concealed anchors and hold down clips 24" o.c.

E. For copings, provide galvanized steel anchor plates, anchors spaced 6'-0" o.c. and snap-lock coping design; all anchors concealed.

F. High-Performance Organic 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 written instructions.

1. Fluoropolymer, Two-Coat, System: Manufacturer's standard two-coat, thermo-cured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.
2. Custom color and gloss as selected by the Architect.

G. Provide units manufactured by OMG Roofing, or equal made by Cheney, Johns Manville or approved equal.

2.2 PREFABRICATED ROOF CURBS

A. Provide manufacturer's standard shop fabricated units made of 14 ga. zinc coated steel factory primed with rust inhibitive primer and insulated with 1-1/2" thick fiberglass board. Provide units manufactured by Pate, Louvers & Dampers, Inc., Industrial Louvers, Inc., or approved equal.

B. Reinforce units over 8'-0" long and units requiring reinforcement due to heavy loads by forming units of double-walled box-type construction with stiffeners of heavy gauge with flanges as required to provide sufficient rigidity and strength to withstand max. lateral forces in addition to super imposed vertical loads.

C. Sloping roof decks: For deck slopes of 1" per ft. and more, fabricate curb units (except expansion joint curbs) to form a level top edge. Where slope is less than 1" per ft., and curb is used to support equipment with moving parts, or supports vertical elements such as gravity ventilators which are intended to be plumb, provide tapered wood nailers (treated wood) at top of curb units to form a level top edge.

D. Provide treated wood nailer, not less than 1-5/8" thick and of the width shown, but not less than the width of the curb wall assembly. Anchor nailer securely to the top of the metal frame unit. Refer to Section 062000 of these specifications for pressure-treatment required for wood nailers.

E. Provide 22 ga. galvanized steel curb liners; where required extend curb liners through deck construction to coordinate with work below.

F. Provide 18 ga. galvanized steel cap flashing to cover a min. of 3" over roof flashing.

G. Where curb units are shown to support shop fabricated items of equipment, do not proceed with fabrication of curb units until size or dimensions have been checked for coordination with equipment.

2.3 VINYL GUTTERS

A. Provide 5-inch traditional K-style vinyl gutter system, including all required attachment hardware, by Guttersupply or equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where roof specialties and accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with 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. 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.

C. 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.

D. Gutters:

1. Gutters should have a minimum pitch of ¼” for every 10 feet of single section.
2. Downspouts should be installed every 40 feet.
3. Outlets and Elbows will be screwed or riveted to the adjoining section for security.
4. Miters will be screwed or riveted to the adjoining section with an approved sealant. Field cut miters, Box miters, and Strip miters are all acceptable forms of installation.
5. Hangers will be spaced a maximum 24”-36” inches apart on any continuous gutter run for strength and stability of the overall system.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal and plastic surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

B. Clean and polish plastic skylight units, inside and out, not more than 5 days prior to date of substantial completion.

END OF SECTION

SECTION 078413 - FIRESTOPS AND SMOKESEALS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the firestops and smokeseals as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
4. Sealant joints in fire-resistance-rated construction.
5. Penetrations at each floor level in shafts and/or stairwells.
6. Construction joints, including those between top of fire rated walls and underside of floors above; and those between exterior curtain walls and the outer perimeter edge of floor assemblies.

1.3 RELATED SECTIONS

A. Cast-in-place concrete - Section 033000.

B. Joint sealers - Section 079200.

C. Drywall - Section 092900.

D. Piping penetrations - Division 22.

E. Duct penetrations - Division 23.

F. Cable and conduit penetrations - Division 26.

1.4 REFERENCES

A. ASTM E 814 "Standard Method of Fire Tests of Through-Penetration Firestops."

B. UL 1479, UBC 7-5 (Both are same as A. above).

C. ASTM E 136 "Standard Test Method for Assessing Combustibility of Materials."

D. UL 263, UBC 7-1 "Fire Tests of Building Construction and Materials"

E. UL 2079 "Tests for Fire Resistance of Building Joint Systems."

F. ASTM E 1399 "Test for Dynamic Movement Conditions."

G. ASTM E 1966 (Same as E. above).

H. ASTM G 21 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi."

I. Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus."

J. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Firestops."

K. Published Through-Penetration Systems by recognized independent testing agencies.

1. UL Fire Resistance Directory, Volume II of current year.

2. Warnock Hersey Certification Listings, current year.

3. Omega Point Laboratories, current year.

L. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.

1.5 SUBMITTALS

A. Submit manufacturer's product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance, limitation criteria, test data and indication that products comply with specified requirements.

B. Submit shop drawings detailing materials, installation methods, and relationships to adjoining construction for each firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspection agency evidencing compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, for proposed UL listed (or equal) firestop and smokeseal assembly required for the Project.

C. Material Safety Data Sheets: Submit MSDS for each firestop product.

D. Submit qualifications of firestop installer, including letter from firestop manufacturer of products proposed to be installed, wherein manufacturer approves or recognizes as trained/ or certifies installer for installation of that manufacturer's products.

E. Engineering Judgment: For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.6 QUALITY ASSURANCE

A. General: Provide firestopping systems that are produced and installed to resist the spread of fire and the passage of smoke and other gases.

B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.

C. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E 814 or UL 1479. The F-rating must be a minimum of one (1) hour, but not less than the fire resistance rating of the assembly being penetrated. T-rating, when required by code authority, shall be based on measurement of the temperature rise on the penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.

1. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
   a. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
   b. T-Rating: When penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
   c. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.
2. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
   a. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

D. Firestopping products shall be asbestos free and free of any PCBs.

E. Do not use any product containing solvents or that requires hazardous waste disposal.

F. Do not use firestop products which after curing, dissolve in water.

G. Do not use firestop products that contain ceramic fibers.

H. Firestopping Installer Qualifications: Firestop application shall be performed by a single firestopping contractor who specializes in the installation of firestop systems, whose personnel to be utilized have received specific training and certification or approval from the proposed respective firestop manufacturer, and firestop installer shall have a minimum of three years' experience (under present company name) installing firestop systems of the type herein specified.

I. Mock-Up: Prepare job site mock-ups of each typical Firestop System proposed for use in the project. Approved mock-ups will be left in place as part of the finished project and will constitute the quality standard for the remaining work.

J. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

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 or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the 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.

K. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of less than or equal to 1 as determined by ASTM G 21.

L. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post-installed." Provide cast-in-place firestop devices prior to concrete placement.

M. Firestop systems do not reestablish the structural integrity of load bearing partitions or assemblies or support live loads and traffic. Installer shall consult the Structural Engineer prior to penetrating any load bearing assembly.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original unopened containers with manufacturer's name, product identification, lot numbers, UL or Warnock Hersey labels, and mixing and installation instructions, as applicable.

B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.

C. All firestop materials shall be installed prior to expiration of shelf life.

1.8 PROJECT CONDITIONS

A. Verify existing conditions and substrates before starting work

B. Do not use materials that contain solvents, show sign of damage or are beyond their shelf life.

C. During installation, provide masking and drop cloths as needed to prevent firestopping products from contaminating any adjacent surfaces.

D. Conform to ventilation requirements if required by manufacturer's installation instructions or Material Safety Data Sheet.

E. Weather Conditions: Do not proceed with installation of firestop products when temperatures are in excess or below the manufacturer's recommendations.

F. Schedule installation of firestop products after completion of penetrating item installation but prior to covering or concealing of openings.

G. Coordinate this work as required with work of other trades.

1.9 SEQUENCING AND SCHEDULING

A. Pre-Installation Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

B. Sequence: Perform work of this and other sections in proper sequence to prevent damage to the firestop systems and to ensure that their installation will occur prior to enclosing or concealing work.

C. Install all firestop systems after voids and joints are prepared sufficiently to accept the applicable firestop system.

D. Do not cover firestop systems until they have been properly inspected and accepted by the authority having jurisdiction.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following manufacturers:

1. Hilti, Inc.
2. U.S. Gypsum Co.
3. Nelson.
4. Specified Technologies Inc.
5. 3M
6. Tremco

2.2 FIRESTOPPING, GENERAL

A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

B. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials including the following:
   a. Semirefractory fiber (mineral wool) insulation.
   b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Joint fillers for joint sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

D. Smokeseals at top of partitions shall be flexible to allow for partition deflection.

E. Polypropylene Sleeves (PP): (For cast-in device options.)

2.3 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.

B. Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation.

C. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.

D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or polyethylene foil on one side.

E. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.

F. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

G. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

H. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam.

I. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant unless firestop system limits use to non-sag grade for both opening conditions.

J. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic or polypropylene sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

K. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.

L. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.

M. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

N. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

O. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12” of unreinforced annular space.

P. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.

2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

1. Sealant Colors: Color of exposed joint sealants as selected by the Architect.

B. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

1. Additional Movement Capability: Provide sealant with the capability to withstand 33 percent movement in both extension and compression for a total of 66 percent movement.

C. Multi-Component, Non-Sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

1. Additional Movement Capability: Provide sealant with the capability to withstand 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719 and remain in compliance with other requirements of ASTM C 920 for uses indicated.

D. Single-Component, Non-Sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

2.5 MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE SAFING)

A. Provide min. 4 pcf safing insulation; Thermafiber Safing Mineral Wool Insulation by Thermafiber, Inc. (an Owens Corning company), Roxul Safe Fire Safing Insulation by Rockwool, Mineral Wool Safing by Johns Manville or approved equal to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.

B. Material shall be classified non-combustible when tested per ASTM E 136.

2.6 MIXING

A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping 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 configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:

1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form release agents from concrete.

B. Priming: Prime substrates where recommended by firestopping 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 firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

3.3 CONDITIONS REQUIRING FIRESTOPPING

A. Building Exterior Perimeters

1. Where exterior facing construction is continuous past a structural floor, and a space (i.e. construction joint) would otherwise remain open between the inner face of the wall construction and the outer perimeter edge of the structural floor, provide firestopping to equal the fire resistance of the floor assembly.

a. If mineral wool is part of firestop system, the mineral wool must be completely covered by appropriate thickness of UL or Warnock Hersey listed firestop sealant or spray.
b. Refer to Article 3.6 herein for description of fire safing insulation.

2. Firestopping shall be provided whether or not there are any clips, angles, plates, or other members bridging or interconnecting the facing and floor systems, and whether or not such items are continuous.
3. Where an exterior wall passes a perimeter structural member, such as a girder, beam, or spandrel, and the finish on the interior wall face does not continue up to close with the underside of the structural floor above, thus interrupting the fire-resistive integrity of the wall system, and a space would otherwise remain open between the interior face of the wall and the structural member, provide firestopping to continuously fill such open space.

B. Interior Walls and Partitions

1. Construction joints between top of fire rated walls and underside of floors above, shall be firestopped.
2. Firestop system installed shall have been tested by either UL or Omega Point, including exposure to hose stream test and including for use with steel fluted deck floor assemblies.
3. Firestop system used shall allow for deflection of floor above.

C. Penetrations

1. Penetrations include conduit, cable, wire, pipe, duct, or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.
2. Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E 814.
3. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall of opening.

D. Provide firestopping to fill miscellaneous voids and openings in fire rated construction in a manner essentially the same as specified herein before.

3.4 INSTALLING THROUGH PENETRATION FIRESTOPS

A. General: Comply with the through penetrations firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for through penetration firestop systems by proven techniques to produce the following results:

1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
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.

3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install joint fillers 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 that allow optimum sealant movement capability and develop fire resistance rating required.

C. 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 width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.6 INSTALLING FIRESAFING INSULATION

A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.

B. Completely fill voids in areas where safing insulation is required. At spandrel conditions/floor edges, depth of insulation top to bottom shall be at least four (4) inches.

C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

A. Inspecting agency employed and paid by the Owner will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.

B. Inspecting agency will report observations promptly and in writing to Contractor, Owner and Architect.

C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

D. Where deficiencies are found, Contractor must repair or replace firestopping so that it complies with requirements.

3.8 CLEANING

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which openings and joints occur.

B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to product firestopping complying with specified requirements.

END OF SECTION

SECTION 079200 - JOINT SEALERS

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. The Work of this Section includes all labor, materials, equipment and services necessary to complete the joint sealers work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.
2. Control and expansion joints in walls.
3. Joints at wall penetrations.
4. Joints between items of equipment and other construction.
5. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

1.3 RELATED SECTIONS

A. Firestop and Smoke Seals - Section 078413.

B. Glazing sealants - Section 088000.

C. Sealant within drywall construction - Section 092900.

D. Sealant at tile work - Section 093013.

1.4 QUALITY ASSURANCE

A. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.

B. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.

C. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work shall start until results of these tests have been submitted to the Architect and he has given his written approval to proceed with the work.

1.5 SUBMITTALS

A. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.

1. Submit joint sizing calculations signed and sealed by NYC Licensed Engineer certifying that movement capability of sealant is not being exceeded.

B. Samples: Submit the following:

1. Color samples of sealants, submit four (4) physical samples (not color chart).
2. Sealant bond breaker and joint backing.

C. Product Data: Submit manufacturer's technical information and installation instructions for:

1. Sealant materials, indicating that material meets standards specified herein.
2. Backing rods.

D. Submit manufacturer's certification as required by Article 1.6 herein.

E. Submit results of testing required in Article 1.4 herein.

1.6 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

A. Contractor shall require sealant manufacturer to review the Project joint conditions and details for this Section of the work. Contractor shall submit to the Architect written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vapor tight seals (as applicable), and that materials supplied meet specified performance requirements.

1.7 ENVIRONMENTAL CONDITIONS

A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.

B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.8 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

C. Storage

1. Store sealant materials and equipment under conditions recommended by their manufacturer.
2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.
3. Material shall be stored in unopened containers with manufacturers' name, batch number and date when shelf life expires.

1.9 GUARANTEE

A. Provide a written, notarized guarantee from the manufacturer stating that the applied sealants shall show no material failure for a period of ten (10) years.

B. Contractor to provide a written, notarized, guarantee stating that the applied sealants shall show no failure due to improper installation for a period of five (5) years.

C. Guarantee shall be in a form acceptable to the Nassau County Department of Public Works and executed by an authorized individual.

D. Include in guarantee provision, agreement to repair and/or replace, at Contractor's expense, sealant defects which develop during guarantee period, because of faulty labor and/or materials.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

A. Interior Sealant: Provide a one (1) part acrylic-based sealant conforming to ASTM C 834, equal to "AC-20+ Silicone" made by Pecora, or comparable product made by Tremco.

B. Colors: Colors selected from manufacturer's standard selection.

2.2 MISCELLANEOUS MATERIALS

A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non- staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "HBR" made by Nomaco Inc. or approved equal, twenty-five (25) percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing

B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.

C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.

D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.

E. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instructions.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where joint sealers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with instructions and recommendations of the manufacturer and in accordance with ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.

B. Sample Section of Sealant

1. During sealant installation work in exterior wall, the manufacturer of sealant shall send his representative to the site, under whose supervision a section of the wall (used as "control section") shall be completed for purposes of determining performance characteristics of sealant in joints. Construction Manager and Architect shall be informed of time and place of such installation of control section.
2. Control section shall be installed according to specification given herein and shall not be considered as acceptable until written acceptance is provided by the Architect.
3. Accepted control section shall be standard to which all other sealant work must conform.

C. Supervision: The Contractor shall submit to the Construction Manager and Architect written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. The Contractor shall use only skilled and experienced workmen for installation of sealant.

D. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.

E. Preparation and Application

1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
   a. Do not use any acid or other material which might stain surfaces.
   b. Remove laitance by grinding or mechanical abrading.
   c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
4. Do not seal joints until they are in compliance with drawings or meet with the control section standard.

5. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joint 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than 1", sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming. Apply primer with clean brush and only when temperature is above 45 deg. F.
7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately twenty-five (25) percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.
8. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
9. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
10. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 4A in ASTM C 1193. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.
11. Replace sealant which is damaged during construction process.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 081113 - STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the steel doors and frames work as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Interior and exterior hollow metal doors and frames for fire-rated and unrated door openings.
2. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.
3. Preparation of hollow metal doors to receive glazing where required.
4. Steel louvers for hollow metal doors.
5. Furnishing anchors for building into drywall.
6. Factory prime painting of work of this Section.

1.3 RELATED SECTIONS

A. Installation of doors and frames - Section 062000.

B. Finish Hardware - Section 087100.

C. Glass and Glazing - Section 088000.

D. Gypsum Drywall - Section 092900.

E. Painting and Finishing - Section 099000.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.

B. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, reinforcement for surface applied hardware, dimensions of profiles and hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.

C. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.

1. Coordinate glazing frames and stops with glass and glazing requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames 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. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

C. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.

D. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.

1. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40" or less above the sill.
2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.
3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating as required by prevailing Building Code in 30 minutes of fire exposure.

E. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

F. Fire rated assemblies must have UL approved label.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.

B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames under cover at building site. Conform to the requirements of ANSI/SDI A250.11 for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch-high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

PART 2 PRODUCTS

2.1 FABRICATION - GENERAL

A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.

B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.

C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."

D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

2.2 MANUFACTURERS

A. Provide products manufactured by Steelcraft, Curries, Ceco Door Products, Fleming or approved equal meeting these specifications.

B. Exterior Doors and Frames

1. Basis of Design Energy Efficient - 797 Mercury Series by Curries or approved equal.
2. Basis of Design: Curries Company (CU) – Thermal Break TQ Series.

2.3 FRAMES

A. Materials

1. Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A 1008, Type B not less than 14 ga., and shall have a hot dipped galvannealed coating conforming to ASTM A 924 and A 653 with A60 coating. The zinc-alloy coating shall be a dull matte surface treated for paint adhesion.
2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM A 1008, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011, Commercial Steel, Type B. Metal thickness shall be not less than sixteen (16) ga. for frames in openings 4'-0" or less in width; not less than fourteen (14) ga. for frames in openings over 4'-0" in width.

B. Design and Construction

1. All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Knock-down frames are not permitted.
2. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16” positive thermal break and integral vinyl weatherstripping.
3. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
4. Jamb depths, trim, profile and backbends shall be as shown on drawings.
   a. Frames at drywall partitions shall be formed with double return backbends to prevent cutting into drywall surface.
5. Welded frames shall have corners mitered and reinforced and faces of welded frames shall be continuously back welded full depth and width of frame conforming to NAAMM Standard HMMA-820; face joints shall be hairline.
6. Minimum depth of stops shall be 5/8". Cut-off (Sanitary or hospital type) stops, where scheduled, shall be capped at forty-five (45) degrees at heights shown on drawings, and all jamb joints below cut-off stops shall be ground and filed smooth, making them imperceptible. Do not cut off stops on frames for soundproof, light proof or lead-lined doors.

7. Frames for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth.
    a. Mullions shall have 16 ga. internal steel stiffeners welded not less than 4" o.c.
8. Hardware Reinforcements
    a. Frames shall be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.
    b. Minimum thickness of hardware reinforcing plates shall be as follows (contractor shall provide larger and thicker plates as required to accommodate weight of door):
        1). Hinge and pivot reinforcements - seven (7) ga., 1-1/4" x 10" minimum size.
        2). Strike reinforcements - twelve (12) gauge.
        3). Flush bolt reinforcements - twelve (12) gauge.
        4). Closer reinforcements - twelve (12) gauge.
        5). Reinforcements for surface mounted hardware - twelve (12) gauge.
9. Floor Anchors
    a. Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
    b. Minimum thickness of floor anchors shall be fourteen (14) gauge.
10. Jamb Anchors
    a. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb as follows:
        1). Frames up to 7'-6" height - four (4) anchors.
        2). Frames 7'-6" to 8'-0" height - five (5) anchors.
        3). Frames over 8'-0" height - five (5) anchors plus one additional for each 2'-0" or fraction thereof over 8'-0".
11. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
12. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
13. Loose glazing stops shall be of cold rolled steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium-or zinc-plated screws. Interior frames may be provided with Snap-On glazing stops.
14. Except on weather-stripped frames, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.

C. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Frames shall then be chemically treated to insure maximum paint adhesion and shall be coated on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.

2.4 HOLLOW METAL DOORS

A. Materials: Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM A 1008, Commercial Steel, Type B and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than eighteen (18) gauge. Face sheets for exterior doors shall be not less than sixteen (16) gauge and shall have a hot dipped galvannealed coating conforming to ASTM A 924 and A 653, A60 coating. The zinc alloy coating shall be a dull matte surface treated for paint adhesion.

B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, and ANSI/SDI A250.4 for physical performance level.

1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel reinforced core with no stiffener face welds.
   a. Provide 16-gauge steel vertical reinforcements 6 inches apart and welded in place. Foamed in place polyurethane core is chemically bonded to all interior surfaces. No face welding is permitted.
   b. Thermal properties to rate at a fully operable minimum U-Factor 0.374 and R-Value 2.53, including insulated door, Mercury thermal-break frame and threshold.
   c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.378 and R-Value 2.5, including insulated door, kerf type frame, and threshold.

C. Design and Construction

1. All doors shall be of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".
2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
3. Face sheets shall be stiffened by continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be not less than twenty-two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners shall be sound deadened and thermal insulated the full height of the door with an inorganic non-combustible batt type material.
4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than fourteen (14) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weather stripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
6. Edge profiles shall be provided on both vertical edges of doors as follows:
   a. Single-acting swing doors - beveled 1/8" in two (2) inches.
   b. Double acting swing doors - rounded on 2-1/8" radius.
   c. No square edge doors permitted.
7. Hardware Reinforcements
   a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates.
   b. Minimum gauges for hardware reinforcing plates shall be as follows (contractor shall provide larger and thicker plates as required to accommodate weight of door):
      1). Hinge and pivot reinforcement - seven (7) gauge.
      2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - twelve (12) gauge.
      3). Reinforcements for all other surface mounted hardware - sixteen (16) gauge.

8. Glass Moldings and Stops
   a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
   b. Fixed moldings shall be securely welded to the door on the security side.
   c. Loose stops shall be not less than twenty (20) gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.
9. Louvers shall be sixteen (16) gauge sheet steel, stationary type, closely spaced inverted "V" blade design, flush with face sheets of door, integral with and welded to door. Fifty (50) percent free area, unless indicated otherwise on drawings.

D. Finish: After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive alkyd primer as specified for frames which shall be fully cured before shipment.

E. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, including in a diagonal direction.

2.5 LABELED DOORS AND FRAMES

A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames shall be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service.

B. If any door or frame specified by the Architect to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Architect shall be so advised before fabricating work on that item is started.

2.6 HARDWARE LOCATIONS

A. The location of hardware on doors and frames shall be as noted in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames" of the Door Hardware Institute unless otherwise required by prevailing Handicapped Codes.

2.7 CLEARANCES

A. Fabricate doors and frames to meet edge clearances as follows:

1. Jambs and Head: 1/8" plus or minus 1/16".
2. Meeting Edges, Pairs of Doors: 1/8" plus or minus 1/16".
3. Bottom: 3/4" if no threshold, 3/8" at threshold.

B. Fire rated doors shall have clearances as required by NFPA 80.

2.8 MANUFACTURING TOLERANCES

A. Manufacturing tolerance shall be maintained within the limits given in HMMA 841 of ANSI/NAAMM, current edition.

2.9 PREPARATION FOR FINISH HARDWARE

A. Prepare door and frames to receive hardware:

1. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
2. Preparation includes sinkages and cut-outs for mortise and concealed hardware.

B. Provide reinforcements for both concealed and surface applied hardware:

1. Drill and tap mortise reinforcements at factory, using templates.
2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.10 REJECTION

A. Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed and replaced with new at no cost.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where steel doors and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Refer to Section 062000 for installation procedures for all work of this Section.

END OF SECTION

SECTION 081713 - FRP DOORS AND ALUMINUM FRAMES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the fiberglass reinforced door shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Fiberglass reinforced polyester (FRP) doors and frames.
2. Fiberglass reinforced polyester (FRP) doors within aluminum storefront.
3. Vision-Lites at exterior doors.

1.3 RELATED SECTIONS

A. Aluminum Entrances and Storefronts – Section 084113.

B. Finish Hardware - Section 087100.

1.4 PERFORMANCE REQUIREMENTS

A. Face Sheet.

1. Standard Interior and Exterior Class A 0.120" thick, contemporary wood grain, painted FRP sheet.
   a. Surface Burning, ASTM-E84: Flame Spread ≤ 25, Smoke Developed ≤ 350.

B. Stiles & Rails.

1. Fastener Withdrawal, ASTM-D1761: 894 lbs.

1.5 SUBMITTALS

A. Product Data: Submit door manufacturer's product data, specifications and installation instructions for each type of door.

B. Shop Drawings:

1. Plans: Indicate location of each door and frame opening assembly in project.
2. Elevations: Dimensioned elevation of each type door opening assembly in project; indicate sizes and locations of door hardware, and lites and louvers, if specified.
3. Details: Installation details of each type installation condition in project; indicate installation details of glazing, if specified.
4. Schedule: Indicate each door opening assembly in project; cross reference to plans, elevations and details.

C. Selection Samples: Manufacturer's standard color chips.

D. Verification Samples: Two (2) samples to verify color match.

E. Manufacturer's Instructions: Printed installation instructions for door opening assemblies.

F. Warranty Documents: Manufacturer's standard warranty documents, executed by manufacturer's representative, countersigned by Contractor.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer's ten (10) year warranty against failure due to corrosion from specified environment.

1.7 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading: Package door opening assemblies in manufacturer's standard containers.

B. Store door assemblies in manufacturer's standard containers, on end, to prevent damage to face corners and edges.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Products and Manufacturers: "AF-220 Composite Fiberglass Door" as manufactured by by Special-Lite, Inc., ChemPruf Door Company, Ltd. or approved equal.

2.2 MATERIALS

A. Construction.

1. Door Thickness.
   a. 1-3/4"
2. Stiles & Rails.
   a. Pultruded fiberglass with integral channels for securing corner reinforcing clip.
3. Corners.
   a. Mitered.
   b. Secured with pultruded fiberglass corner clip chemically welded to stiles and rails.
   c. Mechanical fasteners to secure corner joints not acceptable.
4. Core.
   a. PP Polypropylene Honeycomb.
      1) 5.0 pcf density.
      2) High strength to weight ratio.
      3) Corrosion, fungi, rot, chemical and moisture resistant. 4). Sound and vibration dampening.
      4) Energy absorbing and recyclable.
5. Face Sheet.
   a. Exterior
      1) 0.120" thick, sandstone texture, through color with integral surfaseal film FRP sheet. White #5596.
   b. Interior
      1) 0.120" thick, sandstone texture, through color with integral surfaseal film FRP sheet.
   c. Attachment of face sheet.
      1) Face sheets to be flame treated to promote durable, long lasting bond.
      2) Face sheets adhered to stiles, rails, and core using hot melt adhesive evenly coated across all surfaces to produce strong bond and prevent moisture absorption.
6. Cutouts.
   a. Manufacture doors with cutouts for required vision lites, louvers, and panels.
   b. Vision Lite Frames shall be 1" insulated glass with internal aluminum muttons, bone white.

7. Hardware.
    a. Pre-machine doors in accordance with templates from specified hardware manufacturers.
    b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
8. Reinforcements.
    a. Solid high-density polyurethane shapes chemically welded to stiles, rails and/ or core.
    b. No metallic reinforcements will be allowed.

2.2 ALUMINUM FRAMING CONSTRUCTION

A. Thermally Broken Storefront Framing:

1. Size and Type: As indicated on the Drawings.
2. Materials: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes, 0.125-inch minimum wall thickness tube. Fiberglass pultruded thermal strut 2 ½" wide by 3/6" thick.
3. Perimeter Frame Members:
    a. Frame with thermally broken pocket filler.
    b. Factory fabricated by frame manufacturer.
    c. Open-back framing is not acceptable.
4. Applied Doorstops: 0.625-inch high, with screws and weatherstripping. Door stop shall incorporate pressure gasketing for weathering seal. Counterpunch fastener holes in door stop to preserve full metal thickness under fastener head. Minimum ½" aluminum bar reinforcement under doorstop for required hardware attachments.
5. Caulking: Caulk joints before assembling frame members.
6. Joints:
    a. Secure joints with fasteners.
    b. Provide hairline butt joint appearance.
    c. Shear block construction only, no screw spline allowed.
7. Hardware:
    a. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and hardware schedule.
    b. Factory install hardware.
8. Anchors:
    a. Anchors appropriate for wall conditions to anchor framing to wall materials.
    b. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
    c. Secure head and sill members of transom, side lites, and similar conditions.
9. Removable Mullion: As indicated on drawings.
10. Fasteners:
    a. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
    b. Compatibility: Compatible with items to be fastened.
    c. Exposed Fasteners: Screws with finish matching items to be fastened.
11. Glazing Gaskets: Gaskets installed in captive assembly of glazing stops.
    a. EPDM: ASTM D 2000.
    b. Closed-Cell Foam: ASTM D 1667.
12. Finish: Kynar 500 complying with AAMA 2605, color Bone White

2.3 FABRICATION

A. Factory Assembly.

1. Door and frame components from the same manufacturer.
2. Required size for door and frame units, shall be as indicated on the drawings.
3. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
4. All cut edges to be free of burs.
5. Electrical arc welding of doors or frames is not acceptable.
6. Maintain continuity of line and accurate relation of planes and angles.
7. Secure attachments and support at mechanical joints with hairline fit at contact surfaces.

