Hufft

PROJECT MANUAL_

Andy's Frozen Custard
Lee’s Summit 204

700 NW Ward Road,
Lee’s Summit, MO 64086

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Project Information & Contacts

PROJECT		ISSUE
Andy's Frozen Custard – Lee's Summit #204		May 3, 2024
700 NW Ward Road, Lee's Summit, MO 64086		Construction Documents

ARCHITECT

Hufft Projects LLC
3612 Karnes Blvd.
Kansas City, MO 64111

(816) 381-2726
Contact: Wesley Yngsdal
Email: wyngsdal@hufft.com

ARCHITECT OF RECORD
Jeffery Kloch

OWNER

Andy's Frozen Custard

211 E. Water Street
Springfield, MO, 65806

(417) 881-3500
Contact: Josh Braun
Email: josh.braun@eatandys.com

CIVIL ENGINEER

Phelps Engineering, Inc
1270 N Winchester,
Olathe, Kansas 66061

(913) 538-5821

Contact: Dan Finn
Email: dfinn@phelpsengineering.com

ENGINEER OF RECORD

Dan Finn

STRUCTURAL ENGINEER

Mettemeyer Structural
2101 W. Chesterfield Blvd. B105
Springfield, MO 65807

(417) 890-8002

Contact: Joshua Thorpe
Email:

ENGINEER OF RECORD

Alan Mettemeyer

MECHANICAL / ELECTRICAL PLUMBING (MEP) ENGINEERS
Malone Finkle Eckhardt & Collins, Inc.
3333 East Battlefield Road, Suite 1000
Springfield, MO 65804

(417) 881.0020

Contact: Tyler Enserro
Email: Tyler.Enserro@rtmec.com

ENGINEER OF RECORD

Cameron Collins

Division 00 - Procurement & Contracting Requirements

SECTION 00 11 16 – INVITATION TO BID

HUFFT PROJECTS, LLC
3612 Karnes Blvd
Kansas City, MO 64111
(816) 531-0200

Andy's Frozen Custard #204
700 NW Ward Road, Lee's Summit, MO 64086
Architect's Project Number #736

You are invited to bid on a General Contract for Andy's Frozen Custard located at 165 John Jones Dr, Burleson, TX 76028 for Andy's Frozen Custard Stores, LLC, hereinafter termed as Owner. The bids shall be on a lump sum basis and bid at 120 days.

Release Date: **TBD**

Pre-Bid Meeting: **TBD:**
A 30-minute Pre-Bid meeting will be held with Bidders via Zoom on TBD.
between 11:30am - 12:00am. Please contact Josh Braun at josh.braun@eatandys.com or 417-881-3500 for an invitation to the meeting.

RFI Deadline: **TBD, 2024 @ 5:00pm**

Bid Proposal Deadline: **TBD, 2024 @ 5:00pm**
Bids must be emailed to Josh Braun in digital pdf format.

Late bids will not be considered.

Points of Contact

Wesley Yngsdal	Josh Braun
Hufft - Architect	Andy's Frozen Custard Stores, LLC - Owner
wyngsdal@hufft.com	josh.braun@eatandys.com
816.381.2736	417-881-3500

Documents as follows:

- Section 00 11 16 Invitation to Bid
- Section 00 70 00 General Conditions of the Contractor for Construction
- Construction Documents, dated …
- Project Manual, dated …
- Andy's Frozen Custard Bidding Form

Plans and forms may be accessed online and downloaded HERE.

Notice to Bidders:
Bidders are responsible for reviewing all documents posted to the Plan Room prior to submittal.

The Owner reserves the right to reject any and all bids, and to waive any formalities. This invitation does not commit the Owner to pay any cost incurred in the preparation of bids. Bidders shall conform to the requirements of the Missouri licensing laws and regulations for contractors and shall be licensed before their bid is submitted.