B. Shop Fabrication

1. All shop fabrication to be completed in accordance with manufactures process work instructions.
2. Quality control to be performed before leaving each department.

2.4 FINISHES

A. Door and Frame: Finish as selected by Architect.

1. Unique, high-solids, high-build, multifunctional coating.
2. Low VOC, high-gloss, self-priming coating.
3. Impact Resistance, ASTM-D2794: 140 in·lbs (direct), 50 in·lbs (reverse) @ 5 mils thickness.
4. Taber Abrasion, 1 kg load, 1000 cycles, CS-17 wheel: 60.2 mg.
5. Graffiti cleaning with Amerase with gloss retention: 100 cycles.
6. Chemical Resistance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Openings are correctly prepared to receive doors.
2. Openings are correct size and depth in accordance with shop drawings.

B. Installer’s Examination

1. Have installer examine conditions under which construction activities of this section are to be performed and submit written report if conditions are unacceptable.
2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
4. Beginning construction activities of this section indicated installer’s acceptance of conditions.

C. Verify that glazing has been factory installed.

3.2 INSTALLATION

A. Install door opening assemblies in accordance with shop drawings, SDI 100, and manufacturer’s printed installation instructions, using installation methods and materials specified in installation instructions.

B. Installation of door hardware is specified in Section 08700.

C. Install door hardware in accordance with manufacturer's printed instructions, using through bolts to secure surface applied hardware.

D. Site Tolerances: Maintain plumb and level tolerances specified in manufacturer's printed installation instructions.

3.3 ADJUSTING

A. Adjust doors in accordance with door manufacturer's maintenance instructions to swing open and shut without binding, and to remain in place at any angle without being moved by gravitational influence.

B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instructions.

3.4 CLEANING

A. Clean surfaces of door opening assemblies and sight exposed door hardware in accordance with manufacturer's maintenance instructions.

3.5 PROTECTION OF INSTALLED PRODUCTS

A. Protect door opening assemblies and door hardware from damage by subsequent construction activities until final inspection.

END OF SECTION

SECTION 083113 - ACCESS DOORS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the access doors as indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Frameless recessed panel access doors at drywall ceilings and walls.
2. Framed flush panel access doors at masonry and tile walls.
3. Provide access doors and frames for access from occupied spaces to the following, where indicated or required, and as directed by the trades of Divisions 23 and 26.
   a. All shutoff or balancing valves.
   b. Fire dampers, as required.
   c. Points of duct access.
   d. Pull boxes.
   e. Controls of mechanical and electrical items.
   f. Masonry shafts for pipes and conduits, as required.
   g. Pipe spaces, if required.
   h. Inlets of fans.
   i. Fusible link and splitter damper at filter bank.
   j. Automatic damper and motor.
   k. Equipment not otherwise accessible.

1.3 RELATED SECTIONS

A. Unit Masonry - Section 042000.

B. Gypsum Drywall - Section 092900.

C. Ceramic tile - Section 093013.

D. Valves and connections - Division 23.

1.4 QUALITY ASSURANCE

A. For actual installation of the work of this Section, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the skills required.

B. Fire-Resistance Ratings: Wherever a fire-resistance classification is shown, or for construction where access doors are installed, provide required access door assembly with panel door, frame, hinge and latch from manufacturers listed in Underwriters' Laboratories, Inc. "Classified Building Materials Index" for the rating shown.

1. Provide UL label on each access panel.
2. Provide flush, key operated cylinder lock.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.

1.5 SUBMITTALS

A. Before any materials of this Section are delivered to the job site, submit complete manufacturer's literature to the Construction Manager and Architect. Submit plans and schedules showing size and location of each and every access door for Architect's acceptance prior to installation.

1.6 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

A. Provide access door assembly manufactured by Milcor Inc, or equal made by Nystrom Inc., Karp Associates, Inc. or approved equal. Assembly shall be an integral unit complete with all parts and ready for installation.

B. Fabricate units of continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces. Provide attachment devices and fasteners of the type required to secure access panels to the types of supports shown.

C. Frames for Masonry and Tile Wall Only (Flush Panel Units)

1. Fabricate frame from sixteen (16) gauge steel. Provide frame with exposed flange not less than one (1) inch wide around perimeter of frame for the following construction:
   a. Exposed masonry.
   b. Tile finish.
2. For installation in masonry construction, provide frames with adjustable metal masonry anchors.

D. Frameless Units for Drywall Surfaces (Recessed Panel Units): Provide access doors without exposed frames for drywall adhered to recessed panel.

E. Panels: Fabricate from fourteen (14) gauge steel, with concealed spring hinges set to open to 175 degrees. Provide removable pin type hinges of the quantity required to support the access panel sizes used in the work. Finish with manufacturer's factory applied baked enamel prime coat applied over phosphate protective coating on steel.

F. Locking Devices

1. For non-rated access doors, provide flush, screwdriver operated cam locks of number required to hold door in flush, smooth plane when closed.
2. For fire rated doors, provide locks as described in paragraph 1.04, B. herein.

G. Inserts and Anchorage: Furnish inserts and anchoring devices which must be built into masonry for the installation of access panels. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where access doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 COORDINATION

A. Coordinate all work with the mechanical trades to insure proper locations and in a timely manner to permit orderly progress of the total work.

B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

C. Adjust hardware and panels after installation for proper operation.

D. Remove and replace panels or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 083613 - SECTIONAL OVERHEAD DOORS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the sectional overhead doors, as shown on the drawings, and/or specified herein, including but not limited to, the following:

1. Steel sectional overhead doors.
2. Tracks and hardware.
3. Manual operation.

1.3 RELATED SECTIONS

A. Finish painting - Section 099000.

1.4 QUALITY ASSURANCE

A. Provide each sectional overhead door as a complete unit produced by one manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, hardware, operators and installation accessories, to suit openings and head room allowable.

B. Unless otherwise acceptable to Architect, furnish sectional overhead door units by one manufacturer for entire project.

C. Wind Loading: Design and reinforce sectional overhead doors to withstand a 30 lb. per sq. ft. wind loading pressure with a maximum deflection of 1/120 of opening width.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of overhead door. Include manufacturer's operating instructions and maintenance data.

B. Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed in manufacturer's data.

1.6 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide insulated overhead door assemblies manufactured by Overhead Door Co., Crawford Door Co., or approved equal meeting these specifications.

2.2 METAL OVERHEAD DOORS

A. Insulated Steel Sectional Overhead Doors: Thermacore 490 Series Insulated Steel Doors by Overhead Door Corporation.

1. Door Assembly: Rigid steel fully insulated construction with a metal foam metal sandwich panel. Fabricated with EPDM seals between sections.
   a. Size: As indicated on the Drawings.
   b. Panel Thickness: 2 inches (51 mm) nominal.
   c. Panel Style: Shiplap panels.
      1). Contemporary flush panel, 495 Series.
   d. Exterior Steel: .012-inch (.030 mm) nominal, high strength hot dipped galvanized steel with an embossed wood grain texture.
   e. Insulation: CFC-free foamed in place polyurethane.
   f. Thermal Values: R-value of 17.5. U-Factor of < 0.37 (exceeds 2015 IECC climate zone requirements for maximum U-Factor of Operable fenestrations, section C402.4).
   g. Air Infiltration: <0.40 (exceeds 2015 IECC Section C402.5.2 for Garage Doors).
   h. Windload Design: Provide to meet the Design/Performance requirements specified.
2. Finish/color: As scheduled on the drawings.
3. Hardware: Standard hinges.
4. Lock:
   a. Interior mounted slide lock.
   b. Keyed lock.
5. Bottom fixture: DASMA 103 red-head fasteners.
6. Weatherstripping: Co-extruded EPDM bulb-type strip at bottom.
7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
8. Standard rollers.
9. Manual operation.

2.3 COUNTERBALANCING MECHANISMS

A. Hang door assembly for operation by heavy duty torsion type counterbalance mechanism with oil tempered helical wound springs sprung for size and weight of door. Mechanism shall be capable of a minimum life of 100,000 cycles.

2.4 MANUAL DOOR OPERATORS

A. Equip door with manufacturer's recommended manual door operator unless another type of door operator is indicated.

B. Push-up Operation: Lift handles and pull rope for raising and lowering doors, with counterbalance mechanism designed so that required lift or pull for door operation does not exceed 25 lbf.

C. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25 lbf. force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where sectional overhead doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install door, track, and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions and as herein specified.

B. Fasten vertical track assembly to framing at not less than 24" o.c. Hang horizontal track from structural overhead framing with angle or channel hangers, welded and bolt-fastened in place. Provide sway bracing, diagonal bracing, and reinforcing as required for rigid installation of track and door operating equipment.

C. Upon completion of installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

END OF SECTION

SECTION 08 41 13 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
(Delegated Design)

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. Work Included:

1. This Section includes aluminum and glass assemblies consisting of the following:
   a. Aluminum-Framed Storefront systems, comprised of structural and non-structural extruded framing members/supports, custom formed, and extruded aluminum applied trims, closures and copings, insulating glass assemblies, support anchor clips/brackets, flashings, neoprene and silicone rubber seals, gaskets and other accessories required.
   b. Internal steel reinforcement where required.
   c. Trims and similar filler panels.
   d. Insulation and fire-stopping.
   e. Joint sealing within the curtain wall system.
2. This Section includes aluminum entrances assemblies consisting of the following:
   a. Aluminum framed entrance assemblies, as indicated.
   b. Aluminum door frames/jambs and fixed sidelight assemblies, as indicated.
   c. Anchorages, shims, fasteners, accessories, and support brackets for components of the entrance assemblies.
   d. Installation of the door hardware as specified in Section 087100.

1.3 DESIGN RESPONSIBILITY

A. The Contract Documents define design intent and performance requirements. Details show preferred profiles. Contractor is responsible for final design, structural calculations, shop drawings, fabrication, installation, warranties, certifications and related documentation.

1. The appearance of exposed elements, including width and depth, shall be consistent throughout the Project.
2. The overall thickness of each glass type, and the component thicknesses of each multiple layer glass type, shall be consistent throughout the Project.
3. The materials, systems and assemblies shown on the Contract Documents establish the design intent utilizing manufacturer's standard product lines; the Contractor is responsible for the ultimate design, engineering, fabrication, erection and installation of the entire assemblies. The installed assemblies must be capable of meeting all the specified performance requirements. Provide test data which indicates the assemblies meets the specified performance requirements. The Contractor will be solely responsible for the installed system performance of the complete exterior enclosure systems.
   a. The Contract Documents do not cover all field conditions, which may require standard detail modifications. It is however, intended that these conditions be fully detailed on the Shop Drawings; and be developed with the selected manufacturer in conjunction with the Contractor to the satisfaction of the Architect. Standard- and modified- construction details shall be held to the same level of aesthetics and performance criteria. The Contractor, by accepting a contract for the work, acknowledges this and agrees that the Architect shall have final acceptance on the complete design details.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Provide the following submittals for approval.

1. Provide drawings showing materials in place. Drawings shall include elevations, floor plans, sections and full-size details showing all adjacent materials, whether or not part of this section, to allow for verification and coordination. Details shall be fully drawn (not outlined). Drawings shall include the following information. Coordinate with related shop drawing submissions with single source responsibility related section requirements.
   a. Joinery and internal seals.
   b. Glass and metal thicknesses.
   c. Metal alloy, temper and finish.
   d. Glass strength and safety backing.
   e. Fastener alloy, strength, plating, diameter, length and spacing.
   f. Glazing materials identification.
   g. Sealants identification by product name.
   h. Relative layout of walls, beams, columns and slabs with dimensions noted.
   i. Dimensioned position of glass edge relative to metal daylight.
   j. Provisions for thermal movements and building movements.
   k. Locations of, and details for, any embedded anchors including tie backs and supports. Identification of, and details for, thermal insulation and safing insulation.
   l. Weld information and weld symbols conforming to AWS conventions.
   m. Glazing details applicable to replacement glass, with outline of procedure for glass replacement.
   n. Provisions for adjustment of anchors relative to tolerances of building structure.
   o. Entrance doors and related construction and hardware placement, including door operator items and construction, coordinate with door schedule and related shop drawing submissions.

C. Include setting drawings, templates, and directions for installation of anchor bolts and other anchorages installed under other sections.

D. Samples: Provide four (4) samples, for each aluminum finish type and color required on 12-inch-long sections of extrusions or formed shapes and on 6-inch squares of aluminum sheet or plate. Include two or more units in each sample set showing the extreme limits of variations expected in color and texture of finish. Include full size samples of each different type and shape of the exposed aluminum trims.

1. The Architect reserves the right to require fabrication samples that show the following:
   a. Prime members.
   b. Joinery.
   c. Anchorage.
   d. Expansion provisions.
   e. Glazing and similar details.
   f. Profiles showing intersection of conventionally glazed and structurally glazed system components, including applied trims and closures.
   g. Intersections.
   h. Custom coping profiles.

E. Shop Drawings: For each Aluminum-Framed Entrances and Storefront systems Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of Aluminum-Framed Entrances and Storefront systems, showing the following:
   a. Joinery, including concealed welds.
   b. Anchorage.
   c. Expansion provisions.
   d. Glazing.
   e. Flashing and drainage.
   f. Aluminum extrusion trims.
   g. Coping profiles and closures.

F. Delegated-Design Submittal: For Aluminum-Framed Entrances and Storefront systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Calculations:
   a. The Contractor shall submit shop drawings of each different system, complete with structural data and calculations indicating compliance with specified requirements. Shop drawings, structural information and calculations shall be submitted signed and sealed by a New York State licensed Professional Engineer responsible for the preparation.
   b. Structural Calculations. Test reports are not an acceptable substitute for calculations. Calculations shall include the following information:
      1) Analysis for all applicable loads on framing members.
      2) Analysis for all applicable loads on anchors, including anchors embedded in concrete.
      3) Section property computations for framing members. Sizing of supports and anchors and lateral wind connections.
      4) Seal and signature of professional engineer registered in the State of New York.

G. Installer certificates signed by the manufacturer certifying that the Installers of the system comply with requirements indicated.

H. Certification: Provide certified test results showing that wall systems have been tested by a recognized testing laboratory or agency and comply with specified performance characteristics.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Mockup Testing Submittals:

1. Testing Program: Developed specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

B. Qualification Data: For Installer.

C. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each glazed Aluminum-Framed Entrances and Storefront systems.

D. Product Test Reports: For glazed Aluminum-Framed Entrances and Storefront systems, for tests performed by a qualified testing agency.

E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.

F. Source quality-control reports.

G. Field quality-control reports.

H. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For glazed Aluminum-Framed Entrances and Storefront systems to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Engage a Fabricator/ Installer for the glazed Aluminum-Framed Entrances and Storefront systems to assume undivided responsibility for all components, including structural design, installation, glazing, and the weatherproof integrity of the system in place.

1. The manufacturer shall be regularly engaged in construction of glazed Aluminum-Framed Entrances and Storefront systems and able to demonstrate successful performance of comparable projects. The manufacturer shall also have a minimum of 10 years of experience in installations of glazed Aluminum-Framed Entrances and Storefront systems similar to that of this project.
2. Responsibility shall also include design, furnishing, and installing anchor assemblies, support framing, related connections, and fasteners as required for compliance with specified performance data.

B. Installer's Qualifications: Engage an Installer and craftsmen who have successfully completed (3) three glazed Aluminum-Framed Entrances and Storefront systems projects similar in scope, materials and design to this project within the last (10) ten years.

C. 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 referenced standards.

D. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or on one component pane of units, with the appropriate certification label of inspecting and testing organization indicated below.
1. Insulating Glass Certification Council (IGCC).

E. Design Criteria: The drawings indicate sizes, profiles, and dimensional requirements of the glazed curtain wall system and are based on the specific type indicated. Similar systems by other manufacturers that have equal performance characteristics may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept or intended performance as judged by the Architect.

1. The burden of proof for equality is on the proposer and must be approved by the Architect.

F. Preconstruction Compatibility and Adhesion Testing: Submit to sealant manufacturers, and glass manufacturer if applicable, samples of each glass, gasket, glazing accessory, and glass-framing member that will contact or affect glazing sealants or sealant substrates for compatibility and adhesion testing as indicated below:

1. Use test methods standard with sealant manufacturer to determine if priming and other specific preparation techniques are required for rapid, optimum glazing sealants adhesion to glass and glazing channel substrates.

G. Preinstallation Conference: Before beginning installation of the system, conduct a preinstallation conference at the Project site with the manufacturer, installer, and other interested parties to review procedures, schedules, and coordination of installation with other elements of the Work.

H. In-place Mock-Up: The Contractor shall erect a in-place mock-up of Building 'B' - Police Precinct / Apartment Storefront Entry. The field constructed mock-up shall consist of a "corner" of the proposed construction, unless otherwise acceptable by the Architect.

1. In-place mock-up shall be provided for the Architect's acceptance of materials (both physically and aesthetically), methods of construction (quality of workmanship), as well used in the testing and evaluation relative to performance. Perform tests specified in "Field Quality Control" Article. Modify mockup construction and perform additional tests as required to achieve specified minimum acceptable results.
2. The Contractor shall provide extra/additional materials which may be required as a result of testing failure, except for those intentional failure tests beyond specified performance requirements.

I. Testing:

1. Testing laboratories shall be specifically qualified to conduct laboratory and field performance tests required by these specifications. No testing shall be conducted without the presence of a design professional.
2. All testing, as described shall be performed on the In-place mock-up or portions thereof. The testing laboratory shall be responsible for conducting and reporting the tests and state in the report whether or not the test specimen conforms to all requirements of the Contract Documents and shall specifically note any deviations therefrom. The Contractor, at no additional cost to the SUCF, shall perform necessary corrections and retesting until assemblies meet the design criteria.
   a. Test exterior enclosure systems in accordance with the Contract Documents, and these specifications. Test exterior systems as a complete assembly.
   b. In addition to the Aluminum-Framed Entrances and Storefront systems, testing, the supporting, surrounding, and adjacent materials of construction shall be subject to performance testing. Materials and components subject to such testing include, but are not limited to primary and secondary seals, flashings, insulated glass units, weather-stripping, louvers, and other components of the exterior weather sealed assemblies.
3. Test Sequence: In accordance with the referenced standards, and in accordance with the Architect's requirements.
4. Record test results. Correct any deficiencies and repeat tests as may be required to show compliance with the Contract Documents. Resubmit any calculations affected by these corrections.
   a. Remedial measures which may be necessary on the field constructed mock-ups shall maintain standards of quality and durability and are subject to approval by the Architect.
5. Upon completion of testing, the Contractor shall immediately provide "as-built" In-place mock-up drawings showing any modifications or additions required to meet the performance requirements.
6. The Contractor shall be solely liable for any failure to meet test requirements, without adjustment to the Contract Sum or the Contract Schedule.
7. In-place mock-up materials and assemblies as tested and approved will govern materials and assemblies furnished for field erection. Contractor shall revise all Shop Drawings to confront the approved mock-up and resubmit for approval.

1.8 PROJECT CONDITIONS

A. Field Measurements: Take field measurements before fabrication; verify and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

1.9 SEQUENCING AND SCHEDULING

A. General: Schedule installation of the system in sequence with related elements of the Work specified in other Sections to ensure that assemblies, including flashing, trim, and joint sealers, are protected against damage from effects of weather, aging, corrosion, and other causes.

1.10 WARRANTY

A. General: The warranty specified in this Article shall not deprive Nassau County Department of Public Works of other rights Nassau County Department of Public Works may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties under requirements of the Contract Documents.

B. Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of the glazed Aluminum-Framed Entrances and Storefront systems that fail in materials or workmanship within a period of 15 years from date of Substantial Completion. Failures include, but are not limited to, the following

C. The following types of failure will be adjudged as defective work:

1. Abnormal deterioration, aging or weathering of the work.
2. Air leakage exceeding specified limits.
3. Failure of operating parts to function normally.
4. Structural failure due to pressures and forces up to specified limits.
5. Sealant loss of adhesion, loss of cohesion, cracking or discoloration.
6. Disengagement of gaskets or weatherstrips for conditions not exceeding specified design pressure, building movement and racking test requirements.
7. Deterioration or discoloration of aluminum finish.
8. Loss of effective glass bite due to shifting of glass.
9. Loss of effective glass bearing on setting blocks due to shifting of glass and/or blocks.

D. Certain materials are required to have special warranties extending beyond the system warranty, which shall not limit or reduce the requirements of the system warranty.

1. A finish on aluminum which cracks, fades in excess of specified limits or chalks in excess of specified limits shall be replaced at no charge (material and labor) for a minimum five (5) year period beginning on the date of final acceptance.
2. Glass units shall be warranted from seal failure for a period of no less than fifteen (15) years beginning on the data of final acceptance.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide the manufacturer's Aluminum-Framed Entrances and Storefront systems, adapted to the application indicated, that complies with the performance requirements specified as demonstrated by testing the system according to test methods indicated and applicable for this Project.

1. Performance Requirements: Provide aluminum framed entrance assemblies that comply with specified performance characteristics, as proven by testing corresponding stock assemblies in accordance with specified test methods.

2. Design Requirements: Comply with design requirements of AAMA Entrance and Curtain Wall requirements, ASCE 7, other authorities having jurisdiction.
   a. Design for compliance with AAMA performance rating by a recognized testing agency. Provide certified test results.
3. Thermal Movement: Provide systems capable of withstanding thermal movements resulting from a metal temperature range of 180 deg. F.
4. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.
5. Wind Loading: Provide assemblies capable of withstanding a uniform pressure of 30 psf inward and outward when tested in accordance with ASTM E 330.
   a. Deflection shall not exceed 1/175 of the clear span.
6. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.
   a. Provide a minimum 1/8-inch clearance between members and top of glazing or other fixed part immediately below.
   b. Provide a minimum 1/16-inch clearance between members and doors.
7. Live Loads: Provide entrance system, including anchorage that accommodates the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.
8. Air Infiltration: Provide aluminum framed entrance system with an air infiltration rate of not more than 0.06 CFM per sq. ft. of fixed area (excluding operable door edges) when tested in accordance with ASTM E 283 at an inward test pressure differential of 6.24 psf.
9. Water Penetration: Provide framing systems with no uncontrolled water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E 331 at an inward test pressure differential of 12.0 lb per sq. ft.
10. Condensation Resistance: Where framing systems are "thermal-break" construction, provide units tested for thermal performance in accordance with AAMA 1503 showing condensation resistance factor (CRF) of not less than 69.
11. Thermal Transmittance: Provide window assembly systems that have an overall U-value of not more than 0.39 BTU/ (hr. x sq. ft. x deg. F) at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.

B. Glazing details shall permit glass replacement after initial construction, shall permit reuse of original gaskets, shall permit replacement glass of the same nominal size as original glass, and shall not require cutting of framing members or removal of interior finishes.

   1. Glazing replacement shall be achievable from both surfaces, unless otherwise indicated.

2.2 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include but are not limited to the following:

   1. Kawneer Company, Inc.
   2. YKK AP America Inc.
   3. EFCO Corporation.

B. Basis-of-Design: Selected Products: Provide the following:

   1. Storefront Framing: Provide aluminum and glass storefront framing system shall be equal to EnCORE™ Framing System (Thermally improved), manufactured by Kawneer Company, Inc.; or approved equal manufacturer listed above.
   2. Entrance Doors: Doors for exterior application shall be "Insulpour 250T Narrow Stile" manufactured by the Kawneer Co. Inc. or approved equal manufacturer listed above.

C. Source Limitations: Obtain all components of curtain wall system, including framing spandrel panels, entrance doors and accessories, from single manufacturer.

2.3 MATERIALS

A. Aluminum Members: Provide alloy and temper recommended by the manufacturer for strength, corrosion resistance, and finish; comply with ASTM B 221 for extrusions and ASTM B 209 for sheet or plate.
   1. The alloy and temper combinations are acceptable for extrusions subject to fabrication, finish and structural requirements: 6063-T5. Nominal wall thickness of 0.125 inch or greater is acceptable for structural extrusions; wall thickness less than 0.125 inch may be acceptable and is subject to approval. Minimum nominal wall thickness for nonstructural trim shall be 0.080 inch.
   2. The alloy and temper for sheet and plate subject to fabrication, finish and structural requirements shall be 3003-H14.
   3. Tolerances as listed in the current edition of the Aluminum Association "Aluminum Standards and Data" are applicable to finished, fabricated and assembled materials. Maintain stricter tolerances where required for proper fit of components, including gaskets and glass.

B. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, or other materials warranted by the manufacturer to be noncorrosive and compatible with aluminum and other components.
   1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125" thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts. Fasteners outboard of or within a glazing pocket, gutter or other potentially wet location (after completion) shall be type 302 or 304 stainless steel.
   2. Exposed Fasteners: Except where unavoidable, do not use exposed fasteners. For the application of hardware, use fasteners that match the finish of member or hardware being fastened.
   3. Type: Provide Phillips flat-head machine screws for exposed fasteners, with finish to match item fastened.

C. 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.

D. Concealed Flashing: Provide 26 gage minimum dead-soft stainless steel, or aluminum sheet of thickness, alloy and type selected by manufacturer for compatibility with other components.

E. Brackets and Reinforcements: Where feasible, provide high-strength aluminum brackets and reinforcements; otherwise provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.

F. Steel products shall also conform to the following:
   1. Hot rolled shapes and plates shall conform to ASTM A 36.
   2. Tubing shall conform to ASTM A 500 or A 501.
   3. Stainless steel bars and sheet shall be AISI Type 304 or 316.
   4. Non tubular cold formed carbon steel with thickness 0.168 inch or less shall conform to ASTM A 446.
   5. Cold formed carbon steel with thickness 0.168 inch or less shall be hot dip galvanized to meet or exceed the requirements of classification G 60 of ASTM A 525.
   6. Cold formed carbon steel with thickness exceeding 0.168 inch and hot rolled steel shall be prime painted in conformance with GSA Specification TT-P-645, or hot dip galvanized in conformance with ASTM A 123.

G. Concrete/Masonry Inserts: Provide inserts of cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 123.

H. Glazing Materials

1. Gaskets and weather-strips except at structural silicone.
    a. Sponge gaskets shall be extruded black neoprene with a hardness of 40 +/- 5 durometer Shore A and conforming to ASTM C 509. Design sponge gaskets to provide 20% to 35% compression.
    b. Compression Weather-stripping: Replaceable compressible weather-stripping gaskets of molded neoprene or molded PVC complying with ASTM D 2287. Comply with Section E-402-4 of the New York State Energy Code.
    c. Dense gaskets shall be black extrusions with a Shore A hardness of 75 +/- 5 for hollow profiles and 60 +/- 5 for solid profiles, and conforming to ASTM C 864. Outdoor gaskets shall be neoprene or Santoprene. Indoor gaskets shall be neoprene, Santoprene or EPDM. Where indoor and outdoor gaskets are reversible for reglazing, EPDM shall not be used for either gasket.
    d. Injection mold all corners of gaskets where compatible with installation procedures.
2. Setting Blocks
    a. Setting blocks shall be dense extruded neoprene, silicone or EPDM with a hardness of 85 +/- 5 durometer Shore A, a minimum length of 4 inches, and a minimum width corresponding to the glass thickness.
    b. Setting blocks shall be equidistant from the glass centerline. Location of setting blocks at glass quarter points is acceptable. The distance from the vertical glass edge to the nearest edge of the setting block shall not be less than six inches, or 0.125 times glass width, whichever is greater.
    c. Shims used in conjunction with setting blocks shall be of the same material, hardness, length and width as the setting blocks.
    d. Setting blocks and chairs shall be secured against migration.
3. Provide side blocks at both jambs, between the midheight and top corner of the glass. Blocks shall be 55 +/- 5 durometer Shore A dense neoprene, silicone or EPDM. Install block with 0.125-inch clearance between block and bearing surface. Positively secure blocks in position.