END OF SECTION 00 11 16

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

1. BIDDING DOCUMENTS. Bidders may obtain complete digital sets of Contract Documents from the General Contractor. Complete sets of Contract Documents must be used in preparing bids; neither Owner nor Design Professional assume responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents. Obtaining Contract documents through any source other than the General Contractor or Design Professional is not advisable due to the risks of receiving incomplete or inaccurate information, and the bidder runs the risk of basing bidder's proposal on such information. The documents obtained through the General Contractor or Design Professional or their representative(s) are considered the official version and take precedence if any discrepancies occur. The fact that documents used for bidding purposes are named "contract documents "does not diminish in any way the right of the Owner to reject any and all bids and to waive any formality.
2. EXAMINATION OF DRAWINGS, SPECIFICATIONS AND SITE OF WORK. Bidder shall examine the Contract Documents and visit the project site of work. Bidder shall become familiar with all existing conditions and limitations under which the Work is to be performed and shall base bid on items necessary to perform the Work as set forth in the Contract Documents. No allowance will be made to Bidder because of lack of such examination or knowledge. The submission of a Bid shall be construed as conclusive evidence that the Bidder has made such examination.
3. INTERPRETATION OF CONTRACT DOCUMENTS DURING BIDDING.
   3.1 All references to the Owner shall be interpreted to mean Andy's Frozen Custard Stores, LLC.
   3.2 RFI Deadline: If any person contemplating submitting a Bid is in doubt as to the true meaning of any part of the Contract Documents or finds discrepancies in or omissions from any part of the Contract Documents, he may submit to the Design Professional a written request for an interpretation or correction thereof not later than 7 work days prior to Bid Deadline. All requests for information or clarifications or questions MUST be made through the Architect.
   3.3 Address all communications regarding the Contract Documents through the General Contractor to the Design Professional: Wesley Yngsdal, Hufft Projects LLC, 3612 Karnes Blvd., Kansas City, MO (816) 381-2736, wyngsdal@hufft.com. If the question does not involve the Design Professional, they will forward to the Owner for a response.
   3.4 Interpretation or correction of the Contract Documents will be made only by Addendum and will be emailed, faxed or delivered to each Bidder of record by the Design Professional. The Owner will not be responsible for oral explanations or interpretation of the Contract Documents.
   3.5 Addenda issued during the bidding period will be incorporated into the Contract Documents. The final date of Addenda issuance will be no later than 5 days prior to Bid Deadline.
   3.6 Bid Deadline will be established by the Construction Manager / GC. Exact dates will be confirmed by GC.
4. SUBSTITUTIONS.
   4.1 Materials, products, and equipment described in the Contract Documents establish a standard of required function and a minimum desired quality or performance level, or other minimum dimensions and capacities, to be met by any proposed substitution. Acceptability of substitutions will not be considered during bidding period.
   4.2 In some cases, prior approval of material or equipment, or both shall be obtained from Owner in order to obtain the desired color, size, visual appearance, and other features specified.
5. TYPE OF BID.
   5.1 The Work under this Contract will be awarded under a stipulated sum. No segregated bids or assignments will be considered. Bids are to include all labor, materials, equipment, sales tax, social security tax, bonds, Builder's Risk Insurance, General Liabilty Insurance, State Unemployment Insurance and all other like items necessary to complete this project.
   5.2 Unit Prices: Any estimate of quantities expressed in the Contract Documents is approximate only and shall be the basis for receiving unit price bids for each item but shall not be considered by the Bidder as the actual quantities that may be required for the completion of the proposed work. Bidder shall state a unit price for every item of work named in the Proposal. Bidder shall include, in the unit prices, furnishing of labor, materials, tools, equipment, and apparatus of every description to construct, erect, and finish the Work. The unit price bid for the items shall be shown numerically and in the appropriate spaces provided on the Bid Form. Such figures shall be clear and distinctly legible so that no question can arise as to their intent or meaning. Unit price bids and totals shown in the Bid Form shall not include costs of engineering, advertising, printing and appraising.
6. PREPARATION OF BID. Where Bidder is a corporation, bids shall be signed with the legal name of the corporation followed by the name of the state of incorporation, contractor's license number issued by the Contractors Licensing Board, and the signature of an authorized officer of the corporation.
   6.1 Bids submitted by a "Joint Venture/Joint Adventure" shall be signed by representatives of each component part of the Joint Venture. The licenses of each component part of the Joint Venture shall also be listed in the bid submittal. Therefore, joint venture bidders shall indicate at least two (2) signatures and two (2) license numbers. Exception: Joint Ventures who have been properly licensed with the Kansas City Contractors Licensing as a "Joint Venture" need only to indicate the joint venture license number on the Bid Form. Joint Venture bidders shall indicate at least two (2) signatures on the Bid Form even if they are licensed as a joint venture.
7. INTENTIALLY OMITTED
8. INTENTIALLY OMITTED
9. PROPRIETARY INFORMATION. All bid information, proposals, forms, briefs, sales brochures, etc. will become property of the Owner when submitted with a bid. All bid documents submitted by the bidder shall be available for public inspection after the bid opening. Proprietary pages and documents required to be submitted with bid must be clearly marked as such.
10. MODIFICATION AND WITHDRAWAL. Bidder may withdraw bid at any time before bid opening and may resubmit up to the date and time designated for receipt of bids. No bid may be withdrawn or modified after time has been called for the bid opening. Oral modifications to bids will not be considered. Bidder may submit written modifications to bid in writing, by email at any time prior to the expiration of the bidding time and date and shall so word the modification(s) as to not reveal the amount of the original bid.

11. DISQUALIFICATION OF BIDDERS. The Owner shall have the right to disqualify bids (before or after opening), which includes but is not limited to, evidence of collusion with intent to defraud or other illegal practices upon the part of the Bidder, to reject a bid not accompanied by the required bid security or by other data required by the Contract Documents, or to reject a Bid which is in any way incomplete or irregular.
12. APPLICABLE LAWS.
    12.1 Labor. Contractors employed upon the work will be required to conform to the labor laws of the State of Missouri and the various acts amendatory and supplementary thereto, and to all the laws, regulations, and legal requirements applicable thereto.
    12.2 Discrimination. Bidder shall not discriminate against any employee, applicant for employment, or subcontractor as provided by law. Bidder shall be responsible for ensuring that all subcontractors comply with federal and state laws and regulations related to discrimination. Upon a final determination by a court or administrative body having proper jurisdiction that the Bidder has violated state or federal laws or regulations, the Owner may impose a range for appropriate remedies up to and including termination of the Contract. Taxes. Bidder shall include in the bid all state sales tax, social security taxes, state unemployment insurance, and all other items of like nature. It is the intent that the bid shall represent the total cost to the Owner of all work included in the contract. There are no provisions for a contractor to avoid taxes by using the tax exempt number of a state agency, board, commission or institutions. Said taxes shall be included in the bid price.
    12.3 State and Local licensing laws for Contractors shall apply to this project. All bidders must be properly licensed as required by State and/or Local regulation.
    12.4 Minority Participation: The Owner, City of Kansas City, Missouri and the State of Missouri encourage all small, minority, and women business enterprises to submit bids for capital improvements. Encouragement is also made to all general contractors that in the event they subcontract portions of their work, consideration is given to the identified groups.
13. EVALUATION and CONSIDERATION OF BIDS, It is the intent of the Owner to award a Contract to the lowest responsive qualified bidder provided the bid has been submitted in accordance with the requirements of the Contract Documents and does not exceed the funds appropriated for the project. The Owner shall have the right to waive any formalities in a bid received and to accept the bid which, in the Owner's judgment, is in its best interests. The Owner shall have the right to accept any or all bids for a period not to exceed 30 days.
    13.1 Tie Bids. If two or more sealed bids are equal in amount, meet Bidding Document requirements, and are the lowest received by the time of the bid opening, then the apparent low bidder will be determined by lot (placing the name of the tie bidders into a container and drawing one name). The drawing will be conducted by the Owner, and another person so designated by the Owner in the presence of a witness and the tie bidders or representatives. Nothing in the above and foregoing will diminish the Owner's reserved right to reject any and all bids and to waive any formalities.
14. EXECUTION OF CONTRACT.
    14.1 The apparent low Bidder shall be prepared, if so required by the Owner, to present evidence of experience, qualifications, and financial ability to carry out the terms of the Contract. Attention is called to the fact that the bidder in signing the proposal, represents that he has the financial ability and experience to carry out the work throughout its several stages within the time for completion set forth on the Bid Form.
    14.2 The successful Bidder will be required to execute an Agreement with the General Contractor and submit the Performance and Payment Bond and Certification of Insurance within ten days after receipt of the Intent to Award. Failure of the Bidder to do so may result in the Bidder being rejected and could result in disqualification and forfeiture of any bid bond.
    14.3 The successful Bidder will be required to furnish Owner with proof of insurance, as prescribed by the General Conditions and Supplementary General Conditions.

END OF DOCUMENT

END OF SECTION 00 21 13

SECTION 00 31 32 – GEOTECHNICAL DATA

GEOTECHNICAL REPORT: The Owner has retained a "Soils Engineer" to prepare a Geotechnical Report for the work of this Project. The Geotechnical Report is available for review by the Contractor.
LIMITATIONS OF GEOTECHNICAL REPORT & TEST BORING LOG: Data contained in the Geotechnical Report, which includes a test boring log, IS NOT INTENDED as a representation or warranty of accuracy or continuity. Neither the Owner nor the Architect will be responsible for any interpretations or conclusions drawn there from by the Contractor.
AVAILABILITY OF REPORT: The Geotechnical Report is made available solely for the convenience and use by the Contractor.
ADDITIONAL BORINGS or other exploratory operations may be made by the Contractor at no cost to the Owner.

END OF SECTION 00 31 32

SECTION 00 41 00 – BID FORM

ANDY'S FROZEN CUSTARD Stores, LLC

BID FORM

THIS BID PROPOSAL, made this day of , 202 by

_____

_____

_____

_____

hereinafter referred to as the "Contractor,"

to:
Andy's Frozen Custard Stores, LLC
211 E. Water Street
Springfield, MO 65806

hereinafter referred to as the "Owner," for the project known as:

In consideration of being awarded a contract to construct the Project described herein, the Contractor agrees to perform as follows:

Scope of Work: Contractor shall furnish and deliver all of the material and perform all of the Work in the manner and form as provided by the following enumerated plans, specifications, and documents which are incorporated herein by reference as if fully contained herein: Invitation to Bidders, Andy's Frozen Custard Stores, LLC Contract for Construction, Andy's Frozen Custard Stores, LLC General Conditions, this Proposal, and the following described Drawings and Specifications:

Specifications contained in the Project Manual or Specification Manual for the above-referenced project and/or listed on drawings as noted:

SHEET NUMBER & TITLE	DATED	ARCHITECT

The Contractor has received and acknowledges the following addenda, which is herein contained in the Bid Proposal:

Addendum 01

The Contractor affirmatively represents:

They have visited the site, has familiarized himself with the local conditions under which the Work is to be performed and has correlated his observations with the requirements of the Contract Documents;

They are satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, performance, and furnishing of the Work;

They do not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the times, price, and other terms and conditions of the Contract Documents;

They are aware of the general nature of work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents; and

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

The Contractor shall commence the work to be performed as described in Article 1 hereof on the date to be specified in a written Notice to Proceed (which may be a facsimile) and shall fully complete all Work hereunder within

( )

calendar days from said date (time being of the essence). In the event that the progress of the Work is not maintained on schedule by the Contractor in accordance with the Schedule of Work or in the event that the Work is not completed within the time above specified, the Owner may take the actions and enforce the rights granted to it by Articles 8.3 and 14 of the Andy's Frozen Custard Stores, LLC General Conditions.

The Contractor shall faithfully perform as stated in this Proposal, subject to additions or deductions as provided herein for a total price of

(_____)
dollars ($_____). Contractor represents and acknowledges that this sum includes all applicable federal, state, municipal, and other taxes which may be applicable to the Work.

Unit Prices: Any additions or deletions from the Contract Price shall be calculated on the cost of the Work plus appropriate percentages as outlined in Article 4.5 if the Contract for Construction; such sums shall not exceed that following guaranteed maximum prices, and shall be good for the duration of the project:

Trade	Level	Unit Price
Carpenters	Journeyman	$
	Laborer	$
	Apprentice	$
Painters	Journeyman	$
	Laborer	$
	Apprentice	$
Plumbers	Journeyman	$
	Laborer	$
	Apprentice	$
HVAC Mechanics	Journeyman	$
	Laborer	$
	Apprentice	$
Electricians	Journeyman	$
	Laborer	$
	Apprentice	$

Bid Breakdown: For the Owner's use in comparative analysis, the following prices are comprehensive and all inclusive:

NOTE: THE QUANTITY AND UNIT COLUMNS ARE FOR THE OWNER'S USE IN COMPARATIVE ANALYSIS ONLY. QUANTITIES AND UNITS LISTED BELOW BY CONTRACTOR SHALL IN NO WAY RELIEVE THE CONTRACTOR OF ITS OBLIGATION TO COMPLETE THE WORK IN ITS ENTIRETY AS DESCRIBED IN THE PLANS AND SPECIFICATIONS.