I. Shims

1. At connections subject to movement, separate all pairs of moving surfaces with friction reducing pads. Pads shall have minimum 0.125-inch thickness and shall be positively retained in position (open ended slots are not acceptable).
2. Shims which transfer shear forces (tending to slide one shim against another) shall be steel plates, set in a staggered pattern and fillet welded to each other and to the adjacent steel surfaces. The shims and welds shall be structurally designed to support the applied loads.
3. Plastic shims are acceptable at static connections for which the shims transfer only compressive forces. Wood shims are not acceptable.

J. Sealants: Provide weatherseal sealants recommended by the manufacturer of the glazed wall system.

1. Secondary seal or weatherseal silicone sealants shall be compatible with adjacent materials. Weatherseal shall accommodate a 50 percent increase or decrease of joint width as measured at time of application in accordance with ASTM C 719. Provide manufacturer's recommended backer rod.
    a. Secondary silicone seal stress shall be designed with consideration that each light in an insulating glass unit, when both lights are of equal thickness, carries 50 percent of total applied wind load.
2. Sealants shall be tooled as a separate operation after application.
3. Coordinate with other sections to assure compatibility of intersecting sealants.

K. Adhesives: Provide manufacturer's standard two-component, heat cured epoxy adhesive for bonding face sheets to core construction.

2.4 FRAMING SYSTEM AND COMPONENTS

A. Framing System: The extruded aluminum framing system shall be a thermally improved system; with intermediate vertical mullions, horizontal and jamb members shall have a nominal face dimension of the sizes indicated on the Drawings. Framing systems shall provide a flush glazed appearance on all sides with no protruding stops, retainers and other such extrusions.

1. Thermally-Improved Construction: Fabricate Aluminum-Framed Storefront systems with concealed thermal separation, located between members. Use manufacturer's that have been in business for not less than 10 years.
2. Fabricate reinforced mullions as required to meet performance requirements.
   a. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
      1) Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
      2) Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
      3) Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
3. Fabricate custom sill and framing covers as indicated on drawings.
4. Provide "flat" applied trims, unless otherwise indicated.
5. Pressure Caps: Manufacturer's standard / custom aluminum components that mechanically retain glazing.
   a. Include snap-on aluminum trim that conceals fasteners.

B. Stile-and-Rail Type Entrance Doors: Provide manufacturer's standard Narrow Stile glazed aluminum and glass entrance doors. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie-rods.
1. Aluminum Door Frames: Fabricate doors of minimum .125 thick extruded aluminum tubular and channel frame assemblies, with rail and stile members, as indicated. Provide welded or mechanical joints in accordance with manufacturer's standards; reinforce as necessary to support required loads.
2. Glazing Stops and Gaskets: Fabricate doors to facilitate replacement of glass, without disassembly of stiles and rails. Provide snap-on glazing stops and preformed gaskets.
3. Stile and Rail Design: Provide “wide” stile and rail designs of configurations and locations, as indicated on the Drawings.

C. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

1. Glazing: Fabricate assemblies to facilitate replacement of glass panels, without disassembly.

D. Accessories: Provide indicated and required closures and trims for complete installation.

2.5 HARDWARE

A. General: Provide heavy-duty hardware units indicated in sizes, number, and type recommended by manufacturer for entrances indicated. Finish exposed parts to match door finish, unless otherwise indicated.

1. Refer to “Section 08 71 00 - Door Hardware” and the Hardware Schedule for the entrance door hardware required and installation requirements relative to each assembly.

2.6 FABRICATION GENERAL

A. General: Fabricate Aluminum-Framed Entrances and Storefront systems to meet aesthetic and performance criteria indicated. Fit and assemble components in the manufacturer's shop to the fullest extent possible and prior to application of finishes.

1. Before shipment, shop assemble, mark, and disassemble components that cannot be permanently shop assembled.
2. Except where formed aluminum members are indicated, construct the Aluminum-Framed Entrances and Storefront systems with extruded aluminum components similar to sections indicated on the drawings.

B. Fabricate components to allow for expansion and contraction, field adjustment, and minimum clearance and shimming at the perimeter. Fit and secure corners and joints rigidly with screw and spline, internal reinforcement, or welding. Make exposed framing and trim joints and connections flush, hairline, and weatherproof. Match exposed work to produce continuity of line.

C. Prefabrication Entrances: Before delivery, complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible. Disassemble components only as necessary.

1. Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
   a. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
   b. Perform cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.
2. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops; at other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
   a. Provide EPDM or vinyl blade gasket weatherstripping in bottom and top door rails, adjustable for contact with threshold and head frame.
   b. Provide neoprene or PVC gasketing anchored into jamb door edge at frame side and at meeting stile.

D. Design and assemble components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

E. Prepare components to receive anchor and connection devices and fasteners. Provide concealed connectors, attachments, and fasteners unless otherwise indicated. Where fasteners exposed to view from the interior are permissible, provide bolts and screws with countersunk heads. Provide acceptable exposed fasteners with finish that matches the framing members or trim.

F. Where shop welding is permissible or required, use only the Gas Tungsten Arc Welding (TIG) or Gas Metal Arc Welding (MIG) process. Grind visible welds to a minimum of 100-grit finish.

1. Conduct finishing operations subsequent to grinding operations.

G. Install concealed steel items required within the glazed curtain wall assemblies. Apply bituminous coating to concealed steel surfaces and other dissimilar metals to come in contact with aluminum or use another approved method for separation.

2.7 GLASS AND GLAZING MATERIALS

A. Glass: Provide glass of types indicated, and thicknesses required by local Code loads and sizes. Fabricate glass to sizes required for openings indicated with edge clearances and tolerances complying with manufacturer's recommendations. Refer to Division 8 Section 08 80 00 Glazing for requirements.

B. Sealed Insulating Glass: Provide 1 inch thick, Low-E coated, insulating glass units shall be, as specified in "Section 088000 - Glazing", of these specifications. Provide units with a silicone secondary seal with an IGCC-certified CBA level compatible with structural silicone sealant.

1. Comply with requirements of the "Glass and Glazing" Section, including those specified by reference to ASTM E 774 for performance Class A.
2. Units shall be certified compatible by the sealant manufacturer. Insulating glass seals shall be certified to withstand project structural loading requirements.

C. Glazing Gaskets: Provide the manufacturer's standard sealed-corner pressure glazing system of color as selected by the Architect, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers, hardness of each glazing component as selected by the manufacturer.

1. Gasket Material: Extruded EPDM gaskets complying with classification as selected by the system manufacturer for performance and permanence.

D. Spacer Gaskets and Setting Blocks: Provide extruded silicone rubber, heat-cured, bond-breaking spacer gaskets and bonding setting blocks of types suitable for the conditions, compatible with the sealant, and hardness as recommended by the glazed curtain wall system manufacturer.

2.8 GLAZING FABRICATION

A. Glazing Assemblies, General:

1. Glazing assemblies not in vertical position shall have a condensate/leakage collection system capable of controlling water to prevent leaks to the interior space. Joints in this system shall be sealed tight; cross members shall overlap and be designed for controlled water flow.
2. Glazing assemblies shall typically include a continuous heel bead of sealant around the perimeter of all lites.
3. Provide weepholes to the exterior for the removal of condensate/leakage; weepholes shall be protected on the exterior by appropriate rain hoods or baffles against water infiltration.
4. Prepare components to receive anchors, connection devices and fasteners. Provide concealed connectors, attachments, and fasteners unless otherwise indicated. Where fasteners exposed to view from the interior are permissible, provide bolts and screws with countersunk heads. Provide acceptable exposed fasteners with finish that matches the framing members or trim.
5. Install concealed steel items required within the custom metal and glass assemblies. Apply bituminous coating to concealed steel surfaces and other dissimilar metals to come in contact with aluminum or use another approved method for separation.

2.9 DOORS

A. Doors General: Provide glazed aluminum framed doors fabricated from components indicated. Design and sizes of doors and profile requirements of fittings and hardware are indicated on drawings. Top, bottom and side rails shall be aluminum extrusions, finished to match the Architect’s sample.

B. Fabricate work to accommodate required fittings, hardware, anchors, reinforcement, and accessory items.

C. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the Project site. Disassemble component only as necessary for shipment and installation.

D. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

1. Uniformity of Finish: Abutting finishes of adjacent metalwork shall not have an integral color variation greater than half the range indicated in the sample submittal, as judged solely by the Architect.

2.10 SAFING INSULATION AND ACCESSORIES

A. Slag-Wool-Fiber Board Safing Insulation: Semirigid boards designed for use as fire stop at openings between edge of slab and exterior wall panels, produced by combining slagwool fibers with thermosetting resin binders to comply with ASTM C 612, Type IA, IB, II, III; nominal density of 8 lb/cu. ft. passing ASTM E 136 for combustion characteristics; thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F.

1. Combustion Characteristics: Faced blanket/batt passes ASTM E 136 test, unless otherwise indicated.
2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 0, respectively.
3. Thickness: As indicated on the Drawings, or as required to meet the minimum thermal performances indicated.
4. Basis of Design: Subject to compliance with requirements, provide slag-wool-fiber board safing insulation “FireSpan 90” as manufactured by Thermafiber, Inc., or approved equal.
   a. Color: As selected by the Architect.

2.11 INTERIOR TRIM

A. Interior trim, closures, angles, etc., shall be material sizing, shapes as shown, with fastening as required and specified. All snap-on trim shall be of extruded 6063-T6 prime aluminum alloy and temper, and minimum 0.050" thickness. Standard snap-on type trim up to 3/4" x 1-3/8" shall be of single flange construction with the snap grip on one flange.

B. Where drive-on trim closures or panning type closure is shown, it shall be of extruded 6063-T6 prime aluminum alloy end temper and shall not be less than 0.062" thick. Bent trim will not be permitted in lieu of extruded shapes, closures, etc.

C. Provide interior trim size as indicated. Concealed mounting clips for snap-on or drive-on trim will be located within 6" of end and spacing not to exceed 18" intervals. Interior trim clips will not be permitted to be used as window anchors.

2.12 EXTERIOR PANNING TRIM

A. Panning: Provide extruded aluminum panning of the type and configuration required by the architect with a minimum nominal wall thickness of 0.080 inches. Provide stainless steel clips for the head and jamb panning members. Clips shall be attached with stainless steel fasteners. Space stainless steel clips appropriately to allow the window units to secure themselves tightly to the panning. Window units shall lip over the panning sill member allowing water to weep to the exterior. Finish panning to match window units.

B. Trims: Provide extruded aluminum trim of the type and configuration required by the Architect with a minimum nominal wall thickness of .050 inches. Provide extruded aluminum trim clips, with a minimum nominal wall thickness of .050 inch; finished to match curtainwall extrusions.

C. The extruded aluminum sections shall be one piece designed to interlock into the continuous extruded ports of the window frame and panel frame without the use of screws, bolts, etc. The interlock shall be such as to provide a completely weathertight connection, thus allowing unrestricted expansion or contraction of interlocked members. The sill panning shall be supported by the tubular sill section of the window frame and shall require no shimming for support, except specific given sizes which could become ineffective through movement via vibration, etc.

D. The panning members shall be secured at corners with concealed No.8 non-magnetic, stainless steel screws into integral screw ports and continuously backsealed for the total perimeter of window and panel frame units with approved sealant. Joints occurring where the head and sill panning flanges butt to the jamb panning flanges shall be secured with stainless steel clips to align the flanges and are to be fully backsealed. Exposed screws or rivets will not he accepted on exterior panning members.

E. The anchored panning or panning clips will not be accepted as a substitute for window anchoring thru the inner and outer frame members as detailed and specified.

2.13 FINISHES GENERAL

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. 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.

2.14 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. 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.

C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

D. High Performance Organic Coating: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.

1. Fluorocarbon 3-Coat Finish System: Manufacturer's standard 3-coat thermo-cured system composed of specially formulated inhibitive primer and fluorocarbon color coat, and clear fluorocarbon topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight. Resin shall be Kynar 500; comply with AAMA 2605.
   a. Color: PPG, BN3W148B, Duranar XL Ultra-Cool, Eco White 10483, with 614C11 Clear.

E. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: As selected by Architect from full range of industry colors and color densities.

2.15 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the supporting structure and substrate for dimensions and tolerances, material conditions, and support before beginning the glazed curtain wall system installation. Carefully check provisions for anchorage and adjustment, allowances for expansion and contraction, and conditions of preset flashings and flashing connections.

B. Do not proceed until unsatisfactory conditions in affected areas have been corrected.

3.2 PREPARATION

A. Furnish anchor bolts and inserts at proper times for setting in supporting structure, and similar work indicated to support glazed curtain wall system.

B. Paint dissimilar metal surfaces other than stainless steel, zinc, or small areas of white bronze in contact with aluminum with a prime coat of zinc-chromate primer, followed by one or more coats of aluminum paint or other coating free of lead pigment, with a heavy coat of cold-applied asphalt mastic, or separate the dissimilar metals by caulking, nonabsorptive tape, or gasket recommended by the glazed curtain wall system manufacturer.

C. Paint concealed aluminum surfaces in contact with lime mortar, concrete or other masonry materials with an alkali-resistant coating or provide other separation recommended by the glazed curtain wall system manufacturer.

3.3 INSTALLATION

A. General: Comply with the system manufacturer's instructions for protecting, handling, and installing fabricated glazed curtain wall system components, with particular care and attention to preservation of **applied finishes and use of sealants. Discard members damaged before installation and remove installed** members that become damaged; provide acceptable new components.

B. Anchor components securely and permanently in place as required. Shim and use attachment methods that permit adjustment for construction tolerances, irregularities, and alignment. Allow for movement that results from changes in thermal conditions.

1. Provide separators and isolators to prevent corrosion, electrolytic deterioration, and "freeze-up" of moving joints.

C. Erection Tolerances: Install components plumb, level, accurately aligned, and located in reference to column lines and floor levels. Adjust work to conform to the tolerances indicated below. Tolerances indicated below are maximum and are not cumulative.

1. Plumb: Plus, or minus 1/8-inch, maximum variation in story height, or 15'-0" run, noncumulative.
2. Level: Plus, or minus 1/8-inch, maximum variation in any column-to-column space, or, 40' run, noncumulative.
3. Alignment: 1/16 inch where surfaces are flush or less than 1/2 inch out of flush and separated by less than 2 inches by a reveal or protruding work; otherwise limit offsets to 1/8 inch.
4. Location: 3/8-inch maximum deviation from the measured theoretical location of any member at any location.

D. Welding: Where field welding is required or permissible in concealed locations, use only the gas tungsten arc (TIG) or gas metal arc (MIG) welding process. Take care to protect exposed finishes, including work by others.

E. Coordinate installation and connections of seals, insulation, and flashings at perimeter of assemblies to maintain continuity of thermal and water barriers.

F. Glazing: Inspect glazing material and framing for compliance with manufacturing and installation tolerances, including size, squareness, and offsets at corners; edge or face clearances; and effective sealing. Comply with requirements of glazing material and glazing sealant manufacturers as specified in Division 8 section "Exterior Glazing." Avoid point loading of glazing material.

G. Entrance Assemblies Installation.

1. Comply with final shop drawings and manufacturer's recommendations for installation of entrances, glazed frames, hardware, and other components of work.
2. Set units plumb, level, and true to line, without warp or rack of frames or doors. Anchor securely in place. Separate dissimilar metals against electrolytic action.
3. Install entrance assemblies to comply with the following maximum non-accumulative erection tolerances:
   a. Variation from plumb: 1/8 inch in 12 feet, 3/4-inch total in any location.
   b. Variation from level: 1/8 inch in 12 feet, 3/8 inch any location
   c. Variation from building line: 1/8 inch in 22 feet, 3/8-inch total in any location.
   d. Variation in alignment of members: 1/16 inch. No edge projection will be permitted.
   e. Maximum joint opening width: 1/16 inch.
   f. Glazed frames and entrance framing shall be required to accommodate building erection tolerances of plus or minus 1 inch at concrete and plus or minus 1/2 inch at steel.
4. Set frame, sill and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction.
   a. Comply with requirements of “Section 07920 - Joint Sealants” for sealants, fillers, and gaskets.
5. Drill and tap frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
   a. Coordinate with door manufacture for recommended requirements and proper installation.
6. Separate aluminum and other corrodible metal from corrosion or electrolytic action at dissimilar materials.

H. Sealants and Joint Fillers: Comply with requirements specified in "Section 079200 - Joint Sealants."

I. Perimeter Sealants and Joint Fillers: Install weathering sealant at connections to other materials as specified in "Section 079200 - Joint Sealants."

J. Firestopping: Clean debris from behind curtain wall during erection and provide temporary closures to prevent accumulation of debris. Install firestopping to comply with governing regulations and AAMA TIR-A3. Install firestopping to prevent dislocation. Comply with requirements of "Section 07840 - Through- Penetration Firestop Systems".

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Provide the services of an independent testing agency, experienced in testing installed glazed curtain wall assemblies and acceptable to the Architect, to perform field quality control testing.

B. Testing Services: Testing and inspecting of representative areas of exterior metal and glass enclosures shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.

1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article, but not more than 0.50 cfm/sq. ft. of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.
    a. Test Area: One bay wide, but not less than 30 feet, by one story of each different metal and glass enclosure system.
    b. Perform a minimum of three tests in areas as directed by Architect.
    c. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 20, 50, and 90 percent completion.
2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbs. /sq. ft., and shall not evidence water penetration.
    a. Test Area: One bay wide, but not less than 30 feet, by one story of each different metal and glass enclosure system.
    b. Perform a minimum of three tests in areas as directed by Architect.
    c. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 20, 50, and 90 percent completion.
3. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
    a. Test Area: A minimum area of 75 feet by one story of each different metal and glass enclosure system.
4. Metal and glass enclosure system will be considered defective if they do not pass tests and inspections.
5. Typical areas of the aluminum entrances shall be checked for water penetration in accordance with AAMA Standard 501.2, "Field Check of Metal Storefronts, Curtain Walls and Sloped Glazing Systems for Water Leakage". Initial testing will be performed as early in the installation phase as possible. The Architect will designate the areas of the completed work to be so checked and shall witness all tests. The Contractor shall be required to perform a required number of tests prior to acceptance.
    a. Depending upon the prevalence or absence of leakage in the initial water penetration tests, and upon the measures adopted by the Contractor to eliminate the source of leakage (if any) from subsequently erected work, the Architect will determine the necessity of (and scope of) additional tests. All retests required by the Architect due to repeated failures in "initial water tests" shall be performed by the Contractor at no additional cost to the Fund.

C. Testing laboratory shall promptly report test results in writing to the Architect and Contractor.

D. Satisfactorily repair areas damaged by testing and defects discovered or remove items that fail to comply with requirements and provide new acceptable work at no additional cost to the SUCF.
    1. Retest assemblies until they meet all criteria specified, with no sign of failure within testing parameters; at no additional cost to the SUCF.

3.5 ADJUSTING AND CLEANING

A. Clean the completed system, including metal and glazing materials, inside and out, promptly after erection and installation of glass and sealants. Allow for nominal curing of liquid sealants.

    1. Remove temporary protective coverings and strippable coatings from prefinished metal surfaces. Remove labels and part-number markings from components.
    2. Wash exposed surfaces using a solution of mild detergent in warm water applied with soft, clean cloths. Wipe clean. Take care to clean member connections and inside corners. Avoid harsh cleaning materials and methods that would damage metal finishes or glazing.
    3. Remove remaining excess sealant by moderate use of a solvent acceptable to the sealant manufacturer.

B. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

C. Follow recommendations of the system manufacturer for proper and adequate protection and cleaning procedures to be followed during the remainder of the construction period so that the system will be without damage at the time of acceptance.

D. At the time of Substantial Completion, clean the glazed curtain wall system thoroughly and polish glass. Demonstrate proper cleaning methods and materials to the Fund's maintenance personnel.

E. Touch-Up: Touch-up all abraded surfaces with materials and techniques as recommended by the system manufacturer, to match the finishes specified.

3.6 PROTECTION

A. Provide protection to ensure that entrances will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 085400 - COMPOSITE WINDOWS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the composite windows as shown on the drawings and specified herein, including, but not limited to, the following:

1. Windows fabricated of composite material.
2. Swinging composite doors.
3. Anchors, hardware, and accessories.
4. Glass and glazing of windows and doors specified herein.

1.3 RELATED SECTIONS

A. Carpentry - Section 062000.

B. Joint Sealers - Section 079200.

1.4 QUALITY ASSURANCE

A. Performance Requirements: Provide products/systems that have been manufactured, fabricated, and installed to the following performance criteria:

B. Performance and Testing

1. Comply with AAMA/WDMA/CSA 101/I.S.2/A440.
2. air infiltration shall average less than or equal to 0.19 cfm per square foot of unit.
3. Water Penetration: No water penetration beyond the interior face of window unit when tested in accordance with ASTM E 547 at a static pressure of 7.50 psf.
4. Structural Performance: No glass breakage, damage to hardware, or permanent deformation (set) which would cause any malfunction or impair the operation of the unit or residual deflection greater than 0.4 percent of span when tested in accordance with ASTM E 330 at a test pressure of 75 psi.
5. Design Criteria: Design and size window components to withstand loads imposed by wind to a pressure of 40 psf when measured in accordance with ASTM E 330. Limit deflection to L/175.
6. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F.
7. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.32.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, standard details and recommendations for each type of composite window unit required.

1. Submit verification that windows meet standards specified above in Article 1.4.

B. Shop Drawings: Submit shop drawings of windows, including wall elevations and unit elevations at 1" scale, and half-size section details of every typical composite member, including glazing and operators. Show flashing details as related to dissimilar materials.

C. Samples: Submit corner sections, or other samples acceptable to the Architect, of a typical composite window section. Samples shall be of sufficient size to show intended quality of workmanship.

1.6 ALLOWABLE TOLERANCE

A. Glazed Openings: Diagonal dimension of glazed openings shall not differ by more than 1/8". Glazing channels shall not bow more than 1/16" per 4 feet, not exceed 1/32" corner off-set.

B. Erection Tolerances: Not more than 1/8" per 12 linear feet variation from plane of location shown in reviewed shop drawings.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver factory assembled units, suitably protected. Bundle loose materials as necessary to prevent loss and damage.

B. Store products in a clean, protected, dry, well-ventilated building, on platforms or blocking at least 4" above floor. Stack windows so they do not warp, bend, or twist. Store windows upright, not flat, with at least 1/4" air space between units. General contractor is responsible for window storage on site.

1.8 JOB CONDITIONS

A. Connecting Work: Construct to specified tolerance. Field dimensions taken prior to fabrication.

B. Reference Points: Establish benchmarks and other required reference points.

C. Environmental Conditions: Air temperature during installations shall be at least 40 deg. F. and rising and the wind light or still. Work areas and materials shall be dry and free of ice or snow.

1.9 WARRANTY

A. Provide manufacturer's standard 20-year warranty on insulating glass.

PART 2 PRODUCTS

2.1 WINDOWS

A. Provide "100 Series" windows as manufactured by Andersen Corporation or approved equal.

B. Frame and Sash Members: Fabricated from "Fibrex" composite material; color: White.

C. Hardware

1. Sash Lock Type and Material: Single actuations, galvanized steel and engineered polymer components.

D. Limit Devices: Manufacturer's standard limit devices designed to restrict sash opening. Limit clear opening to 4" for ventilation.

E. Insect Screens: Provide venting sash with an insect screen, including attachment hardware.

1. Frames: 0.20" rolled aluminum frame with chromate conversion coating. Provide matching corner locks and latch retainers.
2. Insect Screen Cloth: 18 x 16 aluminum mesh, gun metal finish.
3. Frame Finish: High-bake polyester finish; color as selected by the Architect.

2.2 GLAZING

A. General: Insulating glass units certified through the Insulating Glass Certification Council as conforming to the requirements of IGCC. Provide dual sealed units consisting of polyisobutylene primary seal and silicone secondary seal. Metal spacers to have bent or soldered corners.

B. Insulating Glass: Provide insulating glass units conforming to requirements of Section 088000, consisting of outside lite of clear annealed glass conforming to ASTM C 1036, Type 1, Class 1, Quality q3, and an indoor lite of clear, heat strengthened glass conforming to ASTM C 1048, Type 1, Class 1, Quality q3, Kind HS, separated by an air space filled with argon gas, and with "SmartSun" Low-E coating on the No. 2 surface.

2.3 FABRICATION

A. Fibrex Composite Material

1. Sash Members: Fibrex material sash members with co-extruded interior and exterior colored cap stock.
2. Frame Units: Fibrex material frame member co-extruded interior and exterior colored cap stock and with co-extruded flanges for installation.

B. Glazing: Factory glaze with glazing sealant and snap-in rigid vinyl glazing bead.

C. Weatherstripping: Factory-applied to unit frame. Field-applied interlocking weatherstripping at panel meeting stiles.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where composite windows are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of composite window units, hardware, accessories, and other components of 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. Refer to Section 079200 for joint fillers and sealants required for installation.

3.3 TESTING

A. Window shall be field tested in accordance with AAMA 502, using Test Method A.

3.4 ADJUST AND CLEAN

A. Adjust operating sash, leaves and hardware to provide smooth operation with tight, weather-proof closure. Lubricate hardware and moving parts.

B. Clean glass of units promptly after installation. Wash and polish glass of both faces not more than four (4) days prior to date scheduled for final inspection. Comply with glass manufacturer's recommendations for final cleaning and maintenance.

C. Remove and replace glass that is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

D. Institute protection required through remainder of construction period, to ensure that composite window units will be without damage or deterioration (other than normal weathering) at time of acceptance.

END OF SECTION

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Mechanical and electrified door hardware for:
      a. Swinging doors.

B. Section excludes:
   1. Windows
   2. Cabinets (casework), including locks in cabinets
   3. Signage
   4. Toilet accessories
   5. Overhead doors

C. Related Sections:
   1. Division 01 Section “Alternates” for alternates affecting this section.
   2. Division 06 Section “Rough Carpentry”
   3. Division 06 Section "Finish Carpentry”
   4. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.
   5. Division 08 Sections:
      a. “Metal Doors and Frames”
      b. “Flush Wood Doors”
      c. “Stile and Rail Wood Doors”
      d. “Interior Aluminum Doors and Frames”
      e. "Aluminum-Framed Entrances and Storefronts"
      f. “Special Function Doors”
      g. "Entrances”
   6. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.

1.02 REFERENCES

A. UL - Underwriters Laboratories
   1. UL 10B - Fire Test of Door Assemblies
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies
   4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware
   3. Keying Systems and Nomenclature
   4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association
   1. NFPA 70 – National Electric Code
   2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
   3. NFPA 101 – Life Safety Code
   4. NFPA 105 – Smoke and Draft Control Door Assemblies
   5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute
   1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
   2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
   3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
   4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
   5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:
   1. Submit in accordance with Conditions of Contract and SECTION 013300 Submittal Procedures.
   2. Prior to forwarding submittal:
      a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
      b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
      c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:
   1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
   2. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
      a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
   3. Door Hardware Schedule:
      a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
      b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
      c. Indicate complete designations of each item required for each opening, include:
         1) Door Index: door number, heading number, and Architect’s hardware set number.
         2) Quantity, type, style, function, size, and finish of each hardware item.
         3) Name and manufacturer of each item.
         4) Fastenings and other pertinent information.
         5) Location of each hardware set cross-referenced to indications on Drawings.
         6) Explanation of all abbreviations, symbols, and codes contained in schedule.
         7) Mounting locations for hardware.
         8) Door and frame sizes and materials.
         9) Degree of door swing and handing.
   4. Key Schedule:
      a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
      b. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.

c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

5. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
b. Include warranties for specified door hardware.

D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Factory order acknowledgement numbers (for warranty and service)
d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.
f. Final approved hardware schedule edited to reflect conditions as installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

E. Inspection and Testing:
1. Submit a written report of the results of functional testing and inspection for fire door assemblies, in compliance with NFPA 80.
a. Written report to be provided to the Construction Manager and Nassau County Department of Public Works and be made available to the Authority Having Jurisdiction (AHJ).
b. Report to include the door number for each fire door assembly, door location, door and frame material, fire rating, and summary of deficiencies.
2. Submit a written report of the results of functional testing and inspection for required egress door assemblies, in compliance with NFPA 101.

a. Written report to be provided to the Construction Manager and Nassau County Department of Public Works and be made available to the Authority Having Jurisdiction (AHJ).
b. Report to include the door number for each required egress door assembly, door location, door and frame material, fire rating, and summary of deficiencies.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
    a. Warehousing Facilities: In Project's vicinity.
    b. Scheduling Responsibility: Preparation of door hardware and keying schedules.
    c. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies like those indicated for this Project.
    d. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Construction Manager, Architect and electrical engineers and provide installation and technical data to the Construction Manager, Architect and other related subcontractors.
        1) Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
    a. For door hardware: DHI certified AHC or DHC.
    b. Can provide installation and technical data to Architect and other related subcontractors.
    c. Can inspect and verify components are in working order upon completion of installation.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
    a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
    b. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
    a. Provide door hardware that meets requirements of assemblies tested according to UL1784 and installed in compliance with NFPA 105
    b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Accessibility Requirements:
    a. Comply with governing accessibility regulations cited in “REFERENCES” article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
    a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2) Preliminary key system schematic diagram.
3) Requirements for key control system.
4) Address for delivery of keys.

2. Pre-installation Conference
   a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Inspect and discuss preparatory work performed by other trades.
   c. Inspect and discuss electrical roughing-in for electrified door hardware.
   d. Review sequence of operation for each type of electrified door hardware.
   e. Review required testing, inspecting, and certifying procedures.
   f. Review questions or concerns related to proper installation and adjustment of door hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer’s original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
    a. Mechanical Warranty
        1) Locks
            a) Mortise: 3 year
            b) Cylindrical: 10 year
        2) Exit Devices: 10 years
        3) Closers: 25 years
        4) Accessories
            a) Continuous Hinges: Lifetime

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 5BB series
2. Acceptable Manufacturers and Products:
   a. Hager BB1191/1279 series
   b. Stanley FBB series
   c. Bommer BB5000 series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins
10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with enough and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 SPRING HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 3SP series
2. Acceptable Manufacturers and Products:
   a. Bommer LB4000 series
   b. Hager 1250 series
   c. Stanley 2060 series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.

2. Provide 3 knuckle, spring full mortise hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Steel, 4-1/2 inches (114 mm) high
4. Doors over 1-3/4 inch (44 mm) thick or over 36 inches (914 mm) wide:
   a. Exterior: Bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Steel, 5 inches (127 mm) high
5. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
6. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.
7. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.

2.05 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Select
   b. Roton
   c. ABH

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with enough and wire gage to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.06 FLUSH BOLTS

A. Manufacturers:
   1. Scheduled Manufacturer:
      a. Ives
   2. Acceptable Manufacturers:
      a. Burns
      b. DCI
      c. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Burns
   b. DCI
   c. Hiawatha
   d. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage L9000 series
2. Acceptable Manufacturers and Products:
   a. Accurate 9000/9100 series
   b. Sargent 8200 series
   c. Best 45H series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to “KEYING” article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latch bolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.

7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
8. Provide motor based electrified locksets with electrified options as scheduled in the hardware sets and comply with the following requirements:
    a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
    b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
    c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
    d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
    e. Connections – provide quick-connect Molex system standard.
9. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
    a. Lever Design: 06A

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
    a. Falcon T series
2. Acceptable Manufacturers and Products:
    a. Sargent 10-Line
    b. Best 9K series
    c. Schlage ND Series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
    a. Lever Design:

2.10 TUBULAR LOCKS – GRADE 2

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
    a. Schlage S series
2. Acceptable Manufacturers and Products:
    a. Arrow C series
    b. Sargent DL series

B. Requirements:
   1. Provide tubular locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 2, and UL Listed for 3-hour fire doors.
   2. Cylinders: Refer to “KEYING” article, herein.
   3. Provide locks with standard 2-3/8 inches (60 mm) adjustable to 2-3/4 inches (70 mm) backset with 1/2-inch (13 mm) latch throw.
   4. Provide locksets that fit standard 2-1/8 inches (54 mm) diameter bore without use of thru bolts.
   5. Door Thickness: Locksets adjustable to fit in 1-3/8 inches (35 mm) or 1-3/4 inches (44 mm) door thickness.
   6. Provide standard T-strikes unless extended lip strikes are necessary to protect trim.
   7. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
      a. Lever Design:

2.11 EXIT DEVICES

A. Manufacturers and Products:

   1. Scheduled Manufacturer and Product:
      a. Falcon 24/25 series
   2. Acceptable Manufacturers and Products:
      a. Von Duprin 98/99
      b. Sargent 19-43-GL-80 series
      c. Precision Apex series

B. Requirements:

   1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
   2. Cylinders: Refer to “KEYING” article, herein.
   3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
   4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
   5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
   6. Provide flush end caps for exit devices.
   7. Provide exit devices with manufacturer’s approved strikes.
   8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
   9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
   10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
   11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
   12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
   13. Provide electrified options as scheduled.
   14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.12 CYLINDERS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product:

a. Schlage Everest 29 S

2. Acceptable Manufacturers and Products:
   a. Corbin-Russwin Patented Keyway
   b. Sargent DG1
   c. Yale Keymark

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.

   a. Conventional Patented Open: cylinder with interchangeable core with open keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

C. Construction Keying:

1. Replaceable Construction Cores.
   a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
      1) 3 construction control keys
      2) 12 construction change (day) keys.

2.13 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

C. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
   a. Master Keying system as directed by the Owner.
2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:
   a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
   b. Patent Protection: Keys and blanks protected by one or more utility patent(s).
4. Identification:
   a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
   b. Identification stamping provisions must be approved by the Architect and Owner.
   c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
   d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.

e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

5. Quantity: Furnish in the following quantities.
   a. Change (Day) Keys: 3 per cylinder/core.
   b. Permanent Control Keys: 3.
   c. Master Keys: 6.

2.14 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Telkee
2. Acceptable Manufacturers:
   a. HPC
   b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
   a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
   b. Provide hinged-panel type cabinet for wall mounting.

2.15 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN 4050A series
2. Acceptable Manufacturers and Products:
   a. Falcon SC70A series
   b. Norton 7500 series
   c. Sargent 351 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.

8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives.
2. Acceptable Manufacturers:
   a. Elmes
   b. Trimco
   c. Burns

B. Requirements:

1. Provide push plates, push bars, pull plates, and pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Burns
   b. Trimco
   c. Hiawatha

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
   a. Glynn-Johnson
2. Acceptable Manufacturers:
   a. Rixson
   b. Sargent
   c. ABH

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Trimco
   b. Burns
   c. Hiawatha

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other, and overhead stop cannot be used.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Zero International
2. Acceptable Manufacturers:
   a. National Guard
   b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.21 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Burns
   b. Trimco
   c. Hiawatha

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.22 ROLLER LATCHES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Burns
   b. Hiawatha
   c. Trimco

B. Requirements:

1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer’s template.

2.23 DOOR VIEWERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Burns
   b. Rockwood

B. Provide appropriate door viewer for door type and rating with minimum of 180-degree view area.

2.24 LATCH PROTECTORS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Burns
   b. Trimco
   c. Rockwood

B. Provide stainless steel latch protectors of type required to function with specified lock.

2.25 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
3. Protection Plates: BHMA 630 (US32D)
4. Overhead Stops and Holders: BHMA 630 (US32D)
5. Door Closers: Powder Coat to Match
6. Wall Stops: BHMA 630 (US32D)
7. Latch Protectors: BHMA 630 (US32D)
8. Weatherstripping: Clear Anodized Aluminum
9. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Where on-site modification of doors and frames is required:

1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
2. Field modify and prepare existing doors and frames for new hardware being installed.
3. When modifications are exposed to view, use concealed fasteners, when possible.
4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
   a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
   b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
   c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

H. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.

I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

K. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

L. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants".

N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

Q. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

A. Inspection and Testing:

1. Provide functional testing and inspection of fire door assemblies by a qualified person in accordance with NFPA 80.

a. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
b. Submit a signed, written final report as specified in Paragraph 1.03.E.1.
c. Correct all deficiencies and schedule a reinspection of fire door assemblies noted as deficient on the inspection report.
d. Inspector to reinspect fire door assemblies after repairs are made.

2. Provide inspection of required egress door assemblies by a qualified person in accordance with NFPA 101.
   a. Schedule egress door assembly inspection within 90 days of Substantial Completion of the Project for the required openings.
   b. Submit a signed, written final report as specified in Paragraph 1.03.E.2.
   c. Correct all deficiencies and schedule a reinspection of egress door assemblies noted as deficient on the inspection report.
   d. Inspector to reinspect required egress door assemblies after repairs are made.

3.05 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. 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.

   1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
   2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.06 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer's instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.07 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to 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.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

3.08 HARDWARE SETS:

HARDWARE SET NO. 01 - SINGLE PUSH/PULL - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	•	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	•	630	IVE
1	EA	PULL PLATE	8302 10" 4" X 16"	•	630	IVE
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	•	630	IVE
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 02 - SINGLE PRIVACY - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	PRIVACY LOCK	T301S DAN	•	626	FAL
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 02A - SINGLE PRIVACY - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	PRIVACY LOCK	T301S DAN	•	626	FAL
1	EA	FLOOR STOP	FS438	•	626	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 02B - SINGLE PRIVACY - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	PRIVACY LOCK	T301S DAN	•	626	FAL
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 03 - SINGLE CLASSROOM SECURITY
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	CLASSROOM SEC LOCK	T381J DAN	•	626	FAL
2	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
2	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	•	630	IVE
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 04 - PAIR CLASSROOM SECURITY - COMMERCIAL
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	SET	AUTO FLUSH BOLT	FB41P	•	630	IVE
1	EA	DUST PROOF STRIKE	DP2	•	626	IVE
1	EA	CLASSROOM SEC LOCK	T381J DAN	•	626	FAL
2	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
2	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	COORDINATOR	COR X FL	•	628	IVE
2	EA	MOUNTING BRACKET	MB	•	689	IVE
2	EA	SURFACE CLOSER	4050A CUSH	•	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	•	630	IVE
2	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 05 - SINGLE OFFICE - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	ENTRY / OFFICE LOCK	T511J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	OH STOP	90S	•	689	GLY
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 05A - SINGLE OFFICE - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	ENTRY / OFFICE LOCK	T511J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 05B - SINGLE OFFICE - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	ENTRY / OFFICE LOCK	T511J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	•	630	IVE
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 06 - SINGLE CLASSROOM - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	CLASSROOM LOCK	T561J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 06A - SINGLE CLASSROOM - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	CLASSROOM LOCK	T561J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	FLOOR STOP	FS436	•	626	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 06B - SINGLE CLASSROOM - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	CLASSROOM LOCK	T561J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 08 - SINGLE STOREROOM - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	STOREROOM LOCK	T581J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 09 - PAIR CLOSET - COMMERCIAL
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
2	EA	MANUAL FLUSH BOLT	FB358	•	626	IVE
1	EA	DUST PROOF STRIKE	DP2	•	626	IVE
1	EA	STOREROOM LOCK	T581J DAN	•	626	FAL
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FSIC CORE	23-030 ICX	•	622	SCH
2	EA	OH STOP	90S	•	689	GLY
2	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 11 - SINGLE HOLDING CELL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	CYLINDER DEAD LOCK	L9464T L283-721	•	630	SCH
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	PULL PLATE	8303 8" 4" X 16"	•	630	IVE
1	EA	OH STOP	90S	•	689	GLY
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 100 - SINGLE APARTMENT ENTRY - RESIDENTIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	SPRING HINGE	3SP1 4.5 X 4.5	•	652	IVE
1	EA	CORRIDOR LOCK	L9456T 06A L583-363 L283-723	•	626	SCH
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
1	EA	GASKETING	188SBK PSA	•	BK	ZER
1	EA	DOOR BOTTOM	364AA	•	AA	ZER
1	EA	DOOR GUARD	482	•	626	IVE
1	EA	VIEWER	U698	•	626	IVE

HARDWARE SET NO. 101 - SINGLE BED/BATH - RESIDENTIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	PRIVACY LOCK	S40D FLA	•	626	SCH
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 102 - SINGLE CLOSET - RESIDENTIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
1	EA	PASSAGE SET	S10D FLA	•	626	SCH
1	EA	WALL STOP	WS406/407CCV	•	630	IVE
3	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 103 - PAIR CLOSET - RESIDENTIAL
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	•	652	IVE
2	EA	ROLLER LATCH	RL30	•	626	IVE
2	EA	SINGLE DUMMY TRIM	S170 FLA	•	626	SCH
2	EA	SILENCER	SR64	•	GRY	IVE

HARDWARE SET NO. 110 - EXTERIOR FRONT RESIDENTIAL DOOR
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	ENTRANCE HANDLESET	F60 ADD FLA	•	619	SCH
1	EA	BALANCE OF HARDWARE	BY DOOR MANUFACTURER			

HARDWARE SET NO. 111 - EXTERIOR REAR RESIDENTIAL DOOR
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	PASSAGE SET	S10D FLA	•	626	SCH
1	EA	SGL CYL DEADBOLT	B60	•	619	SCH
1	EA	BALANCE OF HARDWARE	BY DOOR MANUFACTURER			

HARDWARE SET NO. AL01 - PAIR A/G - COMMERCIAL
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112XY	•	628	IVE
2	EA	MANUAL FLUSH BOLT	FB458	•	626	IVE
1	EA	DUST PROOF STRIKE	DP2	•	626	IVE
1	EA	DEADBOLT	MS1850, TO SUIT DOOR	•	628	ADA
2	EA	MORTISE CYLINDER	20-062 ICX X K510-711 36-082-018 36-082-037	•	626	SCH
2	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
2	EA	PUSH/PULL BAR	9190HD-10"-NO	•	630	IVE
2	EA	OH STOP	90S	•	689	GLY
2	EA	SURFACE CLOSER	4050A RW/PA MOUNT TOP JAMB	•	689	LCN
2	EA	MOUNTING PLATE	4050-18G	•	689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	545A-223	•	A	ZER

HARDWARE SET NO. EX01 - SINGLE EXIT EXTERIOR DOOR - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY	•	628	IVE
1	EA	PANIC HARDWARE	25-R-NL	•	630	FAL
1	EA	MORTISE CYLINDER	20-061 ICX X K510-730 36-083 36-082-037	•	626	SCH
1	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	FLUSH PULL	BY DOOR MANUFACTURER			
1	EA	SURFACE CLOSER	4050A SCUSH	•	689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	546A-223	•	A	ZER

HARDWARE SET NO. EX01A - SINGLE EXTERIOR DOOR - COMMERCIAL
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY	•	628	IVE
1	EA	STOREROOM LOCK	L9080T 06A	•	626	SCH
2	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	•	689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	546A-223	•	A	ZER

HARDWARE SET NO. EX02 - PAIR EXITS EXTERIOR - COMMERCIAL
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY	•	628	IVE
1	EA	REMOVABLE MULLION	KR4023	•	SP28	FAL
1	EA	PANIC HARDWARE	CD-25-R-DT	•	630	FAL
1	EA	PANIC HARDWARE	CD-25-R-NL	•	630	FAL
2	EA	MORTISE CYLINDER	20-061 ICX X K510-730 36-083 36-082-037	•	626	SCH
2	EA	MORTISE CYLINDER	20-061 ICX X K510-730 XQ11-948 36-083 36-082-037	•	626	SCH
4	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
2	EA	SURFACE CLOSER	4050A HCUSH	•	689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	546A-223	•	A	ZER

HARDWARE SET NO. EX02A - PAIR EXITS VESTIBULE - COMMERCIAL
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5	•	652	IVE
1	EA	REMOVABLE MULLION	KR4023	•	SP28	FAL
1	EA	PANIC HARDWARE	CD-25-R-DT	•	630	FAL
1	EA	PANIC HARDWARE	CD-25-R-NL	•	630	FAL
2	EA	MORTISE CYLINDER	20-061 ICX X K510-730 36-083 36-082-037	•	626	SCH
2	EA	MORTISE CYLINDER	20-061 ICX X K510-730 XQ11-948 36-083 36-082-037	•	626	SCH
4	EA	FSIC CORE	23-030 CKC EV29 S	•	626	SCH
2	EA	SURFACE CLOSER	4050A HCUSH	•	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	•	630	IVE
2	EA	SILENCER	SR64	•	GRY	IVE

END OF SECTION

SECTION 088000 - 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.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the glass and glazing as shown on the drawings and/or specified herein, including, but not limited to, glazing of the following:

1. Glass and glazing for exterior and interior locations.
2. Mirror glazing.

1.3 RELATED SECTIONS

A. Steel Doors and Frames - Section 081113.

B. Aluminum Framed Entrances and Storefronts – Section 084113.

C. Toilet Accessories (Mirrors) – Section 102800.

1.4 REFERENCES

A. Comply with the recommendations of the following references unless more stringent requirements are indicated herein.

1. FGMA Publications: FGMA Glazing Manual.
2. LSGA Publications: LSGA Design Guide.
3. SIGMA Publications: TM-3000 Vertical Glazing Guidelines.
4. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201, Safety Standards for Architectural Glazing, Sealed Insulating Glass Manufacturing Association.
5. Fire-Resistive Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
6. ASTM C 920, Elastomeric Joint Sealant.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass units shall be annealed, heat strengthened, fully tempered or laminated where required to meet wind load and safety glazing requirements, as shown, specified, or recommended by the glass fabricator, and as required by the prevailing Building Code.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements, including performance requirements.

B. Submit compatibility and adhesion test reports from sealant manufacturer indicating materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulation units.

C. Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.

1. Submit complete range of samples of standard colors and patterns for ceramic frits at insulating glass.
2. Submit complete range of samples of sandblasted glass showing variations of grits and opacity achieved.

D. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.

E. Warranties: Provide written warranties as specified herein.

1.7 QUALITY ASSURANCE

A. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.

B. Installer: A firm with a minimum of five years' experience in type of work required by this Section and which is acceptable to manufacturers of primary materials; and with a successful record of in-service installations similar in size and scope to this Project.

C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.

1. GANA Publications: GANA's "Glazing Manual" and "Laminated Glass Design Guide."
2. IGMA Publications: IGMA TM-3000, "Vertical Glazing Guidelines for Sealed Insulating Glass Units."

1.8 PROJECT CONDITIONS

A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.

B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.

1. Protect materials from moisture, sunlight, excess heat, sparks and flame.
2. Sequence deliveries to avoid delays but minimize on-site storage.

1.10 WARRANTIES

A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

B. Manufacturer's Special Project Warranty on Coated Glass Products: Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.

1. Warranty Period: Manufacturer's standard but not less than five (5) years after date of substantial completion.

C. Manufacturer’s Special Project Warranty on Laminated Glass: Manufacturer’s standard form, made out to Owner and signed by laminated glass manufacturer agreeing to replace laminated 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 five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 GLASS MATERIALS AND PRODUCTS

A. Clear Float Glass: ASTM C 1036, Type I (transparent, flat), Class 1 (clear), Quality q3, minimum 1/4" thick.

B. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I (transparent, flat), Condition A (uncoated), Class 1 (clear) or Class 2 (tinted) as indicated, Quality Q3, minimum 1/4" thick.

C. Fully Tempered Glass: ASTM C 1048, Condition A (uncoated), Type I (transparent, flat), Class 1 (clear) or Class 2 (tinted) as indicated, Quality Q3, Kind FT, minimum 1/4" thick. Tempered glass must be certified by SGCC to meet applicable standards.

1. Performance Requirements for Tempered Glass
   a. Length and Width: For 2.9 mm to 6.0 mm; +/-1.6 mm.
   b. Diagonal: +/- 3.0 mm.

c. Edgework: Belt seaming or diamond wheels. 1.5 mm seam of upper and lower glass edges. No sharp edges.
d. Corners: No more than 3.0 mm from square.
e. Float Glass Defects: Must meet the requirements of ASTM C 1036. The most common defects are scratches, stones gaseous bubbles and edge chips. Tables in the glass standards have limits for size/quantity of defects.
f. Tempered glass shall have a minimum surface compression of 10,000 psi.
g. Tempered glass to be heat-treated by horizontal (roller hearth) process with inherent roller-wave distortion parallel to the bottom edge of the glass when installed.
h. Flatness Tolerances
    1). Roller-Wave or Ripple: The deviation from flatness at any peak shall be targeted not exceed 0.003" as measured per peak to valley for ¼" (6mm) thick glass.
    2). Bow and Warp: The bow and warp tolerances shall not exceed 1/32" per linear foot.
    3). Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.

D. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conforming to ASTM C 1172 and as follows:

1. Interlayer Color: Clear.
2. Interlayer Material: Provide Eastman Chemical "Saflex" or "Vanceva," or DuPont "Butacite," 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.
3. Minimum thickness of 1/4".

E. Ceramic-Coated Spandrel Glass

1. Heat-treated glass with ceramic coating complying with ASTM C 1048, Condition B (spandrel glass, one surface ceramic-coated) Type 1 (Transparent, Flat), Quality Q3 (Glazing Select), with other requirements as specified.
2. GANA/GTA 66-9-20, Specification for Heat-Strengthened or Fully Tempered Ceramic Enamel Spandrel Glass Used for Building Window/Curtain Walls.
3. Custom color selected by the Architect.

F. Frameless Mirrors: 1/4", Quality q2, clear float glass with silver, copper, and organic coating, edges uniformly ground and polished.

2.2 GLAZING MATERIALS AND PRODUCTS

A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulating glass sealants, with laminated glass interlayers, and with any other surfaces in contact.

B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:

1. Dow Corning 795.
2. General Electric Silglaze N 2500 or Contractors SCS-1000.
3. Tremco Spectrem 2.

C. Weather Seal Sealant: Provide non-acid curing sealant with movement range ± 50%, ASTM C 719. Provide one of the following:

1. Dow Corning 795.
2. General Electric Silpruf.
3. Tremco Spectrem 2.

D. Backer Rod: Closed cell non-gassing polyethylene rod with rod diameter 25% wider than joint width.

E. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75±5 for hollow profile, and 60±5 for solid profiles, ASTM C 864.

F. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40±5, and 20% to 35% compression, ASTM C 509; Type II.

G. Preformed Glazing Tape: Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C 1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form. Provide Tremco "Polyshim II" or approved equal.

H. Setting Blocks: Provide 100% silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be 1/16" more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds 3/4" the glass manufacturer must be consulted for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.

1. Shims: For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.
2. Structural Silicone Glazing: Provide silicone setting blocks where structural silicone occurs at sills and at insulating units with silicone edge seals.

I. Edge Blocks: Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of 55±5.

J. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.

K. Miscellaneous Glazing Materials: Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.

L. Mirror Adhesive: Palmer's "Mirro-Mastic," or approved equal. Mastic must be compatible with mirror backing.

1. Clips: No. 4 finish Type 304 stainless steel.

2.3 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

C. Grind smooth and polish exposed glass edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GENERAL GLAZING STANDARDS

A. Install products using the recommendations from the manufacturer of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the GANA "Glazing Manual."

B. Verify that Insulating Glass Unit (IGU) secondary seal is compatible with glazing sealants.

C. Install glass in prepared glazing channels and other framing members.

D. Install setting blocks in rabbets as recommended by referenced glazing standards in GANA's "Glazing Manual" and IGMA's "Glazing Guidelines."

E. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by GANA's "Glazing Manual."

F. Provide weep system as recommended by GANA's "Glazing Manual."

G. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.

H. Distribute the weight of glass unit along the edge rather than the corner.

I. Comply with manufacturers and referenced industry standards on expansion joint and anchors; accommodating thermal movement; glass openings; use of setting blocks, edge, face, and bite clearances; use of glass spacers; edge blocks and installation of weep systems.

J. Protect glass edge damage during handling and installation.

K. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.

L. Remove and replace glass that is broken, chipped cracked or damaged in any way.

3.4 GLAZING

A. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead. Install setting blocks at the one greater points of each lite along the horizontal mullion.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

K. Flush Glazing

1. If the butt joint in the metal framing is in the vertical direction, the glazier shall run the tape initially on the head and sill members going directly over this joint. Should the butt joint in the metal framing run horizontally, tapes must first be applied to the jambs so that it crosses over the joint.
2. Each tape section shall butt the adjoining tape and be united with a tool to eliminate any opening.
3. Do not overlap the adjoining length of tape or rubber shim as this will prevent full contact around the perimeter of glass.

L. Off-Set Glazing

1. Where the glazing legs are off-set, the difference in the rabbet width shall be compensated by employing different glazing tapes with different diameter shims. The difference in shim shall be equal to the size of the off-set. The thinner tape shall be positioned first on the glazing leg closest to the interior. The thicker tape shall be cut to the exact length of the dimension between the applied tapes and installed on the outermost glazing leg.
2. Immediately prior to setting glass, paper backing shall be removed. Apply a toe bead of sealant 6" in each direction, from each corner.
3. Locate setting blocks in the sill member at quarter points, or if necessary to within 6" of each corner. Setting blocks must be set equal distance from center line of the glass and high enough to provide the recommended bite and edge clearances.
4. Set edge block according to glass manufacturer's recommendations.
5. Set Glass: The glass shall be pressed firmly against the tape to achieve full contact.
6. In a vented system, apply a heel bead (air seal) of sealant around the perimeter of glass, between the sole of the I.G. unit and the base of the rabbet of the metal framing developing a positive bond to the unit and to the metal framing. The bead of the sealant shall be deep enough so that it will partially fill the channel to a depth of 1/4" between the glass edge and the base of the metal framing rabbet.
7. Interior stops shall be set, and glazing tape spline for the appropriate face clearance shall be rolled into place, compressing the glass to the shim within the glazing tape.

3.5 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant as recommended by glass manufacturer or glass frame manufacturer.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape where noted on approved shop drawings.

3.6 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.7 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. Exterior glazing gasket shall be set a minimum of 1/8" below exterior glazing stop to create a channel for sealant installation.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.8 FRAMELESS MIRRORS

A. Apply mastic to back of mirror "pats" spaced 4 pats/sq. ft.; adjust mirror so that it is plumb and in place to avoid distortion of reflecting images. Allow 1/8" space between back of mirror and wall surface.

1. Apply "pats" using Palmer Electric Applicator.

B. Apply stainless steel clips at mirror top and bottom; securely clip to substrate using non-corrosive anchors. At drywall back-up anchors must be secured to studs or steel wallplate spanning from stud to stud.

3.9 PROTECTION AND CLEANING

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

E. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.

F. Glass to be cleaned according to:

1. GANA Glass Information Bulletin GANA 01-0300 – "Proper Procedure for Cleaning Architectural Glass Products."
2. GANA Glass Informational Bulletin GANA TD-02-0402 – "Heat Treated Glass Surfaces are Different."

G. Do not use razor blades, scrapers or metal tools to clean glass.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 092423 - PORTLAND CEMENT STUCCO

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the Portland cement plaster/stucco as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Portland cement stucco applied over sheathing.

1.3 RELATED SECTIONS

A. Wood Framing – Section 061100.

B. Wood Panel Product Sheating – Section 061636

C. Air Barrier Coatings – Section - 072729

1.4 DESIGN REQUIREMENTS

A. Joints: Provide expansion joints in the stucco system where building movement is anticipated: at joints in the substrate or supporting construction, where the system is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, at columns and cantilevered areas.

1. Provide expansion joints at through wall penetrations, for example, above and below doors or windows.
2. Provide appropriate accessories at stucco terminations and joints.
3. Provide appropriate sealant at stucco terminations.

1.5 SUBMITTALS

A. Submit the following for the Architect's review:

1. Manufacturer's specifications, details, installation instructions and product data.
2. Manufacturer’s code compliance report.
3. Manufacturer's standard warranty.
4. Four (4) samples of each color for approval as directed by Project Architect.
5. Prepare and submit project-specific details.

B. Provide manufacturer’s letter indicating stucco contractor is certified to install this system and provide warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Requirements

1. Stucco products manufacturer for a minimum of 20 years.
2. Stucco finish products manufactured under ISO 9001 Quality System.

B. Contractor Requirements

1. Licensed, insured and engaged in application of Portland cement stucco systems for a minimum of 3 years.
2. Knowledgeable in the proper use and handling of manufacturers materials.

3. Employ skilled mechanics who are experienced and knowledgeable in Portland cement stucco application, and familiar with the requirements of the specified work.
4. Successful completion of minimum of 3 projects of similar size and complexity to the specified project.
5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with manufacturer’s published specifications and details and the project plans and specifications.

C. Inspections: Provide independent third-party inspection and code compliance.

1.7 DELIVERY, STORAGE, HANDLING

A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings (pail products) from freezing and temperatures in excess of 90□F. Store away from direct sunlight.

C. Protect Portland cement-based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.8 PROJECT/SITE CONDITIONS

A. Protect Portland cement-based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

B. Provide supplementary heat for installation in temperatures less than 40 degrees F. Prevent concentration of heat on uncured stucco and vent fumes and other products of combustion to the outside to prevent contact with stucco.