Category 1: Site Work

Earth Work	Quantity	Unit	Unit Cost	Total	Notes
Site Surveying		LOT			
Environmental Work		LOT			
Clear and Grub		LOT			
Excavation (on site)		C.Y.			
Fill (on site)		C.Y.			
Import Fill		C.Y.			
Export Fill		C.Y.			
Excavate Rock; Dispose Off Site		C.Y.			
Rough Grading		S.Y.			
Finish Grading		S.Y.			
Trash Enclosure		S.F.			
Fencing and Screening		L.F.			
Other (specify)					
			Subtotal:		

Site Concrete Work	Quantity	Unit	Unit Cost	Total	Notes
Concrete Sidewalk		S.Y.			
Concrete Curb & Gutter		L.F.			
Concrete Aprons/Pads		S.Y.			
Misc. Formed Concrete		LOT			
Patio		S.Y.			
Other (specify)					
			Subtotal:		

Base and Paving	Quantity	Unit	Unit Cost	Total	Notes
Compacted Sub Base		S.Y.			
Base Coarse		S.Y.			
A.C. Binder Course		S.Y.			
A.C. Surface Course		S.Y.			
Remove Existing Asphalt, Base, & Sub-Base; Dispose of Off Site					
Lot Striping					
Other (specify)					
			Subtotal:		

Site Plumbing	Quantity	Unit	Unit Cost	Total	Notes

Storm Curb Inlet		EA.			
Storm Ditch Bottom Inlet		EA.			
Concrete Aprons/Pads		S.Y.			
Water Service		L.F.			
Fire Hydrants / Standpipe		L.F.			
Fire Sprinkler Line		L.F.			
Sewer Piping		L.F.			
Sewer Connection		LOT			
Grease Trap		EA.			
Septic System		LOT			
Gas Service		L.F.			
Other (specify)					
			Subtotal:		

Site Electrical	Quantity	Unit	Unit Cost	Total	Notes
General Wiring		LOT			
Light Poles		EA.			
Light Fixtures		EA.			
Lighting Foundation		EA.			
Site Signage		LOT			
Electrical Service: Transformer		L.F.			
Primary Wiring		L.F.			
Secondary Wiring		L.F.			
Other (specify)					
			Subtotal:		

Site Improvements	Quantity	Unit	Unit Cost	Total	Notes
Landscaping		LOT			
Irrigation		LOT			
Other (specify)					
			Subtotal:		

Off Site Improvements	Quantity	Unit	Unit Cost	Total	Notes
Sanitary Sewer Extension		L.F.			
Storm Sewer Extension		L.F.			
Electric Service Extension		L.F.			
Gas Extension		L.F.			
Concrete Walks		L.F.			
Paving-DOT Improvements		S.F.			
Side/Rear Roads		L.S.			
Street Curb Work		L.F.			
Other (specify)					
			Subtotal:		

Total Category 1	

Category 2: Building Construction

Division 1: General Requirements	Quantity	Unit	Unit Cost	Total	Notes
Overhead & Profit		LOT			
Supervision		WK.			
Temporary Utilities		LOT			
Dumpster		EA.			
Final Cleaning		LOT			
Storage Trailer		LOT			
Performance Bond		LOT			
Barricade		L.F.			
Other (specify)					
			Total Division 1:		

Division 2: Demolition	Quantity	Unit	Unit Cost	Total	Notes
General Demolition		LOT			
Electrical Demolition		LOT			
Plumbing Demolition		LOT			
HVAC Demolition		LOT			
Barricade Removal		LOT			
Other (specify)					
			Total Division 2:		

Division 3: Concrete	Quantity	Unit	Unit Cost	Total	Notes
Saw Cutting and Patching		L.F.			
Floor Slab (incl. fill, prep, and grading)		LOT			
Form Work		LOT			
Core Drilling		LOT			
Footings/Foundation		LOT			
Other (specify)					
			Total Division 3:		

Division 4: Masonry	Quantity	Unit	Unit Cost	Total	Notes
Block / Brickwork		LOT			
E.I.F.S. / Stucco		LOT			
Misc. Lintels		LOT			
Demolition		LOT			
Other (specify)					
			Total Division 4:		

Division 5: Metals	Quantity	Unit	Unit Cost	Total	Notes
Structural Steel		LOT			
Architectural Steel		LOT			
Engineering Fee		LOT			
Other (specify)					
			Total Division 5:		

Division 6: Carpentry	Quantity	Unit	Unit Cost	Total	Notes
Wall Framing		LOT			
Soffit Framing		LOT			

Plywood		LOT			
Rough Carpentry		LOT			
Finish Carpentry		LOT			
Mechanical Chases / Shaftwall		LOT			
Other (specify)					
			Total Division 6:		

Division 7: Therm. & Moist. Prot.	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Roofing		LOT			
Waterproofing		LOT			
Gutters and Downspouts		LOT			
Insulation		LOT			
Other (specify)					
			Total Division 7:		

Division 8: Doors & Windows	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Storefront Metal/Glass		LOT			
Vestibule Metal/Glass		LOT			
Hollow Metal Doors		EA.			
Hollow Metal Frames		EA.			
Wood Doors		EA.			
Panic / Handicap Access Hardware		LOT			
Door Hardware		EA.			
Specialty Doors		EA.			
Specialty Glass		LOT			
Roll Down Grille		EA.			
Miscellaneous		LOT			
Other (specify)					
			Total Division 8:		

Division 9: Finishes	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Drywall		S.F.			
Rigid Vinyl Panels		S.F.			
Floor Prep		L.S.			
Ceramic Floor Tile Labor		HRS.			
Ceramic Floor Tile Materials		S.F.			
Quarry Floor Tile Labor		HRS.			
Quarry Floor Tile Materials		S.F.			
Wall Tile Labor		HRS.			
Wall Tile Materials		S.F.			
Carpet Labor		HRS.			
Carpet Materials		S.F.			
Vinyl Base		L.F.			
Interior Painting		L.S.			
Exterior Painting		L.S.			
Vinyl Wallcovering Labor		HRS.			
Vinyl Wallcovering Materials		L.S.			

Acoustical Ceiling & Grid		S.F.			
Vinyl Tile Ceiling & Grid		S.F.			
Wood Flooring and Finish		S.F.			
Stainless Steel Cornerguards		LOT			
Stainless Steel Enclosures		LOT			
Other (specify)					
			Total Division 9:		

Division 10: Specialties	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Toilet Partitions		LOT			
Toilet Accessories		LOT			
Miscellaneous		LOT			
Other (specify)					
			Total Division 10:		

Division 11: Install Owner Items	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Millwork		HRS.			
Steel Accessories		HRS.			
Artwork / Graphics		HRS.			
Furniture		HRS.			
Post-Turnover Carpentry		HRS.			
Other (specify)					
			Total Division 11:		

Division 15a: Plumbing	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Restroom Fixtures		LOT			
Water Piping		LOT			
Piping Insulation.		LOT			
Underground Waste Piping		LOT			
Above-Ground Waste Piping & Vents		LOT			
Grease Trap		LOT			
Water Heater		LOT			
Soda Chase		LOT			
Mop Sink		LOT			
Gas Piping		LOT			
Water Meter, RPZ, Backflow Devices		LOT			
Other (specify)					
			Total Division 15a:		

Division 15b: Wet Sprinkler System	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
Main		LOT			
Drops		EA.			
Dry Heads		EA.			
Flow Devices		EA.			