C. Prevent uneven or excessive evaporation of moisture from stucco during hot, dry or windy weather. For installation under any of these conditions provide special measures to properly moist cure the stucco.

D. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.9 MANUFACTURER'S WARRANTY

A. Provide manufacturer's standard 10-year warranty.

PART 2 PRODUCTS

2.1 STUCCO SYSTEM.

A. Basis of Design: Provide "Senergy Sentry Ultra Wall" stucco wall system as manufactured by BASF or approved equal. (Senergy products are specified as the basis for the project design.)

1. Provide drainage mat, waterproofing/air barrier, stucco, primer and finish from single source manufacturer.

B. Weatherproofing/ Air Barrier: Manufacturer's standard fluid-applied, acrylic-based permeable waterproofing/air barrier for sheathing substrates.

C. Lath: BASF "Permalath" open weave, three dimensional, self-furred, nominal 1/8” thick glass fiber reinforcing lath, in compliance with ASTM C 847.

D. DRAINAGE MAT DF A three-dimensional drainage core bonded to a breathable fabric. The mat consists of fused, entangled filaments designed to provide an unobstructed drainage path.

E. SRT MESH Stucco Reinforcing Mesh**:** a woven fiber glass mesh with high mechanical strength and dimensional stability for improved clack resistance. Must be used with a Senergy base coat or STUCCO SURFACE LEVELER.

F. Accessories: Weep screed, casing bead, corner bead, corner lath, expansion and control joint accessories. All accessories shall meet the requirements of ASTM C 1063 and its referenced documents:

1. PVC plastic in compliance with ASTM D 1784, cell classification 13244C.
2. All accessories shall have perforated or expanded flanges and shall be designed with grounds for the specified thickness of stucco.

G. Job Mixed Ingredients

1. Water: Clean and potable, without foreign matter.
2. Sand: Clean, well graded, free of deleterious materials in compliance with ASTM C 897.
3. Stucco Admixture: "Senergy Stuccobond" substrate bonding agent; an acrylic-based, non-reemulsifiable bonding agent.

H. Base Coat: "Senergy Stuccobase," factory-blended stucco mixture of Portland cement, reinforcing fibers, and proprietary ingredients; supplied by BASF Wall Systems for scratch and brown coats, field mixed with graded sand (ASTM C 897), water and bonding agent.

I. Primer: "Senergy Stucco Prime," acrylic-based, tinted, primer/sealer.

J. Finish Coat: Silicone enhanced textured wall coating as selected by the Architect. Finish coating to be supplied by same manufacturer as stucco system.

1. Senerflex Finish:
   a. Uniform pebble finish.
2. Color: As selected by the Architect, see Architectural drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Comply with manufacturer's requirements.

B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the stucco installation to the General Contractor.

3.2 SURFACE PREPARATION

A. Comply with manufacturer's requirements.

B. Wall sheathings must be securely fastened per applicable building code requirements and manufacturer's recommendations.

3.3 MIXING

A. General: No additives are permitted unless specified in product mixing instructions. Close containers when not in use. Prepare in a container that is clean and free of foreign substances. Do not use a container which has contained or been cleaned with a petroleum-based product. Clean tools with soap and water immediately after use.

B. Base Coat

1. Use mixer that is clean and free of foreign substances.
2. Add 18.9–22.7 liters (5–6 gallons) of clean potable water to mixer per one bag of Senergy Stuccobase.
3. Add one bag of Senergy Stuccobase.

4. Add one half 45.4–54.4 kg (100–120 lbs) of the required plaster sand (ASTM C 144 or ASTM C 897).
5. Mix for 3-4 minutes at normal mixing speed while adding the remainder 45.4–54.4 kg (100–120 lbs) of the plaster sand. Allow material to set for 2–4 minutes, then remix adding water to achieve desired consistency.
6. NOTE: Continuous mixing may cause excessive air entrainment.

C. Finish Coat

1. Thoroughly mix the factory-prepared material with a clean paddle and drill until thoroughly blended.
2. A small amount of clean, potable water may be added to adjust workability.
3. Additives are not permitted.
4. Close container when not in use.
5. Clean tools with soap and water immediately after use.

3.4 APPLICATION

A. Follow manufacturers requirements to achieve warranty.

B. Air/Water-Resistive Barrier:

1. All sheathing joints and windows/openings must be protected, and the air/water-resistive barrier applied in accordance with *Air/Water-Resistive/Vapor Barrier Application Guideline* technical bulletin.
2. Substrate shall be dry, clean, sound, and free of releasing agents, paint, or other residue or coatings. Verify substrate is flat, free of fins or planar irregularities greater than 1/4" in 10' (6.4 mm in 3 m).
3. Unsatisfactory conditions shall be corrected before application of the Senergy air/water-resistive barriers.
4. Apply the SHEATHING FABRIC and Senergy air/water-resistive barrier in accordance with the Senergy air/water-resistive barrier product bulletin.
5. Apply the MAXFLASH in accordance with MAXFLASH product bulletin.
6. Installed materials shall be checked before continuing system application.
7. Ensure SHEATHING FABRIC Senergy air/water-resistive barrier or MAXFLASH overlaps the top flange of the starter track.
8. Installed materials shall be checked before continuing system application.

C. Drainage Mat DF:

1. Apply DRAINAGE MAT DF horizontally or vertically over Senergy air/water-resistive barrier ensuring it is free of wrinkles.
2. Abut all vertical and horizontal edge and secure DRAINAGE MAT DF to substrate with sufficient building staples or galvanized nails to remain in place prior to application lath.
3. The fabric side of the DRAINAGE MAT DF shall face outward toward the installer, and the nylon mat shall be in contact with the surface of the Senergy air/water-resistive barrier

D. Lath: Install in accordance with all local code requirements, applicable standards and application procedures.

1. PERMALATH 1000:
   a. Apply with minimum 3” (76mm) overlap at vertical and horizontal edges and overlap on flange of trim accessories. PERMALATH 1000 can be applied horizontally or vertically and should be applied such that it is flat and free of ripples, wrinkles, etc. Fastener System type appropriate for application and substrate. Fastener spacing 6” o.c. (152 mm) vertically and 16” o.c. (406 mm) horizontally.
   b. Apply STUCCOBASE within 60 days of PERMALATH 1000 application.

E. Stucco Base Coat:

1. Senergy Sentry Stucco Ultra wall system application 3/8”-1/2” thickness (9.5-12.7 mm).
   a. Following surface preparation and installation of the lath and accessories apply selected Master Builders Solutions stucco base mixture to the approved substrate by hand troweling or machine spraying to a thickness of 3/8” to 1/2” (9.5-12.77 mm), completely embedding the lath.
   b. Use rod and darby to level the applied base coat without exposing the lath.
   c. After initial set begins and surface has sufficiently hardened, use sponge or hard rubber float as required to fill voids, holes or imperfections, leaving the surface ready to receive Senergy Finish.
   d. At subcontractor’s option, the double back method of application, whereby the first and second coats are applied and cured as one system, may be used. If this system is used, the second coat (brown) should be applied as soon as the first coat is rigid.
   e. Damp cure for at least 48 hours by lightly and evenly fogging the surface with water at least twice a day. Direct sunlight, hot temperatures, low humidity and windy conditions may make additional fogging necessary.
   f. Allow Stucco Base to cure a minimum of 6 days prior to application of EPS board shapes, Senergy Base Coat, STUCCOPRIME or Senergy Finish application.
2. Senergy Sentry Stucco Ultra wall system application 3/4”-7/8” thickness (19-22mm).
   a. Nominal plaster base coat thickness:
      1). First coat “scratch”: 3/8” (9.5mm)
      2). Second coat “brown”: 3/8” (9.5mm)
   b. Apply selected Master Builders Solutions Stucco Base mixture to the approved substrate by hand troweling or machine spraying with sufficient force to develop full adhesion between the stucco base mixture and the substrate.
   c. Apply first coat to completely embed lath. Cross rake to provide key for second brown coat. Coat must be uniform in thickness. Ensure the first coat is properly “scratched” and sufficiently rigid to resist cracking prior to application and leveling of the second or “brown” coat.
   d. Dampen scratch coat, apply second brown coat to provide the required total thickness. Trowel Stucco Base into trim to seat trim. The lath shall be fully embedded in the coating and shall be completely covered. Coat must be uniform in thickness. Rod off to desired thickness, leveled with screeds, to provide a true, flat plane. Follow this by wood floating or darbying the surface.
   e. After the surface has sufficiently hardened, use sponge or hard rubber float as required to fill voids, holes or imperfections, leaving the surface ready to receive Senergy Finish.
   f. Damp cure for at least 48 hours by lightly and evenly fogging the surface with water at least twice a day. Direct sunlight, hot temperatures, low humidity and wind may make additional fogging necessary.
   g. Allow Stucco Base to cure a minimum of 6 days prior to application of EPS board shapes, Senergy Base Coat, STUCCOPRIME or Senergy Finish application.

F. SRT MESH Reinforcing Mesh:

1. Base coat shall be applied to achieve reinforcing mesh embedment with no reinforcing mesh color visible. Apply mixed Senergy Base Coat or STUCCO SURFACE LEVELER to entire surface of “brown coat” with a stainless-steel trowel to embed the reinforcing mesh.

2. Immediately place reinforcing mesh against wet base coat and embed the reinforcing mesh into the base coat by troweling from the center to the edges. Lap reinforcing mesh 2 1/2” (64 mm) minimum at edges.
3. Ensure reinforcing mesh is continuous at corners, void of wrinkles and embedded in base coat so that no reinforcing mesh color is visible.
4. If required, apply a second layer of base coat to achieve total nominal base coat/reinforcing mesh thickness of 1/16” (1.6 mm).
5. Allow base coat with embedded reinforcing mesh to dry hard (normally 8 to 10 hours).

G. STUCCOPRIME:

1. Base coat shall be clean, dry, sound and free of paint, contaminants or other residue or coatings. Verify substrate is flat, free of fins or planar irregularities greater than 1/4” in 10’ (6.4 mm in 3 m).
2. Apply STUCCOPRIME to substrate with a sprayer, 3/8” (10 mm) nap roller, or good quality latex paint brush at a rate of approximately 150-250 sq. ft. per gallon (3.6-6.1 m2 per liter).
3. STUCCOPRIME shall be dry to the touch before proceeding to the Senergy Finish application.

H. Finish Coat

1. Apply Senergy Finish directly to the base coat with a clean, stainless-steel trowel.
2. Apply and level Senergy Finish during the same operation to minimum obtainable thickness consistent with uniform coverage.
3. Maintain a wet edge on Senergy Finish by applying and texturing continually over the wall surface.
4. Work Senergy finish to corners, joints or other natural breaks and do not allow material to set up within an uninterrupted wall area.
5. Float Senergy Finish to achieve final texture.

3.5 PROTECTION

A. Provide protection of installed materials from water infiltration into or behind them.

B. Provide protection of installed stucco from dust, dirt, precipitation, and freezing.

C. Provide protection of installed primer and finish from dust, dirt, precipitation, freezing and continuous high humidity until fully dry.

END OF SECTION

SECTION 092900 - GYPSUM DRYWALL

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the gypsum drywall as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.
2. Acoustical insulation for gypsum drywall work.
3. Sealant for gypsum drywall work.
4. Taping and finishing of drywall joints.
5. Installing rings and frames in drywall surfaces for grilles, registers and lighting fixtures.
6. Gypsum shaftwall construction.
7. Bracing and connections.

1.3 RELATED SECTIONS

A. Thermal insulation - Section 072100.

B. Steel Door and Frames - Section 081113.

C. Access doors - Section 083113.

D. Painting - Section 099000.

E. Rings for grilles, registers and light fixtures - Division 23 and 26.

1.4 QUALITY ASSURANCE

A. The following standards, as well as other standards which may be referred to in this Section, shall apply to the work of this Section:

1. The Gypsum Construction Handbook, latest edition, USG.
2. Construction Guide, latest edition, National Gypsum.
3. ASTM A 568 "Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For"
4. ASTM C 475 "Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction"
5. ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board"
6. ASTM C 919 "Standard Specification for Use of Sealants in Acoustical Applications"
7. ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Board"
8. ASTM C 1396 "Standard Specification for Gypsum Board"
9. ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"

B. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.

C. System Design Load

1. Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
   a. Drywall assemblies with tile finish shall have a deflection limit of L/360.
   b. Drywall assemblies with stone slab finish shall have a deflection limit of L/720.
2. Provide drywall ceiling assemblies designed, fabricated and installed to have a deflection not to exceed L/360.

D. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.

E. Installer: Firm with not less than 5 years of successful experience in the installation of specified materials.

1.5 SUBMITTALS

A. Submit shop drawing for each drywall partition, furring and ceiling system showing size of framing members, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.

B. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.

C. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.

D. Test Reports: This Contractor shall submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

E. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.

1.6 PRODUCT HANDLING AND PROTECTION

A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.

B. Protect wallboard from becoming wet.

1.7 ENVIRONMENTAL CONDITIONS

A. Provide and maintain minimum temperature of fifty-five (55) degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the drywall work for at least twenty-four (24) hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

1.8 JOB MOCK-UP

A. At a suitable location, where directed by the Construction Manager and Architect, lay up a portion of a finished wall and ceiling demonstrating the quality of work, including finishing, to be obtained under this Section. Omit drywall boards in locations as directed by the Construction Manager and Architect to show stud spacing and attachments, after acceptance, complete assembly.

B. Adjust the finishing techniques as required to achieve the finish required by the Architect as described in this Section of these specifications.

C. Upon approval of the mock-up, the mock-up may be left in place as a portion of the finished work of this Section.

D. All drywall work shall be equal in quality to approved mock-up.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers for Gypsum Drywall Panels and Accessories: U.S. Gypsum Co., Georgia Pacific, CertainTeed Corporation, Continental Building Products, or National Gypsum Co. meeting specification requirements are acceptable.

1. All drywall products must be manufactured in North America.

2.2 GYPSUM WALLBOARD TYPES

A. Gypsum Wallboard: 1/2" thick and 5/8" thick as indicated on drawings, "Sheetrock" by USG, "Gold Bond" by National Gypsum, or "Regular Gypsum" by CertainTeed Corp., 48" wide, in maximum lengths available to minimize end-to-end butt joints.

B. Fire-Rated Gypsum Wallboard: 1/2" thick and 5/8" thick as indicated on drawings, "Sheetrock Firecode C" by USG, "Firecheck Type C" by Lafarge/Continental, "Gold Bond Fireshield" by National Gypsum, or "Type C" and "Type X" by CertainTeed Corp., 48" wide, in maximum lengths available to minimize end-to-end butt joints.

C. Water-Resistant Backing Board for Tile Finish: 5/8" thick, "DUROCK Glass Mat Tile Backerboard" by USG, "Dens-Shield Tile Backer Board" by Georgia Pacific, or "DiamondBack Tile Backer" by CertainTeed Corp. Cover joints with a pressure sensitive woven glass fiber tape equal to Imperial Type P Tape.

D. Moisture/Mold-Resistant Gypsum Wallboard at locations listed below, unless otherwise shown on drawings: 1/2" thick and 5/8" thick as indicated on drawings, "Mold Tough" or "Mold Tough FR" by U.S. Gypsum, "DensArmor Plus" by Georgia Pacific, "Mold Defense" and/or "Mold Defense Type X" by Lafarge/Continental, or "Gold Bond EXP Interior Extreme Gypsum Board" by National Gypsum, 48" wide, in maximum lengths available to minimize end-to-end butt joints. Board must have a rating of 10 per ASTM D 3273 with a core that meets ASTM C 1396, Section 6 or ASTM C 1658.

1. Areas in toilet rooms, lockers, janitor's closets not scheduled to receive ceramic tile, or where fire rating is required.
2. Interior faces of exterior walls of basements, cellars and other below grade rooms.
3. Walls and ceilings of spaces containing condensers, water tanks, water pumps and pressure reduction valves.
4. Walls and ceilings of laundry rooms.
5. Portions of walls within 2 feet of kitchen sinks to a height of 4 feet above the floor.
6. Portions of walls within 2 feet of kitchen stoves to a height of 4 feet above the floor.
7. Walls of bathrooms that are not solely water closet compartments, other than walls specifically required to be cement board.
8. Walls and ceilings in service sink closets.
9. Portion of walls within 2 feet of mop sinks or service sinks to a height of 4 feet above the floor.
10. All perimeter walls and wet shafts.

E. Mold-Resistant Shaft Wall Liner: Solid gypsum board liner for shaft wall construction, 1" thick, 24" wide, as required to suit condition, by standard lengths as required, beveled edges. Provide "Mold Tough Liner Panel" by USG, "DensGlass Shaftliner" by Georgia Pacific, "Mold Defense Shaftliner Type X" and/or "Weather Defense Shaftliner Type X" by Lafarge/Continental, "Gold Bond Brand Fireshield Shaft Liner XP," "Gold Bond Brand EXP Extended Exposure Shaft Liner" by National Gypsum, or "M2Tech Shaftliner" by CertainTeed Corp.

1. Liner board must have a rating 10 per ASTM D 3273 with a core that meets ASTM C 1396 Section 6.

2.3 ACCESSORIES

A. Fasteners for Wallboard: USG Brand Screws; Type W Bugle Head for fastening wallboard to wood framing. Type G Bugle Head for fastening wallboard to wallboard. Lengths specified below under "Part 3 - Execution" Articles and as recommended by drywall manufacturer.

1. For Portland cement base boards, fasteners shall be equal to Durock Steel Screws by U.S. Gypsum.

B. Laminating Adhesive: "Sheetrock Brand Joint Compound."

C. Metal Trim - Corner Beads: For 90-degree External Corners - ClarkDietrich; 103 Deluxe Cornerbead or "Dur-A-Bead" No. 103, 26 U.S. Std. ga. galvanized steel, 1-1/4" x 1-1/4", for 90 degree external corners.

D. Metal Trim - Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim."

E. Partition/Concrete Ceiling Trim: Trim-Tex Super Seal Tear Away or approved equal.

F. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; Setting Type (Durabond 90) or Lightweight Setting Type Joint Compound for taping and topping; and Ready Mix Compound for finishing.

1. For mold-resistant drywall, water resistant drywall, and tile backer board, use glass mesh tape with setting joint compound that is rated 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Acceptable joint compound is "Rapid Set One Pass" made by CTS Cement Manufacturing Corp. or "Rapid Joint" manufactured by Lafarge North America or approved equal meeting standards noted herein.

G. Control Joints: ClarkDietrich; #093 Control Joint or No. 0.093, USG.

H. Acoustical Sealant: USG "Acoustical Sealant" or "Tremco Acoustical Caulking" of Tremco Mfg. Co., Masterseal NP520 by BASF or approved equal.

I. Neoprene Gaskets: Conform to ASTM D 1056.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where gypsum drywall is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. General

1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.

B. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of authorities having jurisdiction, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.

C. Sealant

1. Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.
2. Install acoustical sealant in 1/8" wide vertical control joints within the length of the wall or partitions, and in all other joints, specified below under "Control Joints." Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetration in the wallboard; place sealant bead between penetrations and edge of wallboard.
3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.

D. Wallboard Application

1. Do not install wallboard panels until steel door frames are in place; coordinate work with Section 081113, "Steel Doors and Frames."

2. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
5. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard, fill gaps with acoustic sealant.
6. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
7. Screw fasten wallboard with power-driven electric screwdriver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
8. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.

E. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with three (3) coats of joint compound, feathered and finish sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.

1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.
2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.
3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.

F. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:

1. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.
2. Construction changes within the plane of the partition or ceiling.
3. Shown on approved shop drawings.
4. Ceiling dimensions exceed thirty (30) feet in either direction.
5. Wings of "L," "U," and "T" shaped ceiling areas are joined.
6. Expansion or control joints occur in the structural elements of the building.
7. Shaft-wall runs exceed 30' without interruption.
8. Partition or furring abuts a structural element or dissimilar wall or ceiling.
9. Where control joints are required, ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners.

G. Joint Treatment and Spackling

1. Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

3.3 STUD PARTITIONS

A. Wallboard Installation - Single Layer Application (Screw Attached)

1. Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.
2. Boards shall be fastened securely to studs with screws as specified. Where a free end occurs between studs, back blocking shall be required. Center abutting ends over studs. Correct work as necessary so that faces of boards are flush, smooth, true.
3. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced twelve (12) inches o.c. in the field of the board and 8" o.c. staggered along the abutting edges.
4. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.
5. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.

B. Wallboard Installation - Double-Layer Application

1. General: See drawings for wallboard partition types required.
2. First Layer (Screw Attached): Install as described above for single layer application.
3. Second Layer (Screw Attached): Screw attach second layer, unless laminating method of attachment indicated on drawings or necessary to obtain required sound rating or fire rating. Install wallboard vertically with vertical joints offset thirty-two (32) inches from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws sixteen (16) inches o.c. along vertical joints and sixteen (16) inches o.c. in the field of the wallboard. Screw through first layer into framing members.
4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced twelve (12) inches o.c. around perimeter of wallboard.

C. Wallboard Installation - Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.

D. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.

E. Control Joints

1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
2. Back by double framing members.
3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.
4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

3.4 DRYWALL FASCIAS AND CEILINGS

A. Apply board with its long dimension at right angles to ceiling framing members. Locate board butt joints over center of ceiling framing members. Attach board with one (1) inch self-drilling drywall screws twelve (12) inches o.c. in field of board at each furring channel; eight (8) inches o.c. at butt joints located not less than 3/8" from edges.

3.5 SHAFT WALLS

A. Shaft Wall Liner: Cut shaft wall liner panels one (1) inch less from floor to ceiling height and erect vertically between wood plates.

B. Wallboard Installation - Double Layer Installation: Erect gypsum wallboard base layer vertically or horizontally to meet fire rating on one side of studs with end joints staggered. Fasten base layer panels to studs with one (1) inch Type W screws twenty-four (24) inches o.c. Caulk perimeter of base layer panels. Apply gypsum wallboard face layer vertically over base layer with joints staggered and attached with 1-5/8" Type W screws staggered from those in base, spaced eight (8) inches o.c. and driven into studs.

C. Wallboard Installation (Where Both Sides of Shaft Wall are Finished): Apply gypsum wallboard face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with one (1) inch or two (2) inches Type W screws spaced eight (8) inches o.c. in field and along edges into studs.

D. Where handrails are indicated for direct attachment to drywall shaft system, provide wood blocking, accurately positioned and secured to studs and concealed behind not less than one 1/2" thick course of gypsum board in the system.

E. Horizontal Shaft-wall Duct and Ceiling Assemblies: Provide I-stud cavity shaft-wall system for horizontal duct protection consisting of I-studs 24" o.c. with 1" fire-rated shaft liner panels inserted in the stud tabs, and three layers of 1/2" firecode C gypsum board attached to the stud flanges opposite the shaft liner panels.

3.6 FINISHING

A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.

B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.

C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.

D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.

E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.

F. Except as otherwise noted, level of finish for surface exposed to view shall conform to Level 4 of ASTM C 840 and GA-214 of the Gypsum Association.

1. For drywall boards with fiberglass facing, provide Level 5 finish of ASTM C 840 and GA-214.

G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the Owner.

3.7 CLEANING AND ADJUSTMENT

A. At the completion of installation of the work, all rubbish shall be removed from the building leaving floors broom clean. Excess material, scaffolding, tools and other equipment shall be removed from the building.

B. Work shall be left in clean condition ready for painting or wall covering. All work shall be as approved by Architect.

C. Cutting and Repairing: Include all cutting, fitting and repairing of the work included herein in connection with all mechanical trades and all other trades which come in conjunction with any part of the work and leave all work complete and perfect after all trades have completed their work.

3.8 PROTECTION OF WORK

A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

END OF SECTION

SECTION 093000 - CERAMIC TILE

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ceramic tile as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Ceramic mosaic floor tile.
2. Ceramic glazed wall tile and matching base.
3. Setting beds, grout and sealant.

1.3 RELATED SECTIONS

A. Wood Framing - Section 061000.

B. Gypsum Drywall - Section 092900.

1.4 REFERENCES

A. ANSI A108 Series/A118 Series - American National Standards for Installation of Ceramic Tile.

B. ANSI A136.1 - American National Standards for Organic Adhesives for Installation of Ceramic Tile.

C. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.

D. ASTM C 150 - Standard Specification for Portland Cement.

E. TCNA - Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America, latest 2020 Edition.

F. ISO 13007 - International Standards Organization; classification for Grout and Adhesives.

G. LFT Tile – Large Format Tile, tile 15” or larger in any one direction.

H. Stone Tile – Conform to requirements of MIA (Marble Institute of America) Dimension Stone Design Manual.

1.5 QUALITY ASSURANCE

A. Qualifications of Installers: For cutting, installing and grouting of ceramic tile, use only thoroughly trained and experienced journeyman tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards, and the installers are Certified Ceramic Tile Installer (CTI) through the Ceramic Tile Education Foundation (CTEF) or Tile Installer Thin Set Standards (ITS) verification through the University of Ceramic Tile and Stone.

B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the following:

1. Manufacture all tile in accordance with Standard Grade Requirements of ANSI A-137.1.
2. Glass tile must meet ANSI A137.2.
3. Install all ceramic tile in accordance with the recommendations contained in Handbook for Ceramic, Glass and Stone Tile Installation of the Tile Council of North America, Inc., latest edition noted herein and ANSI A108/A118/A136.
4. Stone tiles shall conform to the requirements of ASTM C1242.

C. Flooring surfaces shall have a minimum wet DCOF AcuTest value of 0.42 and tested per ANSI A326.3 Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

1.6 SUBMITTALS

A. Samples

1. Before any ceramic tile is delivered to the job site, submit to the Architect sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.
2. Submit 6" length of stone saddles.
3. Submit 12" x 12" samples of waterproofing membrane.

B. Master Grade Certificates: Prior to opening ceramic tile containers, submit to the Architect a Master Grade Certificate, signed by an officer of the firm manufacturing the ceramic tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.

C. Mock-ups

1. At an area on the site where approved by the Architect, provide a mock-up ceramic tile installation.
   a. Make the mock-up approximately 3 foot x 3 foot in dimension.
   b. Provide one mock-up for each type, class, and color of installation required under this Section.
   c. The mock-ups may be used as part of the Work, and may be included in the finished Work, when so approved by the Architect.
   d. Revise as necessary to secure the Architect's approval.
2. The mock-ups, when approved by the Architect, will be used as datum for comparison with the remainder of the work of this Section for the purposes of acceptance or rejection.
3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

1.7 PRODUCT HANDLING

A. Delivery and Storage

1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.
2. Store all materials under cover in a manner to prevent damage and contamination, store only the specified materials at the job site.

B. Protection: 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.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

C. Maintain temperatures at not less than 50 deg. F. in tiled areas during installation and for 7 days after completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
2. Obtain waterproof/crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

2.2 TILE

A. Provide tile manufactured by Dal-Tile Corp., American Olean, United States Ceramic Tile Co., Summitville Tiles Inc., or approved equal meeting these specifications. The Architect reserves the right to pick tile from any price group.

2.3 WALL TILE AND BASE

A. Provide vitreous, cushion edge units, 4-1/4" x 4-1/4" x 1/4" thick, matte glazed, in colors as selected by the Architect, Provide sanitary cove base to match wall tile.

1. Basis of Design:
   a. CT-1: Daltile,5 13/16” x 5 13/16” (14.70 cm x 14.70 cm) Volume 1.0 Glazed Porcelain Tile W/ Stepwise Technology – Color Sonic White VL75.
      1) Wall Tile, install with Latex Modified Thinset Mortar and 3/16” wide epoxy grout joints.
   b. CT-2: Daltile, 6” x 12” (Nom.) Porcelain Tile Cove Base No. P-36C9TB - Color Sonic White VL75.
      1) Cove Base, install over cont. Laticrete Anti-Facture Membrane or approved equal, with Latex Modified Thinset mortar and 3/16” wide epoxy grout joints.

2.4 FLOOR TILE

A. Provide porcelain type ceramic mosaic floor tile with all-purpose edge in size, color and pattern as selected by the Architect. Tile to have water absorption not to exceed 0.5%.

1. Basis of Design:
   a. CT-3: Daltile, 5 13/16” x 5 13/16” (14.70 cm x 14.70 cm) Volume 1.0 Glazed Porcelain Tile W/ Stepwise Technology – Color Degrees Silver VL71.
      1) Floor Tile, install with Mud Set over cont. Laticrete Anti-Facture Membrane or approved equal, and 3/16” wide epoxy grout joints.