Other (specify)					
			Total Division 15b:		

Division 15c: HVAC	Quantity	Unit	Unit Cost	Total	Notes
HVAC Units		LOT			
Make-up Air Unit (if separate)		LOT			
Toilet Exhaust Fans		LOT			
Ductwork		LOT			
Welded Ductwork		LOT			
Make-up Air Ductwork		LOT			
Duct Insulation		LOT			
Combustion Air Ductwork		LOT			
Diffuser Drops		LOT			
Oven Hood Installation		LOT			
Oven Vents & Flue		LOT			
Water Heater Flue		LOT			
Other Hood Installations		LOT			
Fire Suppression System		LOT			
Controls and Control Wiring		LOT			
Test and Balance		LOT			
Other (specify)					
			Total Division 15c:		

Division 15d: Refrigeration	Quantity	Unit	Unit Cost	Total	Notes
Cooler/Freezer Installation		HRS.			
Refrigeration		LOT			
Other (specify)					
			Total Division 15d:		

Division 16: Electrical	Quantity	Unit	Unit Cost	Total	Notes
Electric Service to Space		LOT			
Service Equipment:: Switch Gear		LOT			
Service Equipment:: Panels		LOT			
Service Equipment:: Meter / CT		LOT			
Transformer		LOT			

Light Fixtures (Front of House)		LOT			
Light Fixtures (Back of House)		LOT			
Electrical Distribution		LOT			
Electrical Trim		LOT			
POS Wiring		LOT			
Temporary Power & Lighting		LOT			
Fire Alarm System		LOT			
Other (specify)					
			Total Division 16:		

Total Category 2	

Category 1 & 2 Total	

ALTERNATES

Number	Description	Cost
1		
2		
3		
4		
5		

Final Bid	

Days to Complete	

Key to Abbreviations

EA. = Each

LOT = LOT

C.Y.= Cubic Yard

L.F. = Linear Foot

S.F. = Square Foot

S.Y. = Square Yard

WK. = Week

HRS. = Hours

The Contractor shall perform the work described in the following Divisions with its own forces

Contractor shall accept progress payments in accordance with Articles 4, 5, and 6 of Andy's Frozen Custard, LLC. Contract for Construction and Article 9 of Andy's Frozen Custard Stores, Inc. General Conditions.

If this Proposal, including prices, is accepted, the Contractor agrees to enter into a Contract, the form of which shall be the same as that furnished with the Instructions to Bidders.

If this proposal is accepted, the Contractor agrees to supply Certificates of Workmen's Compensation and Liability Insurance at the time the Construction Contract is signed in accordance with the terms of Article 11 in the General Conditions.

This Proposal will remain in effect and will not be withdrawn by the Contractor for a period of sixty (60) days from the scheduled closing time of the receipt of bids.

Contractor does ( ) / does not ( ) qualify as a minority contractor under Federal Law.

Contractor has ( ) / has not ( ) changed bonding company within the last twelve months.

IN WITNESS WHEREOF, the Contractor has executed this Proposal on the day and year first above written.

WITNESS:

_____

CONTRACTOR (Trade or Corporate Name):

_____

By:

_____

Its:

_____

Attest::

_____

Its:

_____

(Corporate Secretary or Assistant Secretary)

SECTION 00 72 00 – GENERAL CONDITIONS OF THE CONTRACTOR FOR CONSTRUCTION

ARTICLE 1 - OWNER

1.1 Definitions

1 1.1 **The Owner** is Andy's Frozen Custard Stores, LLC. The term "Owner" means Andy's Frozen Custard Stores, LLC's authorized representative.

1.1.2 **The Work** means the construction and services required by the Contract documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations.

1.1.3 **The Project** is the total construction of which the Work performed under the contract, Documents may be the whole or a part and which may include construction by separate contractors.

1.1.4 **The Drawings** are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.5 **The Specifications** are that portion of the contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.2 Information and Services Required of Owner

1.2.1 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

1.2.2 Owner shall provide access to the job site to the Contractor and its work force when Owner owns or otherwise controls the job site. The Contractor, and any subcontractors and any other person performing the Work or furnishing materials to land or areas owned or controlled by Owners shall use only those rights-of-way for access and egress as are designated by Owner. Any other land or areas of materials shall be provided by the Contractor and shall not be the responsibility of the Owner.

1.3 Administration of the Contract

1.3.1 Owner will provide general administration of the Contract, including performance of the functions hereinafter described.

1.3.2 Owner will prepare Addenda or Change Orders in accordance with Article 12, and Owner will have authority to order minor changes in the Work as provided in Subparagraph 12.3.

1.3.3 Owner shall have the right to audit Contractor's records on any project where there is one (1) or more unbonded liens or other legal actions instituted against Owner, or when the reputed value of unbonded legal actions exceeds the sum of $15,000.00.

1.4 Temporary Suspension of Work

1.4.1 Owner shall have the authority to suspend the work, wholly or in part, for such periods as may be deemed necessary for such time as may be deemed necessary due to the failure on the part of the Contractor to perform any provisions of the Contract. Any such suspension ordered shall be given in writing by Owner to the Contractor. The Contractor

shall immediately obey such orders of Owner and shall not resume the Work until ordered in writing by Owner. A temporary suspension of Work shall not be the basis of a claim for any increases in any-reimbursable costs on the Contract Sum.

1.5 Owner's Right to Carry out the Work

1.5.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provisions of the Contract, Owner may, after forty-eight (48) hours written notice (except in the case of emergency), to the Contractor and without prejudice to any other remedy it may have, make good such deficiencies. In such case, an appropriate Change Order shall be issued deducting from any fees, payments and/or reimbursements then or thereafter due the Contractor, the cost of correcting such deficiencies, including the cost of the Architect and additional services made necessary by such default, neglect or failure to perform. If such payment and reimbursements then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall, on demand, pay the difference to Owner

1.6 Inspections and Rejection of Non-conforming Work

1.6.1 Owner and the Architect may conduct periodic inspections of the Work. No inspection by Owner or the Architect shall relieve the Contractor from its obligations to carry on the work in accordance with the Contract Documents, nor shall Owner or the Architect by subjected to liability for failure to call any matters disclosed by such inspections to the attention of the Contractor.

1.6.2 Owner will have authority to reject Work, which does not conform to the Contract Documents.

1.7 Access to the Work

1.7.1 Owner and the Architect, and their respective authorized representatives, shall have access to the Work at all times wherever it is in preparation and progress. The contractor shall provide the necessary facilities for such access.

ARTICLE 2 - ARCHITECT

2.1 Definition

2.1.1 **The Architect** is the person or organization identified as such in the Contract for Construction, and is referred to throughout the Contract Documents as if singular in number and neuter in gender. The term Architect means the Architect or its authorized representative.

2.1.2 Nothing contained in the Contract Documents shall create any contractual relationship between the Architect and the Contractor.

2.2 General

2.2.1 The Architect may make periodic visits to the Job Site to familiarize itself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. No visit, inspection or other action by the Architect shall relieve the Contractor from its obligations to carry out the Work in accordance with the Contract Documents. The Architect is not obligated to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the

Work, and it will not be responsible for failure of the Contractor, any subcontractor, any of their agents or employees, or any other person performing any of the Work, to carry out the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT DOCUMENTS

3.1 Definitions

3.1.1 **The Contract Documents** as defined in Article 1.2 of the contract for Construction form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, including the bidding documents. The Contractor warrants and represents that in undertaking to do the Work required hereunder and executing the Agreement, it has not relied upon any oral inducement or representation as to the nature of the Work, job conditions or otherwise, by Owner, or any of their officers or agents. The Contract may be amended or modified only by a Change Order as defined in Subparagraph 3.1.2.

3.1.2 **Change Order** is a written amendment to the Contract signed by the parties hereto and becomes part of the Contract Documents.

3 1.3 **The Job Site** shall mean the area in which the Work is to be performed and such other areas as may be designated by Owner or Landlord for access thereto and for the storage of the Contractor's materials and equipment

3.2 Execution, Intent and Interpretations

3.2.2 Written interpretations necessary for the proper execution or progress of the Work, in the form of Drawings, or otherwise, shall be obtained from the Owner. Such interpretations shall be consistent with and reasonably infer able from the Contract Documents.

3.2.3 Drawings show conditions as they are believed to exist, but they are not intended or inferred that the conditions as shown thereon constitute a representation by or on behalf of Owner that such conditions actually exist, nor shall Owner, the Architect, or any authorized representative of any of the foregoing be liable for any loss sustained by the Contractor as a result of any variance between the conditions revealed during the progress of the Work or otherwise, nor shall the costs of the Work for which the Contractor is entitled to reimbursement under the Agreement be increased or decreased by reason of any such variance except as otherwise provided herein.

3.2.4 Execution of the Contract by the Contractor is representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

3.3 Ownership of the Contract Documents

3.3.1 All Drawings, Specifications, and other Contract Documents, and copies thereof, furnished by Owner or the Architect are and shall remain Owner's property. They are not to be used by the Contractor on any other project, and with the exception of one complete set for each party to the contract are to be returned to Owner at the completion of the Work.

3.4 No Oral Waiver

3.4.1 The provisions of the contract cannot be amended, modified, varied, or waived in any

respect except by a writing signed by the parties hereto in accordance with Article 3.2.1 of these General conditions. The Contractor is hereby given notice that no person has authority orally to waive, or release the Contractor from, any of the Contractor's duties or obligations under or arising out of the Contract. Any Waiver, approval or consent granted to the Contractor shall be limited to those matters specifically and expressly stated thereby to be waived, approved or consented to and shall not relieve the Contractor of the obligation to obtain any future waiver, approval or consent.

ARTICLE 4 — CONTRACTOR

4.1 Definition

4.1.1 **The Contractor** is the person or organization identified as such in the Contract for Construction and is referred to throughout the Contract Documents as if singular in number and neuter in gender. The term "Contractor", as used herein, shall refer to the person or organization entering into this Contract with Owner.

4.2 Review of Contract Documents

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to Architect any error, inconsistency, or omission it may discover. If the Contractor, either before commencing or in the course of the Work, finds that the Work has not been sufficiently detailed or explained in the Drawings and/or Specifications and the physical conditions on the Job Site, or finds any error, conflict, omission, or discrepancy in any Drawings, Specifications or survey, or a misunderstanding arises regarding the real meaning of the Drawings or Specifications, the Contractor shall promptly notify Architect in writing of such conflict, discrepancy, error, omission or understanding. If the Contractor observes that any portion of the Drawings and/or Specifications are at variance with any applicable law, ordinance, regulation, order or decree, it shall promptly notify Owner in writing of such conflict. If the Contractor observes that any portion of the Drawings and/or Specifications are at variance with any applicable law, ordinance, regulation, order or decree, it shall promptly notify Owner in writing of such conflict. Owner, upon receipt of any such notice, shall give appropriate instructions to the Contractor, and such instructions shall be final. Until such instructions are given, any Work done by or on behalf if the Contractor, directly or indirectly, after its discovery of any such error, discrepancy, conflict, omission or misunderstanding, will be at Contractor's own risk, and contractor shall bear all costs arising there from.

4.2.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies omissions discovered shall be reported to the Owner at once.