B. Provide non-slip tile where scheduled, of same characteristics as ceramic mosaics specified herein with the addition of 7-1/2% abrasive grain by weight

2.5 TRIM AND SPECIAL SHAPES

A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

2.6 MORTAR BED, BOND COAT AND GROUT

A. Portland Cement: ASTM C 150, Type I.

B. Hydrated Lime: ASTM C 207, Type S.

C. Sand: ASTM C 144, clean and graded natural sand.

D. Latex Modified Mortar Bed

1. Laticrete 3701 Fortified Mortar Bed
2. MAPEI, Modified Mortar Bed
3. Pro Spec, Floor Mud with B-710 SBR Acrylic Additive
4. SikaLevel 050 Rapid Slope

E. Latex – Portland Cement Bond Coat, complying with ANSI A118.4 and ISO 13007, C2ES1P1 with minimum compressive strength of 400 psi

1. Laticrete, 254 Platinum
2. MAPEI, Keraflex Super
3. Pro Spec – Permalastic System consisting of Permalastic Dryset Mortar and Permalastic Admixture
4. SikaTile 350 Flex Set

F. Improved Modified Cement Mortars, complying with ANSI 118.15 and ISO 13007, CSES1P1 (Also for use with LFT Tile and Stone Tile)

1. Laticrete, MultiMax Lite
2. Mapei; Keraflex Super
3. Pro Spec; StayFlex 590
4. SikaTile 475 LHT Premium Set or SikaTile 500 LHT Lite (above products are lightweight and non-lightweight)

G. Wall and Base Tile

1. Over drywall use ANSI A136.1-1967 Organic Adhesive for installation of Ceramic Tile, Type I and ISO 13007 D2TE. Shear strength shall be 50 psi minimum. Adhesive primer as recommended by adhesive manufacturer. Manufacturer shall certify, in writing, that adhesive and primer used are proper types for the intended tile types and application. Conform to TCNA Detail W-242.
   a. Laticrete Premium 15 Adhesive.
   b. MAPEI Type 1 Mastic.
   c. ProSpec B-1000 Tile Adhesive
   d. Future Product
2. Over glass mat water resistant gypsum backer board use a Latex Portland cement mortar bond coat, Laticrete TriLite, MAPEI, Keraflex Super, SikaTile 475 LHT Premium Set or SikaTile 500 LHT Lite and for non-LHT SikaTile 350 Flex Set or equal by Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES1P1, and TCNA Detail W-245.

H. Floor Tile - Waterproof Setting Bed: Set floor tile using thin set latex Portland cement bond coat, Basis of Design, Laticrete 254 Platinum, MAPEI, Keraflex Super SikaTile 350 Flex Set conforming to ANSI A118.4, ISO 13007-C2ES1P1, and waterproofing membrane conforming to TCNA Detail F-122/122A.

1. For installation of (LFT and Stone Tile), Improved Modified Cement Mortars and medium bed, Basis of Design, Laticrete MultiMax Lite, MAPEI, Ultraflex LFT SikaTile 475 LHT Premium Set or SikaTile 500 LHT Lite, conforming to ANSI 118.15, ISO 13007-C2ES1P1.

I. Waterproofing Membrane complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner: “Hydro Ban” made by Laticrete International, “Mapelastic Aquadefense” by MAPEI with factory blended “Bio-Block Antimicrobial”, SikaTile 100 Moisture Guard or ProSpec B6000.

1. Reinforce membrane with polyester fabric where recommended by manufacturer.

J. Showers: B-415 with waterproof membrane full height.

K. Water: Clean, fresh and suitable for drinking.

L. Grout complying with A118.7; and ISO 13007, CG2WAF: For grouting ceramic tile, provide a commercial Portland cement grout “Laticrete PermaColor or Laticrete PermaColor Select”, SikaTile 815 Secure Grout or “Ultracolor Plus FA” (additive not required) made by MAPEI; (addition not required); color as selected by the Architect.

M. Physical Properties: The setting beds and grouts must meet the following physical requirements:

1. Compressive Strength – 3000 psi min.
2. Shear Bond Strength – 500 psi min.
3. Water Absorption – 4.0% max.
4. Service Rating (ASTM C 627) – Extra Heavy Duty.

N. Sealer: Seal all grout joints and all unglazed tile using “StoneTech Heavy Duty Sealer” by Laticrete, “Sealer’s Choice 15 Gold” by Aqua Mix Inc or “Ultracare Penetrating Plus Stone, Tile, and Grout Sealer” by MAPEI. Merkrete Grout Sealer

O. Temporary Protective Coating: Either product indicated below that is applied in the tile manufacturer's factory and formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, applied hot, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg. F. per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

P. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, equal to "StoneTech Stone & Tile Cleaner" by Laticrete, "Concentrated Stone & Tile Cleaner" made by Aqua-Mix, "Ultracare Concentrated Tile & Grout Cleaner" by MAPEI, or approved equal, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.7 SEALANT

A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.

B. Bond Breaker: Polyethylene tape, 3 mils thick or other material recommended by sealant manufacturer.

C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.

D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Architect. Sealant shall be equivalent to 1700 Sanitary Sealant made by General Electric or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where ceramic tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 CONDITION OF SURFACES

A. Allowable Variations in Substrate Levels

1. Floors: + 1/8" in 10'-0" distance and 1/4" total max. variation from levels shown.

3.3 PREPARATION

A. Blending: for tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved samples. If not, factory blended, either return to manufacturer or blend tiles at project site before installing.

B. Field Applied Temporary Protective Coating: Pre-coat tile with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.4 JOINTS IN TILE WORK

A. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by Architect.

B. Movement Joints: Conform to TCNA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and ceramic tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in ceramic tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.

1. Provide sealant between ceramic tile and plumbing fixtures, mirrors, pipes, countertops, and other dissimilar materials penetrating or adjacent to ceramic tile.

3.5 INSTALLATION

A. Comply with the following installation standards

1. Wall tile over drywall using organic adhesive - ANSI A136.1 and ISO 13007, D2TE.
2. Wall tile over cement board or glass mat backer board using dry set mortar with latex additive - ANSI A118.4 and ISO 13007, C2ES1P1.
3. Floor tile using dry set mortar with latex additive - ANSI A118.4, A118.15, and ISO 13007, C2ES1P1.
4. Floor tile over waterproofing membrane.- A118.15, and ISO 13007, C2ES1P1.

B. Backs of tile must be cleaned before installation.

C. All setting beds and/or adhesives shall provide for an average contact area of not less than 95% coverage.

D. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.

1. Floors: 1/8" in 10'-0" run, any direction; +/- 1/8" at any location; 1/32" offset at any location.
2. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".
3. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.

E. Waterproofing Membrane

1. Install the membrane in strict accordance with manufacturer's written recommendations.
2. Upon completion of work, test horizontal membrane for leaks by flood testing per ASTM D 5957. Inspect for leakage. Make necessary adjustments to stop all leakage and retest until watertight. If membrane is not covered by another surface immediately, provide protection until membrane is covered.

F. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.

G. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.

H. 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 and fixtures so that plates, collars, or covers overlap tile.

I. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

3.6 CLEANING AND PROTECTION

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use cleaners only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning to insure removal of all cleaning material.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Apply coat of sealer to all grout joints and all unglazed tile.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings from tile surfaces.

E. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

END OF SECTION

SECTION 095113 - ACOUSTIC PANEL CEILINGS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the acoustic panel ceilings as shown on the drawings and/or specified herein, including but not limited to, the following:

1. Acoustical panel units.
2. Exposed "T" suspension system, including hangers and inserts.
3. Provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.
4. Cutting, drilling, scribing and fitting as required for electro-mechanical penetrations.
5. Perimeter and column moldings, trim and accessories for acoustical ceilings.

1.3 RELATED SECTIONS

A. Gypsum Drywall (Drywall Ceilings) - Section 092900.

B. Diffusers, grilles and related frames - Division 23.

C. Lighting fixtures - Division 26.

1.4 QUALITY ASSURANCE

A. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Construction Association (CISCA).

B. Qualifications of Installers

1. The suspended ceiling subcontractor shall have a record of successful installation of similar ceilings acceptable to Architect and shall be currently approved by the manufacturer of the ceiling suspension system.
2. For the actual fabrication and installation of all components of the system, use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

C. The work is subject to the following standards:

1. ASTM C 635 "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings," American Society for Testing and Materials.
2. ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels," American Society for Testing and Materials.

D. In addition to suspension system specified, provide seismic struts and seismic clips to meet seismic standards as required by prevailing Codes and Ordinances.

1.5 SUBMITTALS

A. Shop Drawings: Submit completely dimensioned ceiling layouts for all areas where acoustical ceilings are required, showing:

1. Any deviations from Architect's reflected ceiling plan layouts, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into Architect's ceiling layout due to dimensional restrictions of field conditions.
2. Direction and spacing of suspension members and location of hangers for carrying suspension members.
3. Direction, sizes and types of acoustical units, showing suspension grid members, and starting point for each individual ceiling area.
4. Moldings at perimeter of ceiling, at columns and elsewhere as required due to penetrations or exposure at edge of ceiling tiles.
5. Location and direction of lights, air diffusers, air slots, and similar items in the ceiling plane.
6. Details of construction and installation at all conditions.
7. Materials, gauges, thickness and finishes.

B. Samples and Product Literature: Submit four (4) of each of the following samples and related manufacturer's descriptive literature.

1. Twelve (12) inch long sample of each component of suspension systems, including moldings.
2. Acoustical units — full size.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Do not install acoustical ceilings until wet-work in space is completed and nominally dry, work above ceilings has been completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.8 COORDINATION

A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire suppression system components, and partition system.

1.9 EXTRA STOCK

A. Extra Stock: Deliver stock of maintenance material to Owner. Furnish maintenance material 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% of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

A. Provide 5/8" thick, 24" x 24" mineral fiber panels, as manufactured by Armstrong World Industries, or approved equal by Architect. shall have factory applied white finish with light reflectance value of 0.83. Panels shall meet ASTM E 1264, Type III, Form 1, Pattern E I, Class A, with a UL flame spread rating of 0-25.

1. Basis of Design:
   a. C-1, Armstrong 24” x 24” x 5/8” Cortega Square Lay-in Ceiling Tile, Model No. 770.
      1) Prelude XL, 15/16 Exposed Tee.

2.2 SUSPENSION SYSTEM

A. Provide Exposed Tee Suspension System, steel, with low sheen white baked enamel finish equal to "Prelude XL, 15/16 Exposed Tee” 2-way grid system made by Armstrong World Industries, or equal made by USG Interiors, Inc. or Chicago Metallic Corp.

B. The suspension system shall support the ceiling assembly shown on the drawings and specified herein, with a maximum deflection of 1/360 of the span, in accordance with ASTM C 635.

C. Provide min. 12 ga. galvanized wire hangers, soft annealed steel conforming to ASTM A 641, prestretched, Class 1 zinc coating, soft temper, size so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire.

D. Main carrying channels, to which suspension systems shall be fastened, shall be 1-1/2" cold rolled galvanized steel channel; spaced 4'-0" o.c.

E. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than five (5) times the hanger design load, as indicated in ASTM C 635.

F. Suspension systems shall conform to ASTM C 635, intermediate duty.

G. Provide manufacturer’s standard wall moldings with off-white baked enamel finish to match suspension systems. For circular penetrations of ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas where acoustic panel ceilings are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the layout.

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.

3.3 INSTALLATION

A. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.

B. Install suspension systems to comply with ASTM C 636, with wire hangers supported only from building structural members. Locate hangers not more than 6" from each end and spaced 4'-0" along direct-hung runner, leveling to tolerance of 1/8" in 12'-0".

C. 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 hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.

E. Install edge moldings at edges of each acoustical ceiling area, and at locations where edge of acoustical units would otherwise be exposed after completion of the work.

1. Secure moldings to building construction by fastening through vertical leg. Space holes not more than 3" from each end and not more than sixteen (16) inches o.c. between end holes. Fasten tight against vertical surfaces.
2. Level moldings with ceiling suspension system, to a level tolerance of 1/8" in 12'-0".

F. Install acoustical units 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.

G. Install hold-down clips in toilet areas, and in areas where required by governing regulations; space 2'-0" o.c. on all cross tees.

H. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplemental hangers furnished and installed by this Section of work.

I. Where fixture or ceiling apparatus installation causes eccentric loading on runners, provide stabilizer bars to prevent rotation.

3.4 ADJUST AND CLEAN

A. Clean exposed surfaces of acoustical ceilings, including trim, edge molding, 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.

END OF SECTION

SECTION 096500 - RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the resilient tile flooring, as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Vinyl composition tile.
2. Vinyl base.
3. Transition strips.
4. Accessories.

1.3 RELATED SECTIONS

A. Wood Framing - Section 061000.

B. Gypsum Drywall (Partitions) - Section 092900.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

1.5 SUBMITTALS

A. Manufacturer's Data: For information only, submit manufacturer's technical information and installation instructions for type of resilient tile.

B. Samples

1. Submit four (4) full-size sample tiles for each type and color required representative of the expected range of color and pattern variation. Sample submittals will be reviewed for color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
2. Submit four (4) samples, six (6) inch long samples of base and strips.

C. Submit manufacturer’s warranty as noted herein.

1.6 DELIVERY AND STORAGE

A. Deliver materials to the project site in the manufacturer's original unopened containers, clearly marked to indicate pattern, gauge, lot number and sequence of materials.

B. Carefully handle all materials and store in original containers at not less than seventy (70) degrees F. for at least forty-eight (48) hours before start of installation.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F. or more than 95 deg F., in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F. or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

1.8 WARRANTY

A. Provide manufacturers 5-year limited warranty.

PART 2 - PRODUCTS

2.2 TILE

A. Provide 12" x 12" x 1/8" thick vinyl composition tile conforming to ASTM F 1066, Class 2, in colors as selected by the Architect, by Armstrong, or “Azrock VCT” made by Johnsonite Tarkett, Roppe or approved equal. Provide tile units with uniformly distributed color and pattern throughout the thickness of tile. Variations in shades and off- pattern matches between containers are not acceptable.

1. Basis of Design:
   a. VT-1: Armstrong Commercial Flooring, Standard Excelon Imperial Texture #51903-Blue/Gray 12”x12”.
   b. VT-2: Roppe, ESD Vinyl Color 702 Electron.

2.3 BASE

A. Provide four (4) inches high, 1/8" thick, continuous vinyl, top set cove base with pre-formed internal and external corner pieces, color as selected by the Architect. For areas to receive carpet, provide flat base, no cove. Base shall conform to ASTM F 1861, Type TV, Group 1 as manufactured by Johnsonite, Burke Mercer, Marley Flexco, Armstrong, or approved equal.

1. Basis of Design:
   a. B-1: Johnsonite, Traditional Wall Base, 48 Grey WG/Vinyl Cove Base.

2.4 ACCESSORIES

A. Adhesives: Waterproof, stabilized type, as recommended by the tile manufacturer for the type of service indicated based on a RH of 90%.

B. Leveling Compound: Novoplan 2 made by Mapei, Ardex K-15 or approved equal.

C. Edging Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color as selected by the Architect from manufacturer's standards.

D. Finish

1. Cleaner shall be equal to "Super Shine All" made by Hillyard Chemical Co. or approved equal.
2. Wax shall be equal to "Super Hil-Brite" made by Hillyard Chemical Co. or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where resilient tile flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 CONDITION OF SURFACES

A. Allowable Variations in Substrate Levels (Floors): ± 1/8" in 10'-0" distance and 1/4" total maximum variation from levels shown.

3.3 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.4 INSTALLATION

A. Install tile only after all finishing operations, including painting, have been completed and permanent heating system is operating. Moisture content of concrete slabs, building air temperature and relative humidity must be within limits recommended by tile manufacturer.

B. Place tile units with adhesive cement in strict compliance with the manufacturer's recommendations. Butt tile units tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce neat joints, laid tight, even and in straight, parallel lines. Extend tile units into toe spaces, door reveals, and into closet and similar openings.

C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on the finish tile as marked in the subfloor. Use chalk or other non-permanent marking devices.

D. Lay tile from center marks established with principal walls, discounting minor off-sets, so that tile at opposite edges of the room are 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.

E. Match tiles for color and pattern by using tile from cartons in the same sequence as manufactured and packaged. Cut tile neatly to and around all fixtures. Broken, cracked, chipped or deformed tile is not acceptable.

F. Tightly cement tile to sub-base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks through tile, or other surface imperfections.

G. Lay tile with grain in all tile running in the same direction.

H. Place resilient edge strips tightly butted to tile and secure with adhesive. Provide edging strips at all unprotected edges of tile, unless otherwise shown.

I. Bases: In all spaces where base is indicated, install bases tight to walls, partitions, columns, built-in cabinets, etc., without gaps at top or bulges at bottom, with tight joints and flush edges, with molded corner pieces at internal and external corners. Provide end stops adjacent to flush type door frames and where base does not terminate against an adjacent surface. Keep base in full contact with walls until adhesive sets.

3.5 CLEANING AND PROTECTION

A. Remove any excess adhesive or other surface blemishes from tile, using neutral type cleaners as recommended by the tile manufacturer. Protect installed flooring from damage by use of heavy Kraft paper or other covering.

B. Finishing: After completion of the project and just prior to the final inspection of the work, thoroughly clean tile floors and accessories. Apply two (2) coats of wax and buff using materials as specified herein.

END OF SECTION

SECTION 099000 - PAINTING AND FINISHING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Prime painting unprimed surfaces to be painted under this Section.
2. Painting all items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.
3. Painting all ferrous metal (except stainless steel) exposed to view.
4. Painting all galvanized ferrous metals exposed to view.
5. Painting gypsum drywall exposed to view.
6. Painting plaster surfaces.
7. Painting of wood exposed to view, except items which are specified to be painted or finished under other Sections of these specifications. Back painting of all wood in contact with concrete, masonry, or other moisture areas.
8. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
9. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.
10. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
11. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

1.3 RELATED SECTIONS

A. Shop priming is required on some, but not all of the items scheduled to be field painted. Refer to other Sections of work for complete description.

B. Shop Coat on Machinery and Equipment: Refer to the Sections under which various items of manufactured equipment with factory applied shop prime coats are furnished, including, but not necessarily limited to, the following Sections. All items of equipment furnished with prime coat finish shall be finish painted under this Section.

1. Plumbing - Division 22.
2. Heating, ventilation and air conditioning - Division 23.

C. Color Coding of Mechanical Piping and Electrical Conduits - Divisions 22 and 26.

1. This Color Coding consists of an adhesive tape system and is in addition to painting of piping and conduits under this Section, as specified above.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

A. Items of equipment furnished with complete factory finish, except for items specified to be given a finish coat under this Section.

B. Factory-finished acoustical tile.

C. Non-ferrous metals, except for items specified and/or indicated to be painted.

D. Finished hardware, excepting hardware that is factory primed.

E. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

1.5 QUALITY ASSURANCE

A. Job Mock-Up

1. In addition to the samples specified herein to be submitted for approval, apply in the field, at their final location, each type and color of approved paint materials, applied 10 feet wide, floor to ceiling of wall surfaces, before proceeding with the remainder of the work, for approval by the Architect. Paint mock-ups to include door and frame assembly.
2. These applications when approved will establish the quality and workmanship for the work of this Section.
3. Repaint individual areas which are not approved, as determined by the Architect, until approval is received. Assume at least two paint mock-ups of each color and gloss for approval.

B. Qualification of Painters: Use only qualified painters for the mixing and application of paint on exposed surfaces.

C. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Architect in writing of any anticipated problems using the coating systems as specified with substrates primed by others.

D. All paints must conform to the Volatile Organic Compounds (VOC) standards of prevailing codes and ordinances.

1.6 SUBMITTALS

A. Materials List

1. Before any paint materials are delivered to the job site, submit to the Construction Manager and Architect a complete list of all materials proposed to be furnished and installed under this portion of the work.
2. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this work by the Architect.

B. Samples

1. Accompanying the materials list, submit to the Architect copies of the full range of colors available in each of the proposed products.
2. Upon direction of the Architect, prepare and deliver to the Architect two (2) identical sets of Samples of each of the selected colors and glosses painted onto 8-1/2" x 11" x 1/4" thick material; whenever possible, the material for Samples shall be the same material as that on which the coating will be applied in the work.

C. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable alternate in this Section of these specifications, submit for the Architect's review the current recommended method of application published by the manufacturer of the proposed material.

D. Close out Submittal

1. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or plant manufacturer/supplier shall furnish a coating maintenance manual such as 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, MSDS, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.7 PRODUCT HANDLING

A. Deliver all paint materials to the job site in their original unopened containers with all labels intact and legible at time of use.

B. Protection

1. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
2. Use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
3. Use all means necessary to protect paint materials before, during and after application and to protect the installed work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 EXTRA STOCK

A. Upon completion of this portion of the Work, deliver to Nassau County Department of Public Works an extra stock of paint equaling approximately ten (10) percent of each color and gloss used and each coating material used, with all such extra stock tightly sealed in clearly labeled containers.

1.9 JOB CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds eighty-five

(85) percent; or to damp or wet surfaces, unless otherwise permitted by the paint manufacturer's printed instructions.

D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 PRODUCTS

2.1 PAINT MANUFACTURERS

A. Except as otherwise noted, provide the painting products listed for all required painting made by one of the manufacturers listed in the paint schedule (Section 2.4). These companies are Benjamin Moore, PPG Paints (PPG), and Sherwin Williams (S-W). Comply with number of coats and required minimum mil thicknesses as specified herein.

2.2 MATERIALS

A. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer and use only to recommended limits.

B. Colors and Glosses: All colors and glosses shall be as selected by the Architect. Certain colors will require paint manufacturer to prepare special factory mixes to match colors selected by the Architect. Color schedule (with gloss) shall be furnished by the Architect.

C. Coloring Pigment: Products of or furnished by the manufacturer of the paint or enamel approved for the work.

D. Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D 234 and D 260, respectively.

E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D 13.

F. Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not less than four (4) lbs. of gum per gallon of alcohol.

G. Driers, Putty, Spackling Compound, Patching Plaster, etc.: best quality, of approved manufacture.

H. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

2.3 GENERAL STANDARDS

A. The various surfaces shall be painted or finished as specified below in Article 2.4. However, the Architect reserves the right to change the finishes within the range of flat, semi-gloss or gloss, without additional cost to the Owner.

B. All paints, varnishes, enamels, lacquers, stains and similar materials must be delivered in the original containers with the seals unbroken and label intact and with the manufacturer's instructions printed thereon.

C. All painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.

D. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.

E. Paint shall arrive on the job color-mixed except for tinting of under-coats and possible thinning.

F. All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.

G. It shall be the responsibility of the Contractor to see that all mixed colors match the color selection made by the Architect prior to application of the coating.

2.4 SCHEDULE OF FINISHES

A. High Performance Coating on Exterior Galvanized Ferrous Metals

First Coat:
"PittGuard Rapid Coat Epoxy 95-245 Series by PPG, "Series 27WB Typoxy" by Tnemec; "Epoxy Mastic Coating V 160" by Benjamin Moore Corotech or "Recoatable Epoxy Primer 867-45" by Sherwin Williams.

Second Coat:
"Pitthane Ultra 95-812 (Gloss)" or "High Build 95-8800 (Semi-Gloss)" by PPG; "Series 1080 (gloss) Endura-Shield WB" or "Series 1081 (semi-gloss) Endura- Shield WB" by Tnemec; "Acrylic Aliphatic Urethane V 500 (Gloss)" or "V 510 (Semi-Gloss)" by Benjamin Moore Corotech or "Hi-Solids Urethane B65- 300/350" by Sherwin Williams.

B. High Performance Coating on Exterior Non-Galvanized Ferrous Metals

Prime Coat:
"Amercoat 68HS Epoxy Zinc-Rich Primer" by PPG; "Series 94-H2O Hydro-Zinc" by Tnemec; "Organic Zinc Rich Primer V 170" by Benjamin Moore Corotech or "Zinc Clad II Plus Inorganic Zinc Rich Coating B69V212" by Sherwin Williams.

Second Coat:
"Pitt Guard Rapid Coat Epoxy 95-245" by PPG; "Series 27WB Typoxy" by Tnemec; "Epoxy Mastic Coating V 160" by Benjamin Moore Corotech or "Macropoxy 646 Fast Cure Epoxy B58-600" by Sherwin Williams.

Third Coat:
"Pitthane Ultra 95-812 (Gloss)" or "High Build 95-8800 (Semi-Gloss)" by PPG; "Series 1070V (gloss) Fluoronar" or "Series 1071V (semi-gloss) Fluoronar" by Tnemec; "Acrylic Aliphatic Urethane V 500 (Gloss)" or "V 510 (Semi-Gloss)" by Benjamin Moore Corotech or "Hi-Solids Polyurethane B65-300/350" by Sherwin Williams.

C. Interior Ferrous Metal:

Satin Finish/Latex:

Primer:
Benj. Moore Ultra Spec HP Acrylic Metal Primer (HP04)
PPG Pitt Tech Plus DTM Acrylic Primer 4020
S-W Pro-Industrial Pro-Cryl Universal Primer B66-3100 Series

First Coat:
Benj. Moore Ultra Spec-HP DTM Acrylic Low Luster (HP25)
PPG Pitt Glaze WB1 Pre-Catalyzed Eggshell Epoxy 16-310
S-W Pro Industrial Acrylic Eg-Shel, B66-660 Series

Second Coat:
Benj. Moore Ultra Spec-HP DTM Acrylic Low Luster (HP25)
PPG Pitt Glaze WB1 Pre-Catalyzed Eggshell Epoxy 16-310
S-W Pro Industrial Acrylic Eg-Shel, B66-660 Series
a. Total DFT not less than: 3.9 mils

Semi-Gloss Finish/Latex

Primer:
Benj. Moore Ultra Spec-HP Acrylic Metal Primer (HP04)
PPG Devflex 4020 PF DTM Primer/Flat Finish
S-W Pro-Industrial Pro-Cryl Universal Primer B66-3100 Series

First Coat:
Benj. Moore Ultra Spec HP DTM Acrylic Semi-Gloss (HP29)
PPG Pitt Glaze WB1 Pre-Catalyzed Semi-Gloss Epoxy 16-510
S-W Pro Industrial Acrylic Semi-Gloss, B66-650 Series

Second Coat:
Benj. Moore Ultra Spec HP DTM Acrylic Semi-Gloss (HP29)
PPG Pitt Glaze WB1 Pre-Catalyzed Semi-Gloss Epoxy 16-510
S-W Pro Industrial Acrylic Semi-Gloss, B66-650 Series
a. Total DFT not less than: 4.0 mils

D. Interior Drywall

Flat Finish/Vinyl Acrylic Latex

Primer:
Benj. Moore Ultra Spec 500 Interior Latex Primer (N534)
PPG Speedhide Zero Interior Latex Primer 6-4900XI
S-W ProMar 200 Zero VOC Interior Latex Primer, B28-2600

First Coat:
Benj. Moore Ultra Spec 500 Latex Flat (N536)
PPG Speedhide Zero Interior Latex Flat 6-4110XI
S-W ProMar 200 Zero VOC Interior Latex Flat, B30-12600 Series

Second Coat:
Benj. Moore Ultra Spec 500 Latex Flat (N536)
PPG Speedhide Zero Interior Latex Flat 6-4110XI
S-W ProMar 200 Zero VOC Interior Latex Flat, B30-12600 Series

a. Total DFT not less than: 3.6 mils

Eggshell Finish/ Scuff Resistant Latex

Primer:
Benjamin Moore Ultra Spec 500 Interior Latex Primer (N534)

First Coat:
Benjamin Moore Ultra Spec Scuff-X Latex Eggshell (485)

Second Coat:
Benjamin Moore Ultra Spec Scuff-X Latex Eggshell (485)

Matte Finish/Scuff and Stain Resistant Acrylic Latex

Primer:
PPG Pure Performance Interior Latex Primer 9-900

First Coat
PPG UltraLast Interior Latex Paint + Primer Matte 13-210

Second Coat
PPG UltraLast Interior Latex Paint + Primer Matte 13-210

Eggshell Finish/Scuff and Stain Resistant Acrylic Latex

Primer:
PPG Pure Performance Interior Latex Primer 9-900

First Coat
PPG UltraLast Interior Latex Paint + Primer Eggshell 13-310

Second Coat
PPG UltraLast Interior Latex Paint + Primer Eggshell 13-310

Semi-Gloss Finish/Scuff and Stain Resistant Acrylic Latex

Primer:
PPG Pure Performance Interior Latex Primer 9-900

First Coat
PPG UltraLast Interior Latex Paint + Primer Semi-Gloss 13-510

Second Coat
PPG UltraLast Interior Latex Paint + Primer Semi-Gloss 13-510

Eggshell Finish/Vinyl Acrylic Latex

Primer:
Benj. Moore Ultra Spec 500 Interior Latex Primer (N534)
PPG Speedhide Zero Interior Latex Primer 6-4900XI
S-W ProMar 200 Zero VOC Interior Latex Primer, B28-2600

First Coat:
Benj. Moore Ultra Spec 500 Interior Latex Eggshell (N538)
PPG Speedhide Zero Interior Latex Eggshell 6-4310XI
S-W ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series

Second Coat:
Benj. Moore Ultra Spec 500 Interior Latex Eggshell (N538)
PPG Speedhide Zero Interior Latex Eggshell 6-4310XI
S-W ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series
a. Total DFT not less than: 3.8 mils

E. **Interior Painted Wood**:

Satin Finish/Latex:

Primer:
Benj. Moore Advance Waterborne Int. Alkyd Primer (790)
PPG Seal Grip Int./Ext. Acrylic Universal Primer/Sealer 17-921
S-W Multi-Purpose Latex Primer/Sealer B51 Series

First Coat:
Benj. Moore Advance Waterborne Int. Alkyd Satin (792)
PPG Speedhide Zero Interior Latex Satin, 6-4410XI
S-W ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series

Second Coat: Benj. Moore Advance Waterborne Int. Alkyd Satin (792)
PPG Speedhide Zero Interior Latex Satin, 6-4410XI
S-W ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series
a. Total DFT not less than: 4.0 mils

Semi-Gloss Finish/Latex:

Primer:
Benj. Moore Advance Waterborne Int. Alkyd Primer (790)
PPG Seal Grip Int./Ext. Acrylic Universal Primer/Sealer 17-921
S-W Multi-Purpose Latex Primer/Sealer B51 Series

First Coat:
Benj. Moore Advance Waterborne Int. Alkyd (793)
PPG Speedhide Zero Interior Semi-Gloss Latex, 6-4510XI
S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series

Second Coat:
Benj. Moore Advance Waterborne Int. Alkyd (793)
PPG Speedhide Zero Interior Semi-Gloss Latex, 6-4510XI
S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
a. Total DFT not less than: 3.8 mils

2.5 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

A. Paint all exposed piping, conduits, ductwork and mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment. The Contractor is cautioned not to paint or otherwise disturb moving parts in the mechanical systems. Mask or otherwise protect all parts as required to prevent damage.

B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Latex Enamel Undercoater and one (1) coat Acrylic Latex Flat.

C. Exposed Covered Piping, Duct Work and Equipment: Primer/Sealer and one (1) coat Acrylic Latex Flat.

D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Latex Enamel Undercoater and two (2) coats Latex Semi-Gloss.

E. Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to match original finish. Do not paint over name plates and labels.

F. All surfaces of insulation and all other work to be painted shall be wiped or washed clean before any painting is started.

G. All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is required.

H. All items of Mechanical and Electrical trades which are furnished painted under their respective Contracts shall be carefully coordinated with the work of this Section so as to leave no doubt as to what items are scheduled to be painted under this Section.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 GENERAL WORKMANSHIP REQUIREMENTS

A. Only skilled mechanics shall be employed. Application may be by brush or roller. Spray application only upon acceptance from the Architect in writing.

B. The Contractor shall furnish the Architect a schedule showing when he expects to have completed the respective coats of paint for the various areas and surfaces. This schedule shall be kept current as the job progresses.

C. The Contractor shall protect his work at all times and shall protect all adjacent work and materials by suitable covering or other method during progress of his work. Upon completion of the work, he shall remove all paint and varnish spots from floors, glass and other surfaces. He shall remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and shall leave his part of the work in clean, orderly and acceptable condition.

D. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide ample in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.

E. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.

F. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.

G. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the Owner.

H. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.

I. All suction spots or "hot spots" in plaster after the application of the first coat shall be touched up before applying the second coat.

J. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

3.3 PREPARATION OF SURFACES

A. Existing Surfaces: Clean existing surfaces requiring paint or finishing, remove all loose and flaking paint or finish and sand surface smooth as required to receive new paint or finish. No "telegraphing" of lines, ridges, flakes, etc., through new surfacing is permitted. Where this occurs, Contractor shall be required to sand smooth and re-finish until surface meets with Architect's approval.

B. General

1. The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished shall be perfectly dry, clean and smooth.
2. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

C. Metal Surfaces

1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.
2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces, where solder flux has been used, with benzene. Clean surfaces by flushing with non-hydrocarbon based cleaner. For aluminum surfaces, wipe down with an oil free solvent prior to application of any pre-treatment.
   a. Bare metal to receive high performance coating specified herein must be blast cleaned SSPC SP-6 prior to application if field applied primer; coordinate with steel trades furnishing ferrous metals to receive this coating to ensure that this cleaning method is followed.

3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal." Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.
4. Galvanized Metal: Prepare surface as per the requirements of ASTM D 6386.
5. Metal Filler: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with an approved metal filler suitable for the purpose and meeting the requirements of the related Section of work; after setting, sand to a smooth, hard finish, flush with adjoining surface.

D. Plaster Surfaces: Scrape off all plaster nibs or other projections and sand smooth or finish to match adjoining surface texture. Cut out all scratches, cracks, holes, depressions and similar voids and fill with non-shrinking grout, spackles, patching plaster or other approved patching material; allow to dry, refill if necessary, then sand smooth (or refinish) to provide a flush, smooth surface of the same texture as the adjacent plaster surface.

1. Allow at least 28 days, from installation of final plaster coat, before starting work.

E. Gypsum Drywall Surfaces: Scrape off all projections and splatters, spackles all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards established in Section 092900, "Gypsum Drywall."

F. Wood Surfaces: Sand to remove all roughness, loose edges, slivers, or splinters and then brush to remove dust. Wash off grease or dirt with an approved cleaner. Fill all cracks, splits, nail holes, screw holes, and surface defects with putty after the priming coat has been applied. Putty shall be brought up flush with the surface and sanded smooth and touched-up with primer when dry.

G. Testing for Moisture Content: Contractor shall test all plaster and drywall surfaces for moisture content using a reliable electronic moisture meter. Contractor shall also test latex type fillers for moisture content before application of top coats of paint. Do not apply any paint or sealer to any surface or to latex type filler where the moisture content exceeds seven (7) percent as measured by the electronic moisture meter.

H. Touch-Up: Prime paint all patched portions in addition to all other specified coats.

3.4 MATERIALS PREPARATION

A. Mix and prepare painting materials in strict accordance with the manufacturer’s directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.

C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.

D. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.5 APPLICATION

A. General

1. Apply paint by brush or roller in accordance with the manufacturer’s directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.

2. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper, or rub surfaces with pumice stone, where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   a. "Exposed surfaces" is defined as those areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.
6. Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.
7. Finish doors on tops, bottoms, and side edges the same as the faces, unless otherwise indicated.
8. Enamel finish applied to wood or metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface.
9. Paste wood filler applied on open grained wood after beginning to flatten, shall be wiped across the grain of the wood, then with a circular motion, to secure a smooth, filled, clean surface with filler remaining in open grain only. After overnight dry, sand surface with the grain until smooth before applying specified coat.

B. Scheduling Painting

1. Apply the first coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Prime Coats: Re-coat primed and sealed walls and ceilings 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.

D. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.

E. "Touching-Up" of Factory Finishes: Unless otherwise specified or shown, materials with a factory finish shall not be painted at the project site. To "touch-up," the Contractor shall use the factory finished material manufacturer's recommended paint materials to repair abraded, chipped, or otherwise defective surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.

B. 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.

3.7 CLEAN UP

A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each workday.

B. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 10450 - SIGNAGE

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. Work Included: The Work of this Section shall include but not be limited to the following as indicated on drawings:

1. Interior wall mounted signs for the following locations:
   a. Restroom doors.
   b. Stair doors.
   c. Exit doors.
   d. Office doors.
   e. Conference doors.
   f. Classroom doors.
   g. Evacuation plan signs.
   h. Doors to all other permanently assigned rooms (room number only); and as indicated on the Drawings.
2. Exterior wall mounted signs for all buildings:
   a. Building Name.
   b. Building Address Numbers.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.

B. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

1. Provide message list for each sign required, including full-size details of wording and layout of lettering.

C. Samples: Submit four (4) samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

B. Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.

C. jurisdiction including ADA (Americans with Disabilities Act) requirements for type of signage, content, location, material, installation and other related requirements.

D. The Fire Hazard Classification: Provide signage materials as specified herein which comply with State and Local Building Code, and the following.

1. Finish materials shall be classified in accordance with ASTM E-84, NFPA-255, UL- 793.
2. Classification: Class A, flame spread 0-25; any material classified at 25 or less, and any element thereof which, when so tested, shall not continue to propagate fire.

1.4 DELIVERY AND HANDLING

A. Delivery: Provide protective covering as recommended by the manufacturer to protect sign components and surfaces against damage during transportation and delivery.

B. Handle signs carefully to prevent breakage, surface abrasion, denting, soiling, and other defects. Comply with the manufacturer's written handling instructions for unloading components subject to damage.

C. Inspect sign components for damage on delivery.

1. Do not install damaged sign components.
2. Repair minor damage to signs, as recommended by manufacturer, and as approved by the Architect; otherwise, remove and replace damaged sign components.

1.5 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting. Show recorded measurements on final Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delay.

1.6 WARRANTY

A. General: Submit a written warranty, signed by manufacturer, agreeing to repair or replace panels that fail during the specified warranty period. Failures include, but are not limited to, the following:

1. Coating degradation.
2. Chalking.
3. Fading.
4. Structural failure.
5. Delamination of applied graphics.

B. Warranty Period: 5 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. INTERIOR SIGNS:

1. Acceptable Manufacturers: Subject to compliance with requirements, provide interior, frameless, panel signs as manufactured by InPro Corporation, or approved equal.

a. Selected Product: Subject to compliance with requirements, Basis of Design; provide “Sedona Series” interior panel signs as manufactured by InPro Corporation.

B. EXTERIOR BUILDING SIGNS:

1. Address Numbers: Provide 4-inch-high matte black finished, nail on aluminum address numbers. Building designations to be provided by Nassau County Department of Public Works or as detailed on the drawings.
2. Building Names: Provide 12-inch-high, stainless steel letters pin mounted to building. Building names to be provided by Nassau County Department of Public Works or as detailed on the drawings.

2.2 MATERIALS

A. General: For surfaces exposed to view or coated in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, roughness, or variations in flatness.

B. Acrylic Sheet Materials: Abrasion-Resistant-Coated Acrylic Sheet: ASTM D 4802; Category A-1 (cell-cast sheet); Finish 3 (abrasion-resistant coated); Type UVA (UV absorbing); thickness as required, transparent, monolithic sheet with a luminous transmittance of 91 percent unless otherwise indicated.

1. Acrylic materials shall be allowed, based upon fire resistance classification requirements, if acrylic units do not exceed 36 square inches.
   a. Where sign units contain acrylic sheeting that exceeds 36 square inches provide sheet metal or other plastic materials that comply with fire resistance classification requirements specified herein.

C. Brackets, Fasteners, and Anchors: Provide custom stainless steel (type 304) brackets, fasteners, and anchors of the size, type, finish and arrangement indicated; if not indicated, as selected by the Architect.

D. Lettering: Provide the manufacturer's standard partial inlay style lettering. Text, graphics and other lettering shall be partially embedded; top layer engraved to receive 0.060 inch cut rigid vinyl material; suitable for interior applications.

2.3 FABRICATION

A. The drawings indicate minimum dimensions, thickness for components, and arrangements. Where performance requirements require thickness of material to be increased or additional reinforcing to be added such revisions shall be made without changing the visible profiles of sign elements. Where changes cannot be made without changing visible profiles they shall be made only with approval by the Architect.

1. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
   a. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.
2. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
   a. Font Style: Gil Sans, unless otherwise indicated.
   b. Text and Graphics: As indicated on the Drawings and Schedules.
   c. Sign Color: Provide "skylight" and "peppermint" for the upper and lower portions of the panel signs, respectively.
   d. Text and Graphics Color: White, unless otherwise indicated.
3. Include Grade 2, braille lettering for each different panel sign.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Shear and punch metals cleanly and accurately. Remove burrs. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Remove sharp or rough areas on exposed surfaces.

C. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, provide vandal-resistant fasteners as selected by the Architect.

D. Provide for anchorage of type indicated, coordinate with supporting structure. Fabricate and space anchoring devices to secure signage rigidly in place and to support indicated loads.

E. Shop Assembly: Preassemble items in shop. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

F. Cut, reinforce, drill, and tap components as indicated to receive exposed mounting hardware and similar items.

G. Engraved Copy: Machine-engrave letters, numbers, symbols, and other graphic devices into sign panel top layer as indicated to produce precisely formed copy, incised to uniform depth.

1. Use high-speed cutters mechanically linked to master templates in a pantographic system or equivalent process capable of producing characters of the style indicated with sharply formed edges.

A. Raised Graphics / Lettering: Opaque, nonreflective exterior grade polyvinyl acetate urethane polymer film with phenolic back plate. Photo etched to provide raised copy.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Locate sign units and accessories where indicated or as required to comply with ADA requirements and by authorities having jurisdiction, use mounting methods of the type described and in compliance with the manufacturer's instructions.
   1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
   1. Mechanical Fastening: Mount interior panel signs using the custom, decorative, vandal-resistant, stainless-steel fasteners as indicated on the Drawings; if not indicated, as selected by the Architect.
   2. Provide heavy paper template to locate holes for mechanical fasteners.

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 Nassau County Department of Public Works.

END OF SECTION

SECTION 102800 – TOILET ACCESSORIES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the toilet accessories as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Mirrors.
2. Soap dispensers.
3. Combination towel dispenser and disposal units.
4. Grab bars.
5. Toilet tissue dispenser.
6. Shelf and hook strip for Janitor's Closets.

1.3 RELATED SECTIONS

A. Wood Framing - Section 0610000.

B. Gypsum Drywall - Section 092900.

C. Ceramic tile - Section 093000.

1.4 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. Accessories shall be installed at heights in compliance with prevailing Handicapped Code.

C. Products: Unless otherwise noted, provide products of same manufacturer for each type of unit and for units exposed in same areas.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, catalogue cuts and installation instructions for each toilet accessory.

B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work

C. Submit schedule of accessories indicating quantity and location of each item.

1.6 PRODUCT HANDLING

A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge minimum, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Galvanized Steel Sheet: ASTM A 653, G60.

D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

E. Mirrors: ASTM C 1503, mirror glazing quality, clear glass mirrors, nominal 1/4" thick.

2.2 FASTENING DEVICES

A. Exposed Fasteners: Theftproof type, chrome plated, or stainless steel; match finishes on which they are being used.

B. Concealed Fasteners: Galvanized (ASTM A 123) or cadmium plated.

C. No exposed fastening devices permitted on exposed frames.

D. For metal stud drywall partitions, provide ten (10) gauge galvanized sheet concealed anchor plates for securing surface mounted accessories.

2.3 FABRICATION

A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.

B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.

C. Recessed Toilet Accessories, General: Fabricate units of all welded construction, without mitered corners. Hang doors of access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

2.4 MANUFACTURERS

A. Provide products manufactured by:

1. Bobrick Washroom Equipment Co.
2. American Specialties, Inc.
3. Bradley Corp.
4. A & J Washroom Accessories
5. or approved equal.

2.5 ACCESSORY SCHEDULE

A. Unless otherwise noted, model numbers used herein are those of Bobrick Washroom Equipment, Basis of Design.

1. Other manufacturers, approved as equal by the Architect, may substitute their products.

B. Toilet Accessories Schedule:

TOILET ACCESSORIES SCHEDULE NOTE: ALL BASIS-OF-DESIGN MODEL NUMBERS SHOWN ARE MANUFACTURED BY BOBRICK WASHROOM EQUIPMENT, INC. (OR APPR. EQ.) U.O.N.		
MARK	**DESCRIPTION**	**MODEL NO.**
A	RECESSED SEAT–COVER DISPENSER, SANITARY NAPKIN DISPOSAL & TOILET TISSUE DISPENSER – ST. STL. FINISH	B–35745
B	SURFACE MOUNTED HAND DRYER W/ ST. STL. COVER	B–7128
C	WALL–MOUNTED MIRROR W/ ST. STL. CHANNEL FRAME 24" X 36"	B–165 2436
D	36" HORIZONTAL GRAB BAR W/ CONCEALED MOUNTING – SATIN ST. STL. FINISH AT WC REAR WALL	B–6806x36
E	42" HORIZONTAL GRAB BAR W/ CONCEALED MOUNTING – SATIN ST. STL. FINISH AT WC SIDE WALL	B–6806x42
F	18" HORIZONTAL GRAB BAR W/ CONCEALED MOUNTING – SATIN ST. STL. FINISH AT WC SIDE WALL	B–6806x18
G	GREY ABS PUSH BUTTON SURFACE–MOUNTED SOAP DISPENSER	B–5050
H	36" LONG UTILITY SHELF WITH MOP/BROOM HOLDERS, RAG HOOKS AND SATIN ST. STL. FINISH	B–224x36
J	WALL–MOUNTED MIRROR 20.4" WIDE X 24.15" HIGH WITH WHITE FRAME MANUFACTURED BY WOODCRAFTERS	293081

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where toilet accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 PREPARATION

A. Accessories which are to be partition mounted shall be closely coordinated with other trades, so that the necessary reinforcing is provided to receive the accessories.

B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum drywall and masonry partitions. Coordinate the work to assure that base plates and anchoring frames are in the proper position to secure the accessories.

C. Verify by measurements taken at the job site those dimensions affecting the work. Bring field dimensions which are at variance with those on the approved shop drawings to the attention of the Architect. Obtain decision regarding corrective measures before the start of fabrication of items affected.

D. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

3.3 INSTALLATION

A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.

B. Concealed anchor assemblies for gypsum drywall partitions shall be securely anchored to metal studs to accommodate accessories. Assemblies shall consist of plates and/or angles tack welded to studs.

C. Secure accessories in place, at their designated locations by means of theftproof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.

D. Unless otherwise indicated, accessories shall conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, such locations shall be as directed by the Architect.

E. Installed accessories shall operate quietly and smoothly for use intended. Doors and operating hardware shall function without binding or unnecessary friction. Dispenser type accessories shall be keyed alike. Prior to final acceptance, master key and one duplicate key shall be given to Nassau County Department of Public Works authorized agent.

F. The Architect shall be the sole judge of workmanship. Workmanship shall be of the highest quality. Open joints, weld marks, poor connections, etc., will not be permitted. The Architect has the right to reject any accessory if he feels the workmanship is below the standards of this project.

G. Grab bars shall be installed so that they can support a three hundred (300) lb. load for thirty minutes per ANSI A117.1 and ADA US Department of Justice Guidelines.

3.4 CLEANING AND PROTECTION

A. Upon completion of the installation, clean accessories of dirt, paint and foreign matter.

B. During the installation of accessories and until finally installed and accepted, protect accessories with gummed canvas or other means in order to maintain the accessories in acceptable condition.

C. Replace and/or repair installed work, which is damaged or defective to Nassau County Department of Public Works satisfaction, at no additional cost.

END OF SECTION

SECTION 104416 - FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the fire extinguishers and cabinets as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

A. Gypsum Drywall - Section 092900.

B. Fire suppression systems - Division 22.

C. Fire hose cabinets and valve cabinets - Division 22.

1.4 QUALITY ASSURANCE

A. Provide portable fire extinguishers, cabinets and accessories by one manufacturer.

B. 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.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials. Where color selections by Architect are required, include color charts showing full range of manufacturer's standard colors and designs available.

B. Samples: Submit samples, 6" square, of each required finish. Prepare samples on metal of same gauge as metal to be used in the work. Where normal color variations are to be expected, include 2 or more units in each sample showing the limits of such variations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:

1. J.L. Industries.
2. Larsen's Mfg. Co.
3. Potter Roemer.

2.2 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. Abbreviations indicated below to identify extinguisher type related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher.

C. Multi-Purpose Dry Chemical Type: UL rated 2A-10B:C, 5 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

2.3 MOUNTING BRACKETS

A. Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher specified, in manufacturer's standard enamel finish; color to match extinguisher.

2.4 CABINETS

A. Type and Style: Fire extinguisher cabinets shall be metal, semi recessed, with plexiglass panel, sized to fit within the partition or wall depth. Provide fire rated cabinets within fire rated partitions.

B. Color: Fire extinguisher cabinets shall be factory pre-finished with baked enamel in the colors selected by the Architect from the standard range of colors of the selected manufacturer.

C. Design is based on "Model G-2409-5R" of Larsen's Mfg. Co.

1. Other manufacturers noted herein may substitute their equivalent cabinet upon acceptance by the Architect.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where fire extinguishers and cabinets are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install items included in this Section in locations indicated and at heights to comply with applicable regulations of governing authorities.

1. 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.
2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

B. Where exact location of cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by the Architect.

3.3 IDENTIFICATION

A. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" painted on door by silk-screen process or die cut lettering. Provide lettering on door as selected by Architect from manufacturer's standard letter sizes, styles, colors and layouts.

B. Identify bracket-mounted extinguishers with red letter decals spelling 'FIRE EXTINGUISHER' applied to wall surface. Letter size, style and location as selected by the Architect.

3.4 SERVICE

A. Determine the approximate completion date of the work and then inspect, charge, and tag the fire extinguishers at a date not more than 10 days before or not less than one day before actual completion date of the work.

END OF SECTION

SECTION 105300 - CANOPIES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the canopy at Building “A” Gas Station as shown on the drawings and specified herein.

1.3 RELATED SECTIONS

A. Concrete Reinforcement – Section 032000

B. Cast-In-Place Concrete – Section 033000.

1.4 SUBMITTALS

A. Shop Drawings: Submit detailed drawings, layout of canopy system, bent locations (identify drain columns and wet bents), all mechanical joint locations with complete details, connections, jointing and accessories.

B. Product Data: Submit manufacturer's product data, specifications, component performance data and installation instructions.

C. Calculations: Provide structural calculations for the proposed canopy signed and sealed by a professional engineer registered in the State of New York whose professed discipline is structural engineering.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following except as otherwise indicated:

1. Standard Building Code, latest addition with amendments, if any.
2. AWS (American Welding Society) standards for structural aluminum welding.

B. Manufacturer: Obtain aluminum covered walkway system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.

C. Installer Qualification: Firm with not less than three (3) years of experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.

D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work. However, allow for adjustments within specified tolerations wherever taking of field measurements before fabrication might delay work.

E. Shop Assembly: 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.

F. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway system (sidewalks, curbs, building fascias, etc.).

1.6 PERFORMANCE REQUIREMENTS

A. System Performance: Provide canopy system that has been designed, produced, fabricated and installed to withstand normal temperature changes as well as live loading, dead loading and wind loading in compliance with New York State Building Code requirements for geographic area in which work is located and as follows:

1. Live Load: 30 psf minimum.
2. Structural Design for Wind Forces: Comply with ANSI A58.1-1982.
3. See structural drawings for the applicable wind loading and other required information.
4. Provide structural design for the proposed canopy drawings and calculations signed and sealed by a professional engineer registered in the State of New York whose professed discipline is structural engineering.

B. Sizes shown on drawings are to be considered minimum.

C. Structure shall be capable of sustaining severe icing, hail, hurricane force winds and supporting a concentrated load such as being walked upon.

PART 2 PRODUCT

2.1 MANUFACTURERS

A. Acceptable Manufacturer:

1. Austin Mohawk and Company, Inc., which is located at: 2l75 Beechgrove Place; Utica, NY 135O1; Toll Free Tel: 8O0-765-3l10; Tel: 3l5-793-3O00; Email: request info (info@austinmohawk.com); Web: www.austinmohawk.com
2. Substitutions: Not permitted.

2.2 MATERIALS

A. Structural Steel:

1. Material and work shall conform to the latest AISC 360.
2. Structural steel shall be painted with a rust inhibitive (red oxide) primer (std).
3. Structural steel shall be hot-dip-galvanized.

B. Sheet Metal:

1. Decking: 3 inch (76 mm) by 16 inch (406 mm) by 20 gage smooth white, ASTM A 653/A 653M GR40, Fy = 40 ksi, galvanized steel with baked enamel finish.
2. Center and Tapered Gutter: 24 gage hot-dip galvanized steel baked enamel finish.
3. Perimeter Gutter: 20 gage hot-dip galvanized steel baked enamel finish.
4. Internal Downspout: 3-inch (76 mm) diameter PVC.
5. External Downspouts: 3 inch (76 mm) by 4 inch (102 mm) by 24 gage hot-dip galvanized steel with baked enamel finish.

2.3 PRE-ENGINEERED METAL CANOPY

A. General: Provide a complete, integrated set of manufacturer's standard design canopy components using a flexible frame with fixed base wherein the steel framing system uses stacked I Beam construction transferring the moment to the concrete footing without requiring a rigid connection between steel frame members. The beam arrangements allow for a cantilever design which can bring the columns from the perimeter of the structure to the inner protected zones between the drive lanes. These mutually dependent components form a pre-engineered canopy, ready for construction on project site. Said pre-engineered metal canopy will be designed to meet all site structural wind, snow and seismic requirements.

B. Canopy Fascia:

1. Aluminum Composite Panel (ACM): Available with a fluorocarbon paint finish, masked on one side. Shall be warranted for 10 or 20 years depending on color and finish.
2. 2 Inch Laminated Foam Core Fascia: Panel face shall be 24 gage hot-dip galvanized steel with a baked enamel finish. Finishes shall be warranted against cracking, checking, peeling, or adhesion failure. Warranties for 5, 10, 20 years shall be available depending on color selection. The foam core shall be 2 inch (51 mm) expanded virgin polystyrene. The backing shall be 24 gage galvanized steel.
3. Fascia: Custom fascia to meet design requirements as indicated on architectural drawings.

C. Canopy Finishes: Comply with NAAMM MFM for recommendations for applying and designating finishes.

1. 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. Fabrication: Fabricate pre-engineered canopies completely in factory.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle covered walkway system components as recommended by manufacturer. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

3.2 EXAMINATION

A. Examine adjacent work for conditions that would prevent quality installation of system.

B. Do not proceed until defects are corrected.

3.3 FIELD DIMENSIONS

A. General Contractor shall field confirm bent locations, dimensions and elevations shown on shop drawings prior to fabrication.

3.4 INSTALLATION

A. A work area shall be required extending 10 feet (3 m) beyond buildings and canopies in all directions to the extent practical. The work area shall be flat, comprised of hard-packed soil or gravel, asphalt, or concrete, and free of open excavation, debris, construction equipment and construction workers. An additional flat workspace a minimum of 25 feet (7.6 m) by 25 feet (7.6 m) or as practical shall be provided adjacent to the canopy and/or building for unloading and storing materials. Site to meet OSHA guidelines to allow lift equipment and scaffolding to maneuver the work area.

B. Set pre-engineered metal canopy plumb and aligned. Level base plates true to plane with full bearing on concrete bases.

C. Fasten pre-engineered metal canopy columns to anchor bolts and/or foundation bolts.

D. Provide anchor bolts as follows:

1. Anchor bolts or foundation bolts will be set by the contractor in accordance with approved site- specific drawings. They must not vary from the size and dimensions shown on the erection drawings. Use of a plywood template is recommended. Remove template prior to column erection.
2. Anchor bolts shall conform to ASTM A 307 and shall have a minimum of 7 inches (178 mm) of exposed thread and 23-inch (584 mm) minimum embedment with 1-1/4-inch (32 mm) nut and washer as embedment end.

E. Provide bolted connections as follows:

1. Structural erection bolts shall conform to ASTM A 325/A 325M.
2. Bolts shall be tightened to snug tight per latest RCSC specifications (unless otherwise specified).

F. Provide screws as follows:

1. Fastening shall be performed per installation prints provided by the manufacturer.
2. Self-drilling and self-tapping screws shall have a sufficient cut point and a 1/2 inch (13 mm) outside diameter dished metal-backed neoprene washer to be used in water sealing applications.

G. Provide pedestrian protection and warnings during construction which comply with local, Federal, and OSHA codes.

H. Prior to steel erection of any kind, the Contractor shall grade, backfill and otherwise prepare the job site to allow for rolling scaffold and ensure safe working conditions including the removal or relocation of overhead power lines.

I. Any grade or elevation situations which deviate from the approved manufacturer's plans shall be conveyed to the manufacturer prior to fabrication.