4.3 Supervision and Construction Procedures

4.3.1 The Contractor shall supervise and direct the Work, using its best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures in compliance with the Contract and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall employ a competent supervisor (herein sometimes referred to as the superintendent) and necessary assistants who shall be in attendance at the Job Site during the progress of the Work. The Supervisor shall be satisfactory to Owner and shall not be changed except with the consent of the Owner unless the supervisor proves to be unsatisfactory to the Contractor and ceases to be in its employ. The supervisor shall

represent the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. Communications will be confirmed on written request in each case.

4.3.3 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

4.3.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner or the Architect in the administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

4.3.5 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

4.3.6 The Contractor is required herein by Paragraph 4.2 to isolate any areas of design, engineering or Contract provisions, which may preclude proper performance of a complete system with the required characteristics. The Contractor shall also be responsible for coordination with Owner on problems with any system and ensuring that all systems perform property at the time of Substantial Completion and thereafter, as required by the Contract Documents.

4.3.7 The Contractor shall, at all times, enforce strict discipline and good order among its employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him. If any subcontractor, superintendent. foreman, laborer or other person employed in connection with the Work by the contractor or subcontractor is observed to be failing or refusing to carry out directions given to the Contractor by Architect or shall appear to Architect to be intemperate, incompetent, troublesome or otherwise undesirable, then such person shall not again be employed in connection with the Work

4.3.8 The Contractor shall be responsible to Owner for the acts and omissions of all its employees and Subcontractors, their agents and employees and all other persons performing any of the Work, in the same manner as if they were the acts and omissions of persons directly employed by the Contractor No alcoholic beverages or illegal drugs (including marijuana) shall be permitted on the Job Site.

4.4 Materials, Equipment and Supplies

4.4.1 The Contractor warrants to the Owner and Architect that all equipment, materials and supplies to be incorporated in the Work shall be the best quality and new unless otherwise approved by Owner in writing. All equipment, materials and supplies to be used in connection with the Work shall be in good state of repair and maintained in such state during the progress of the Work. No obsolete equipment shall be incorporated in or used in connection with any of the Work and in no case shall the maker's rated capacity for any equipment be exceeded. All Work shall be of the best quality, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective. If required by the Owner or Architect, the Contractor shall furnish satisfactory evidence as to the kind of quality of materials, equipment and supplies

4.4.2 No written or verbal approval of any Drawings, descriptive data, or samples of such materials and equipment shall relieve Contractor of its responsibility to turn over such materials and equipment to Owner in perfect working order at the completion of the Work

All moving parts shall be properly lubricated by the Contractor and all motors and machinery shall be started up and tested by an authorized service agency. Any items which are not satisfactory and acceptable, or which have been damaged shall be removed and replaced with proper and acceptable items or put in good working order, satisfactory to Owner, without additional cost to Owner.

4 5 Taxes

4.5.1 The Contractor shall pay all sales, consumer, use, privilege, remodel, and other taxes required to be paid in connection with the Work or upon materials brought to the Job Site or used in the Work. Contractor shall also pay all Federal, State and local taxes, if any, on its payroll and shall provide evidence to owner that all withholding for Federal and State income taxes and FICA taxes have been paid to the proper authority, if such evidence is requested by Owner.

4.6 Permits, Fees and Notices

4.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for any permit fees required by its subcontractors, e.g. electrical, plumbing, etc.

4.6.2 The Contractor shall be responsible for making all necessary arrangements with governmental departments, public utilities, public carriers, service companies, and corporations owning or controlling roadways, railways, water, sewer, gas, electrical, telephone, and telegraph facilities such as pavements, tracks, piping, wires, cables, conduits, poles, guys, or other similar facilities, including incidental structures connected therewith that are encountered in the Work in order that such items may be properly supported, protected or relocated. The Contractor shall permit entrance of such parties onto the Job Site in order that they may perform their necessary Work and pay all charges and fees made by such parties for this Work. It is understood that the Contractor will

have no claim whatsoever against Owner for any delay caused it during the construction of the Work due to Work being done by such parties.

4.6.3 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Work.

4.7 Nondiscrimination Policy (Executive Order 11246)

4.7.1 During the performance of this Contract, the Contractor agrees as follows: The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment upgrading, demotion, or transfer, recruitment or advertising, layoff or termination, rates or pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

4.7.2 The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

4.7.3 The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other Contract or understanding, a notice, advising the labor union or worker's representative of the Contractor's commitments under Section 202 of the Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous place available to employees and applicants for employment.

4.7.4 The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of The Secretary of Labor.

4.7.5 The Contractor will furnish all information and reports as required by Executive Order No. 11246 of September 24, 1965 and by the rules, regulations, and orders of The Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the contracting agency and The Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

4.7.6 In the event of the Contractor's noncompliance with the discrimination clauses of this Contract or with any such rules, regulations or orders, this Contract may be canceled, terminated, or suspended in whole or in part.

4.7.7 The Contractor will include the provisions of Paragraphs 4.7.1 through 4.7.7 in every subcontract or Purchase Order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor.

4.8 Labor Harmony

4.8.1 The end that there shall be no labor dispute which would interfere with the construction, completion or operation of the project, or any part thereof, or any part thereof, Contractor agrees to engage the services of only such subcontractors as will work in harmony and without causing any labor dispute with each other and with Contractor and contractor shall employ and shall require its subcontractors to employ such labor as will work in harmony and without causing any labor dispute with all other labor then working on the project or any part thereof.

4.9 Drawings and Specifications at the Site

4. 9.1 One copy of all Drawings, Specifications, Change Orders, Addenda, approved Shop Drawings, Schedule of work, in good order and marked to record all changes made during construction, shall be maintained at the site by the Contractor. The Schedule of Work shall be posted outside and updated to show current status of Work. This material shall be available to Owner, and the Architect. The Drawings, marked to record all changes made during construction, shall be delivered to Owner on completion of the Work within 15 days.

4.10 Shop Drawings and Samples

4.10.1 Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor and which illustrate some portion of the Work. In form of as builds.

4.10.2 Samples are physical examples furnished by the Contractor to illustrate materials, equipment, or workmanship and to establish standards by which the Work will be judged.