J. All anchor bolts and/or leveling plates shall be set within 1/4-inch (6 mm) tolerance on layout and grade level.

K. Connect electrical power service to power distribution system according to requirements specified in Division 16 - Electrical.

3.5 CLEANING AND PROTECTION

A. Damaged Units: Replace roof deck panels and other components of the work which have been damaged or have deteriorated beyond successful minor repair.

B. Cleaning: Remove protective coverings at time in project construction sequence which will afford greatest protection of work. Clean finished surfaces as recommended by manufacturer. Maintain in a clean condition during construction.

C. Protection: Advise Contractor of protection and surveillance procedures, as required to ensure that work of this Section will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 105500 - POSTAL EQUIPMENT

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the postal equipment as indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Mailboxes.

1.3 RELATED SECTIONS

A. Wood Framed Construction – Section 061000.

B. Carpentry - Section 062000.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for postal specialties units required.

1. Provide manufacturer's certification that equipment proposed conforms to U.S. Postal Service regulations and has been approved by the Postmaster General.

B. Shop Drawings: Submit shop drawings for fabrication and erection of postal specialties. Include plans, elevations and large scale details. Show anchorages and accessory items. Provide location drawings.

1.5 QUALITY ASSURANCE

A. Manufacturer: Provide products of manufacturers approved by U.S. Postal Service. Comply with manufacturer's instructions for installation of postal specialties.

B. Requirements of Regulatory Agencies: Comply with the U.S. Postal Service requirements including USPS-STD-4C.

1.6 WARRANTY

A. Warranty: Submit a warranty, signed by Manufacturer and Contractor, agreeing to repair or replace mailbox units which fail in materials or workmanship within 2 years of date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Available Manufacturer: Subject to compliance with requirements, provide postal specialties as manufactured by Salsbury Industries, or approved equal by one of the following:

1. Gaines Manufacturing Co.

2. Or approvd equal

B. Selected Product: Provide front loading horizontal letterbox assemblies "Janzer Model JB-BLK" as manufactured by Gaines Manufacturing, Inc.

2.2 MAILBOX POST

A. Provide Manufacturer’s standard post for mounting the selected mailbox and associated connection hardware.

2.3 FINISHES

A. Exposed Finish: Manufacturer's standard textured black coating.

PART 3-EXECUTION

3.1 EXAMINATION

A. Examine rough-in to verify locations of connections prior to installation.

B. Examine walls and partitions for thickness and framing for units to verify unit depth and mounting prior to installation. Coordinate rough-in requirements with other Sections.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units complying with manufacturer's instructions and final shop drawings.

1. Final acceptance will be contingent upon compliance with U.S. Postal Service requirements and acceptance by USPS.

B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities and those having jurisdiction.

1. Prepare recesses in walls for cabinets as required by type and size of unit and style of trim and to comply with manufacturer's instructions.

2. Fasten mounting brackets and units to structure, square and plumb.

3.3 CLEANING

A. Clean aluminum surfaces promptly after installing units. Exercise care to avoid damage to protective coatings and finishes. Remove excess sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.

B. Protect units after installation, ensure units are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 107313 - CANVAS AWNINGS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the fixed Canvas Awnings as shown on the drawings and/or specified herein, including but not limited to, the following:

1. Awning fabric.
2. Framing.

1.3 RELATED SECTIONS

A. Miscellaneous Metals - Section 05 50 00.

1.4 SUBMITTALS

A. Submit Product Data

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Dimensioned drawings as needed to depict the canopy assembly and its interface with the facade.
4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. Submit four (4) 24" x 24" samples of fabric colors and patterns.

C. Shop Drawings showing awnings in elevation, plan, and section. Drawings shall include the following details:

1. All frame dimensions including overall dimensions, module dimensions, and fabric panel dimensions.
2. Frame module labels.
3. Frame module connection details.
4. Connection details.
5. Material information.
6. All other applicable information.

1.5 QUALITY ASSURANCE

A. Fabricate and install awning assembly to resist positive and negative wind load of 30 psf without damage.

1.6 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.7 WARRANTY

A. Fabrics shall be warranted by the fabric manufacturer for a minimum of five years. Labor to replace defective fabric shall be guaranteed for one year.

1.8 MAINTENANCE

A. Upon installation, awnings are to be clean and free of any substance that might discolor or damage surfaces. Written cleaning instructions are to be made available from the fabric manufacturer. Damaged fabric panels should be replaceable individually, on the job site.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fabric: Provide "Sunbrella Firesist" made by Glen Raven Mills Inc. or approved equal in colors and patterns to match existing; fabric shall conform to the following:

1.	Generic Classification	Solution-dyed Modacrylic
2.	Description	Woven fabric made by 100% SEF-FR self-extinguishing fibers. These are modacrylic solution-dyed fibers with a fluorocarbon finish.
3.	Typical Weight	Approximately 9.25 oz. per square yard.
4.	Colors	Very resistant to ultraviolet rays and color degradation. Colors tested up to 1500 hours in fadeometer with minimal or no color change.
5.	Underside	Same as top surface - both sides alike.
6.	Abrasion Resistance	Good.
7.	Dimensional Stability	Good. Remains fully flexible in frigid temperatures.
8.	Mildew Resistance	Excellent. Fabric will not support growth of mildew. Mildew growing on foreign matter attached to fabric easily.
9.	Flame Resistance (FR)	Passes or Exceeds: National Fire Protection Association Test #701; UL 214 certification (US), and ASTM E 84 (flame spread and smoke density is Class A or Class I). Fabric does not melt drip.
10.	Chemical Resistance	Fabric highly resistant to acids, alkalies and solvents.
11.	Water Repellence	Excellent.

B. Underside of awning to have white translucent fabric meeting standards noted above, type as selected by the Architect.

C. Frame: Heavy duty aluminum pipe frame fabricated of 1-5/8" O.D./17 ga. stainless steel pipe with 1-7/8" O.D./13 ga. aluminum fittings.

1. For anchoring frame to building facade and sidewalk, provide stainless steel anchors and clips.
2. Aluminum shall be kynar 500 coated complying with AAMA 2605 to match storefront.

D. Accessories

1. Thread: No. 12 polyester, color to match fabric.
2. Binding Trim: Polyester, color to match fabric.
3. Lace Bands: Same as awning fabric, No. 0 stainless steel grommets.
4. Lace Cord: 1/8" cotton cord, white.
5. Lettering and Logo: Screen printing. Provide names, addresses and/or logos as indicated or as directed by the Architect.
6. Seam Wetting: 1/8" diameter bead to match fabric.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where awning assembly is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use.

END OF SECTION

SECTION 107423 - PREFABRICATED CUPOLA

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the prefabricated cupola as shown on the drawings and/or specified herein.

1.2 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

C. Installer: 3 years successful experience in installation of systems similar to those required by project and acceptable to system manufacturer.

D. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

C. Submit:

1. Manufacturer’s specifications and other data needed to prove compliance with the specified requirements.
2. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
3. Manufacturer’s recommended installation procedures.

D. Structural Design Drawings: Submit drawings shown the location and magnitude of cupola reactions on supporting structure under all design loading conditions, Submit calculations for design of manufacturers component design.

1. All submittals, drawings and calculations shall be prepared, signed and sealed by a Professional Structural Engineer registered in the state of New York.
2. Engineer shall also submit certification that the cupola design meets loading requirements of the currently adopted edition of the New York State Building Code.

1.4 PRODUCT HANDLING

A. Protection: 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.5 WARRANTY

A. Warrant the product for one year after date of delivery of product installed by others.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Use Cupola, Commercial Dormer, as manufactured by:

1. Décor Architectural Products, Inc., or approved equal by Architect.
   a. 5'-0" Wide x 8'-0" High Prefabricated Glazed Cupola with Finial, Model No. 4509 Modified to have square pyramidal roof with 5:12 pitch.
2. Copper Craft or approved equal by Architect.
   b. 3'-0" Wide x 1'-0" High flanged pre-finished aluminum louvered eyebrow dormer with insect screen. Louver to be 2" deep.

2.2 MATERIALS

A. Cupolas to be wood and/or aluminum framing.

B. Use structural aluminum products according to the Construction Manual of the Aluminum Association, Inc. Aluminum shall be alloy 606-T6 or structural steel conforming to ASTM A36.

C. Cladding: Provide cladding fabricated from 0.032" aluminum sheet 3003-H14 alloy, with custom paint finish as selected by Architect.

2.3 ACCESSORIES

A. Fabricate cross, finial, weathervane and/or topping ornament true to dimensions, with welded or soldered joints, ground smooth.

B. Form louver blades and firmly secure and rivet to frames, and back with 18-inch x 18-inch aluminum or copper screen.

C. Form cornices, moldings, and ornaments in accordance with approved drawings.

D. Fabricate window framing from extruded aluminum tubing alloy 6061-T5, and glaze in glass as specified in section 088000 of suitable thickness, using color as selected by the architect.

E. Cast, stamp, form, and/or spin special ornaments in accordance with good and acceptable practices, and in accordance with approved drawings.

2.4 FABRICATION

A. Fabricate structural steel framing to conform to AWS standards.

B. Fabricate structural aluminum framing with cold driven aluminum rivets, limiting welding to secondary architectural members. Steel framing to be welded, bolted or riveted in accordance with current steel fabricating practices.

C. Internal structures to be designed to withstand local wind codes.

D. Form all exterior cladding with good and acceptable sheet metal practices, and lock form all seams inasmuch as possible.

E. Fabricate finial and topping ornament true to dimensions, with welded to soldered joints, ground smooth. Coordinate with lighting protection specified in Division 26.

F. Form cornices, moldings and ornaments in accordance with approved drawings.

G. Cast, stamp, form and or spin special ornaments in accordance with approved drawings.

H. Conceal all exterior fasteners.

2.5 FINISHES

A. Exposed Aluminum: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC; “Trinar” nu AKZO; “Duranar by PPG; “Fluropon” by VALSPAR. Total dry film thickness not less than 1.0 mils or coatings meet or exceed the requirements of ASCA 96.

1. Color: As selected by Architect from paint manufacturer’s complete specified line.
2. Application: Apply coating systems in strict accordance with manufacturer’s printed instructions and recommendations Refer to Quality Assurance in Part 1.

B. Clean all copper to weather naturally.

C. Paint all aluminum surfaces in contact with steel with on heavy coat of zinc primer and paint all steel surfaces with 2 heavy coats re lead or zinc chromate, followed by one coat of aluminized bituminous paint.

2.6 SEALANTS

A. Clean and dry all surfaces to be sealed.

B. Apply with caulking gun, using nozzle of proper size to fit the joint width.

C. Use silicone sealant; see section 079200.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where prefabricated cupola is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

END OF SECTION

SECTION 107500 - FLAGPOLES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the flagpoles as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

A. Concrete - Section 033000.

1.4 QUALITY ASSURANCE

A. Manufacturing Standards: Provide each flagpole as a complete unit produced by a single manufacturer, including fittings, accessories, bases and anchorage devices.

B. Design Criteria: Provide flagpoles and installations constructed to withstand a 120-mph wind velocity minimum when flying flag of appropriate size. Use heavier pipe sizes if required for flagpole type and height shown.

C. Pole Construction: Construct pole and ship to site in one piece, if possible. If more than one piece is necessary, provide snug-fitting, precision joints with self-aligning, internal splicing sleeve arrangement for weather-tight, hairline field joints.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each type of flagpole required.

B. Shop Drawings: Submit shop drawings of flagpoles and bases, showing general layout, jointing and complete anchoring and supporting systems.

C. Samples: Submit samples of each finished metal for flagpoles, and accessories as may be required.

1.6 DELIVERY, STORAGE AND HANDLING

A. Spiral wrap flagpoles with heavy Kraft paper or other protective wrapping and prepare for shipment in hard fiber tube or other protective container.

B. Deliver flagpole and accessories completely identified for installation procedure. Handle and store flagpoles to prevent damage or soiling.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following manufacturers:

1. Basis of Design:
   a. Poletech Co., Inc. or approved equal by Architect.
      1) Model No. PT256CIW.
2. Alternate manufacturers, as approved by Architect.
   a. Aabec Pole Div., Morgan-Francis Co.
   b. Acme Flagpole, Div., Lingo Inc.
   c. American Flagpole, Div. of Kearney-National.
   d. Concord Industries, Inc.

2.2 FLAGPOLE MATERIALS

A. Provide cone tapered aluminum flagpole fabricated from seamless extruded tubing complying with ASTM B241, alloy 6063-T6, having a minimum wall thickness of 3/16" (0.1875"), tensile strength not less than 35,000 psi and a yield of 30,000 psi. Heat-treat and age-harden flagpoles after fabrication.

B. Flagpole units shall have internal halyard system conforming to the following:

1. 25' exposed height, 6” bottom, 3" top diameter, in wall thickness of .188, ground set.
2. Finish: Ground set polished seamless aluminum
3. Ball: 4" diameter, gold anodized spun aluminum.
4. Truck: Extra heavy, non-fouling, ball-bearing, revolving truck, heavy duty; finish to match pole finish.
5. Winch Assembly: For raising and lowering flag, heavy duty winch assembly shall have bronze drum and hardened steel gear. Mount winch on galvanized steel frame within flagpole. Shaft of winch shall finish flush with outside face of pole through 1" (max.) diameter hole. Provide aluminum plug for winch shaft hole; plug to screw in, to finish flush with pole and to have same finish as pole. Provide removable winch handle. Provide access door in flagpole opposite winch. Access door to finish flush with pole, have same finish as pole, have concealed stainless steel hinges and lock, have stainless steel cylinder lock flush with door, and have hairline joints between door and pole.
6. Halyard: Provide one concealed, continuous 3/16" min. diameter stainless steel aircraft type cable. Halyard shall run concealed within pole from winch to top of pole, and then exposed over sheave and extend down outside of pole for sufficient length to properly fit flag. Flag end of halyard shall have two white neoprene-covered bronze swivel snaps, spaced for flag size. Flag size shall be determined by Architect. At bottom of flag end of halyard, provide rubber coated weight and Teflon-coated stainless steel rope sling around pole.
7. Foundation Tube: Provide 16 ga. min. galvanized corrugated steel tube, or 12 ga. rolled steel tube, sized to suit flagpole and installation. Furnish complete with welded steel bottom base and support plate, lightning ground spike, and steel centering wedges, all welded construction. Provide loose hardwood wedges at top for plumbing pole after erection. Galvanize steel parts after assembly, including foundation tube.
8. Base: Equal to No. 1240 made by American Flagpole, finish to match pole.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where flagpole is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Excavation: Excavate for foundation concrete to neat clean lines in undisturbed soil. Provide forms where required due to unstable soil conditions. Remove wood, loose soil, rubbish and other foreign matter from excavation, and moisten earth before replacing concrete.

B. Concrete: Provide concrete composed of Portland cement, coarse aggregate, fine aggregate and water, mixed in proportions to attain 28-day compressive strength of not less than 3000 psi. Use not less than 5 sacks of Portland cement, complying with ASTM C150, per cu. yd. of wet concrete.

1. Place concrete immediately after mixing. Perform chuting to avoid segregation of mix. Compact concrete in place by use of vibrators to consolidate.

C. Flagpole Installation: Install flagpoles plumb and in compliance with final shop drawings and manufacturer's instructions.

1. Provide positive lightning ground for flagpole installation.
2. Paint portions of ground-set flagpole below grade with heavy coat of bituminous paint.
3. At time of erection, remove all protective wrappings.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 111900 - DETENTION EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the metal roofing as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Bar-grille assemblies
2. Security grilles

1.3 RELATED REQUIREMENTS

A. Wood Framing – 061000

B. Painting and Finishing – 099000

1.4 COORDINATION

A. Templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.6 ACTION SUMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention enclosures

B. Shop Drawings: For detention enclosures

1. Include plans, elevations, sections, and attachment details
2. Indicate location, plan, and dimension of each detention enclosure
3. Indicate type of steel for each detention enclosure component
4. Indicate requirements for cast-in anchors to be installed as work of other Sections.
5. Show elevations of each detention enclosure door and indicate location, dimensions, door swing/slide direction, details of detention door hardware and accessories, and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: Provide two (2) samples for each type of detention enclosure indicated.

1. Include 12-by-12-inch cut-away corner section of bar-grille assembly, constructed of specified round and flat bars, showing fabrication techniques and workmanship.
2. Include 12-by-12-inch cut-away corner section of woven-rod-mesh assembly, constructed of specified framing and woven-rod panel, showing fabrication techniques and workmanship.
3. Include one full-size security grille and vent unit.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified installer and manufacturer.

B. Welding certificates.

C. Material Certificates: For tool-resisting steel indicating compliance with the performance requirements for complete test sequence according to applicable ASTM standard.

D. Material Test Reports: For tool-resisting steel, by a qualified testing agency.

E. Mill Certificates: For tool-resisting-steel rods used in woven-rod mesh assemblies, certifying that rods were fabricated from material with same chemical and physical properties as material used to fabricate tool-resisting-steel round bars.

F. Examination reports documenting inspections of substrates, areas, and conditions.

G. Anchor-inspection reports documenting inspections of built-in and cast-in anchors.

H. Field quality-control reports documenting inspections of installed products.

1. Field quality-control certification signed by Contractor.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For doors in detention enclosures to include in maintenance manuals.

1.9 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
2. Tools: Provide two sets of tools for installing and removing security fasteners.

1.10 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.11 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with detention enclosures by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 BAR-GRILLE ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Jail Products, LLC.
2. DDS Group; Detention Products Division.
3. G-S Company.
4. Kenco Wire & Iron Products Inc.
5. Maximum Security Products Corp.
6. PSI LLC.
7. Sweeper Metal Fabricators Corp.
8. Commissioner approved equal.

B. Tool-Resisting-Steel Bar Grilles: ASTM A 627, Grade 2.

C. Tool-Resisting-Steel Bar Grilles: ASTM A 627, Grade 3.

D. Tool-Resisting-Steel Bar Grilles: ASTM A 627, Grade 4.

E. Mild-Steel Bar Grilles:

1. Vertical Bars: 7/8-inch-diameter, double-ribbed, round mild-steel bars at 4 inches o.c.
2. Horizontal Flat Bars: 3/8-by-2-1/4-inch mild-steel flat bars at 12 inches o.c.
3. Perimeter Framing: 3/8-by-2-1/4-inch mild-steel flat bars.

F. Materials:

1. Tool-Resisting-Steel Round and Flat Bars: ASTM A 627.
2. Mild-Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

G. Finishes:

1. Steel Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

2.3 FABRICATION, GENERAL

A. 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. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of detention enclosures with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Form and grind edges and corners to be free of sharp edges or rough areas.

E. Form metal in maximum lengths to minimize joints. Form sheet-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

F. Weld corners and seams continuously to comply with referenced AWS standard and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention enclosures rigidly in place and to support indicated loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

H. Cut, reinforce, drill, and tap detention enclosures as indicated to receive hardware, security fasteners, and similar items.

I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.

J. Form exposed connections with hairline joints flush and smooth using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security screws. Locate joints where least conspicuous.

K. Exterior Detention Enclosures: Allow for thermal movements from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.4 FABRICATION OF BAR-GRILLE ASSEMBLIES

A. Fabricate bar-grille assemblies with materials and to sizes and configurations indicated, complete with mounting flanges and anchors.

1. Pass vertical round bars through, and positively interlock them with, horizontal flat bars at each intersection without reducing circumference of round bars at these intersections and without using pipe sleeves, swedging, calking, or interlocks that depend on friction. Weld vertical round bars at each intersection with flat bars.
2. Pass ends of round bars at least 1 inch through framing, and weld bars to framing from back side of framing.
3. Fabricate cutouts and openings in bar-grille assemblies for penetrations of sizes and at locations indicated. Frame openings with flat bars of same material and size as horizontal flat bars.
4. Frame connections with plates; use flat bars of same material and size as horizontal flat bars.

2.5 SECURITY FASTENERS

A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific type of fastener. Drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Acument Global Technologies North America.
   b. Bryce Fastener.
   c. Tamperproof Screw Co., Inc.
   d. Tamper-Pruf Screws, Inc.
   e. Commissioner approved equal.
2. Drive-System Type: Pinned Torx-Plus.
3. Fastener Strength: 120,000 psi.
4. Socket Button Head Fasteners:
   a. Heat-treated alloy steel, ASTM F 835.
   b. Stainless steel, ASTM F 879, Group 1 CW.
5. Socket Flat Countersunk Head Fasteners:
   a. Heat-treated alloy steel, ASTM F 835.
   b. Stainless steel, ASTM F 879, Group 1 CW.
6. Socket Head Cap Fasteners:
   a. Heat-treated alloy steel, ASTM A 574.
   b. Stainless steel, ASTM F 837, Group 1 CW.
7. Protective Coatings for Heat-Treated Alloy Steel:
   a. Zinc and clear trivalent chromium where indicated.
   b. Zinc phosphate with oil, ASTM F 1137, Grade I, or black oxide unless otherwise indicated.

2.6 ACCESSORIES

A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

B. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified testing agency; of type indicated below.

1. Threaded or wedge type; 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; hot dip galvanized according to ASTM A 153/A 153M or ASTM F 2329.

C. Embedded Plate Anchors: Fabricated from mild-steel shapes and plates, minimum 3/16 inch thick; with minimum 1/2-inch-diameter, headed studs welded to back of plate.

D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

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 detention enclosures.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention enclosure connections before installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention enclosures.

D. Inspect built-in and cast-in anchor installations, before installing detention enclosures, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

E. Verify locations of detention enclosures with those indicated on Shop Drawings.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install detention enclosures plumb, rigid, properly aligned, and securely fastened in place, complying with manufacturer's written recommendations.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention enclosures to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.

C. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention enclosures. Set detention enclosures accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

D. Provide temporary bracing or anchors in formwork for items that are to be built into adjacent construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.3 INSTALLATION OF BAR-GRILLE ASSEMBLIES

A. Anchorage: Weld framing to continuous angles with continuous welds. Anchor angles to embedded anchors by welding.

B. Weld adjacent framing members to each other with continuous 1/4-inch-deep welds on both sides; grind smooth.

3.4 FIELD QUALITY CONTROL

A. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.

C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

D. Prepare field quality-control certification that states installed products comply with requirements in the Contract Documents.

3.5 CLEANING AND PROTECTION

A. Touchup Painting: Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

B. Touchup Painting: Cleaning and touchup painting of bolted connections and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas; repair galvanizing to comply with ASTM A 780.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
CENTER for TRAINING and INTELLIGENCE
TRAINING VILLAGE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

Spectorgroup

SG Project Number 16070A08

PROJECT MANUAL
ISSUED FOR BID

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SECTION 123216 - KITCHEN CASEWORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the prefabricated casework as shown on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Wood casework with plastic laminate finish.
2. Medium-density fiberboard (MDF) casework.
3. Hardware for casework.

1.3 DEFINITIONS

A. Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors.

B. Semi-Exposed Surfaces of Casework: Surfaces behind opaque doors or drawer fronts, including interior faces of doors and interiors and sides of drawers. Bottoms of wall cabinets are defined as "semi-exposed."

C. Concealed Surfaces of Casework: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets. Tops of wall cabinets and utility cabinets are defined as "concealed."

1.4 SUBMITTALS

A. Product Data: For the following:

1. Cabinets.
2. Cabinet hardware.

B. Shop Drawings for Cabinets: Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, cut-outs for plumbing fixtures, and methods of joining countertops.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material exposed to view.

D. Samples for Verification: As follows:

1. Two full size finished base cabinet complete with hardware, doors, and drawers, but without countertop.
2. Two full size finished wall cabinet complete with hardware, doors, and adjustable shelves.
3. Other samples of prefabricated casework as required by the Architect.

E. Product Certificates: Signed by manufacturers of casework certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

A. Source Limitations for Specified Casework: Obtain casework through one source form a single manufacturer.

B. Product Designations: Drawings indicate size, configurations, and finish material of casework by referencing designated manufacturer's catalog numbers.

C. Quality Standards: Unless otherwise indicated, comply with the following standards:

1. Cabinets: ANSI A161.1.
   a. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semi-exposed location of each unit and showing compliance with the above standard.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.

C. Field Measurements for Countertops: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 COORDINATION

A. Coordinate layout and installation of blocking and reinforcements in partitions for support of cabinets.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Provide plastic laminate-faced casework as scheduled and detailed on drawings.

2.2 BASIC REQUIREMENTS

A. Wood Moisture Content: Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for wood casework at time of installation do not exceed seven (7) percent for hardwood lumber and ten (10) percent for softwood lumber.

B. Measurements: Before proceeding with wood casework required to be fitted to other construction, obtain field measurements, and verify all dimensions of shop drawing details as required for accurate fit.

C. Fabricate wood casework to dimensions, profiles and details shown

2.3 GENERAL MATERIALS

A. Plywood: AWI Section 200; veneer core, particle or plywood core unless otherwise specified, and with the following requirements

1. Hardwood: Premium Grade, Section 200, face veneers as shown or specified
2. Edges: Banded with hardwood in accordance with Premium Grade Standards

B. MDF: ANSI A208.2, Grade MD

2.4 PLASTIC LAMINATE

A. Face Sheets: NEMA Publication LD3, Grade GP50, Type I, 0.05" thick, as manufactured by Formica, Nevamar, Wilson-Art. Color, pattern and finish as selected by the Architect

B. Backing Sheets: Non-decorative, high-pressure plastic laminate, NEMA LD3, Grade BK20, 0.02" thick

C. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified

2.5 METAL

A. Steel

1. Structural Steel Shapes and Plates: ASTM A 36
2. Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only. Galvanize sheets for planters
3. Primer for Unexposed Metal: Zinc chromate primer

2.6 MISCELLANEOUS PRODUCTS

A. Fasteners

1. Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
2. Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.
3. Anchors: Type, size, material and finish as required for the condition of use.
4. Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.

B. Adhesives (all shall be compliant with Green Communities VOC requirements)

1. For Laminating Plastic Laminate Surfaces: Melamine, phenol-resin, or resorcinol-resin complying with FS MMM-A-181; type, grade and best suited for the purpose.
2. For All Other Uses: Moisture resistant complying with FS MMM-A125, Type II, or MMM-A-188, Type I II or III.

2.7 CABINETS WITH PLASTIC LAMINATE FINISH

A. General

1. Face construction of cabinets shall be "Flush Overlay."

2. Provide 3/4" thick doors, drawer fronts and fixed panels (including thickness of plastic) except where required to be thicker by Standards; and provide flush units.
3. Provide dust panels of 1/4" thick plywood or tempered hardboard above compartments and drawers, except where located directly below counter tops.
4. Exposed Edges: Plastic laminate matching exposed panel surfaces. Ease exposed edge of overlap sheet.

B. Plastic Laminate

1. Plastic Laminate for Horizontal Surfaces: 0.050" thick, general-purpose type (high pressure).
2. Plastic Laminate for External Vertical Surfaces: 0.028" thick, general-purpose type (high pressure).
3. Plastic Laminate for Post Forming: 0.042" thick, post forming (high pressure).
4. Plastic Laminate for Cabinet Linings: 0.020" thick, cabinet liner (high pressure).
5. Plastic Laminate for Concealed Panel Backing: 0.020" thick, backer type (high pressure).
6. Plastic Laminate Colors and Patterns: As selected by the Architect from manufacturer's standard satin finish products.

C. Shop Assembly: All work shall be shop assembled. Work that is too large for entrance into the use area shall be fabricated in attachable sections with provisions for reconnection in the using space.

D. Material Thicknesses: See drawings for general materials thicknesses. Minimum thickness of solid lumber for web frames, trim, bases, etc., shall be 3/4". Minimum thickness of plywood and particleboard shall be 3/4".

E. Sizes: See drawings for woodwork sizes required. The manufacturer shall check field dimensions and verify all openings and actual field conditions prior to fabrication of work.

F. Manufacturer is responsible for rigidity and structural stability.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinet abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.

B. Install cabinets without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.

C. Install cabinets level and plumb to a tolerance of 1/8" in 8'-0".

D. Fasten cabinets to adjacent units and to backing.

1. Fasten wall cabinets through back, near top and bottom, at ends, and not less than 24" o.c. with No. 10 wafer head screws sized for 1" penetration into wood framing, blocking, or hanging strips.

E. Coordinate cabinets with installation of countertops.

3.2 ADJUSTING AND CLEANING

A. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

B. Clean cabinets on exposed and semi-exposed surfaces. Touch-up factory applied finishes to restore damaged or soiled areas.

END OF SECTION

NASSAU COUNTY POLICE DEPARTMENT
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