4.10.3 By approving and submitting Shop Drawings and Samples, the Contractor represents that it has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data and that it has checked and coordinated each Shop Drawing and Sample with the requirements of the Work and the Contract Documents. The Contractor also certifies that only approved items will be used.

4.10.4 The Owner will review and approve shop Drawings and Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the Project and with the information given in the Contract Documents. Approval of a separate item shall not indicate approval of an assembly in which the item functions.

4.10.5 Approval of Shop Drawings or Samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the contract Documents unless the contractor has informed Owner in writing of such deviation at the time of submission and the Owner or Architect, have given written approval to the specific deviation; nor shall said approval relieve the contractor from responsibility for errors or omissions in the Shop Drawings or Samples. If the Contractor requires approval of the Shop Drawings or Samples on or before a specified date, it shall advise Owner in writing of such date at the time of the submission and Architect shall use its best efforts to meet subcontractor's requirements. In the event of any delay in the approval of Shop Drawings, where contractor has provided Architect written notice of the specified submittal due date, Contractor's sole remedy shall be a claim for extension of the Contract Time, to be fixed by Owner.

4.10.6 No portion of the Work requiring a Shop Drawing or Sample submission shall be commenced until the submission has been approved by Owner. All such portions of the Work shall be in accordance with approved Shop Drawings and Samples. In no case shall the construction Work be inferior to that shown on the Shop Drawings and submitted Samples.

4.10.7 For items required to be of selected and approved colors, patterns, textures or other finish requirements, the Contractor shall obtain instructions from Architect and shall submit sufficient samples to show the range of shades, tones, values, patterns, textures or other features corresponding to the instructions.

4.10.8 The Contractor shall label or tag each Sample or set of Samples, identifying the manufacturer's name and address, brand name, catalogue number, project title and intended use.

4.11 Substitutions

4.11.1 Should the Contractor propose to use any material, process or equipment other than those indicated and specified, it shall submit to the Owner in triplicate, a list of the proposed substitutions, setting forth therein the difference in cost, if any, together with its reason for proposing the same, a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, Drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation of the proposed substitution.

4.11.2 No deviation from the approved or specified material, equipment or process shall be permitted except:

(A) When the manufacture or production of the specified material, process or equipment has been discontinued; When the specified material, process or equipment is not available in sufficient time to complete the Work when ordered at the time the contract is executed;

(B) When delays beyond the control of the contractor such as strikes, lockouts, floods, fires, or Acts of God preclude procurement and delivery for purposes of the Project; or

(C) For such reason or reasons as the Owner may consider sufficient to justify the Contractor's deviation.

4.11.3 The Contractor shall provide written proof of such conditions. The burden of proof shall be on the Contractor.

4.11.4 If the Contractor does not offer any substitutions, or, where a substitute offered by the Contractor is not found by the Owner to be equivalent to the material or equipment named on the Drawings and/or specified by the Owner or Architect, then the Contractor shall provide the material or equipment so named and/or specified.

4.11.5 At the request of Owner, the Contractor shall, at its own expense, furnish complete information and data concerning the material or equipment offered by it as equivalent to and as a substitute for the material or equipment indicated, mentioned and/or specified; and where Owner shall so require, the Contractor shall at its own expense, have the said material or equipment tested under the direction of Owner, by a testing agency approved by Owner, in order to determine its quality and/or strength, its physical, chemical and other characteristics, its durability, finish and/or efficiency.

4.11.6 The Contractor shall assume any costs incurred by the Owner or Architect for additional design as a result of substituted material, process or equipment, including changes necessitated in related Work affected by such substitution.

4.11.7 Only one brand, kind and make of material or equipment shall be used for each specific purpose throughout the entire Work of the Contract, notwithstanding the fact that similar-materials or equipment of two (2) or more manufacturers or producers may be specified for the same purpose.

4.12 Use of Site

4.12.1 The Contractor shall confine operations at the Job Site to areas permitted by Owner, and by law, ordinance, permits or the Contract Documents, and shall not unreasonably encumber the Job Site with any materials or equipment. The Contractor shall acquaint itself with Owner's ingress and egress procedures, requirements for identification badges for workers, prohibition of firearms and transportation of workers and security inspection of vehicles, either on the Project or at the Job Site and assure compliance with these procedures by its work force and of the work force of all other persons performing any portion of the Work for or on behalf of Contractor.

4.13 Cutting and Patching of Work

4.13.1 The Contractor shall do all cutting, fitting or patching of its Work that may be required to make its several parts (including their existing improvements) fit together properly or to receive the Work of other Contractors and shall not endanger any other Work by cutting, excavating or otherwise altering the Work or any part of it without written permission of Owner.

4.14 Cleaning up

4.14.1 The Contractor shall, at all times, keep the Job Site and surrounding area free from unreasonable accumulations of waste materials or rubbish caused by its subcontractors, employees or others in the performance of the Work. Before application for final acceptance of the Work, the Contractor shall remove from and about the Job Site all rubbish and waste materials resulting from the Work, all temporary utility lines and temporary structures, all tools, scaffolding and surplus materials and shall leave the Work professionally cleaned and in an acceptable state for operation of the restaurant. Areas occupied by temporary lines and structures shall be restored to the condition that existed prior to the execution of the Contract, or to such condition as is satisfactory to Owner. All scaffolding, planking or other materials, either for temporary use or for incorporation into the Work, shall be done in an orderly manner. If the Contractor should neglect to perform

the cleaning-up Work required in this Subparagraph, Owner, after forty-eight (48) hours-written notice to the Contractor, may perform such Work without prejudice to any remedy it may have, and may deduct from the payments then or thereafter due the Contractor all costs thereof. If a dispute arises between Contractor or separate Contractors as to the responsibility for cleaning up as required by the contract Documents, Owner may clean up and charge the cost thereof to the Contractor.

4.15 Schedule of Work

4.15.1 The Contractor when returning signed contracts to owner, shall submit to the Owner two (2) copies of a proposed Schedule of Work for approval.

ARTICLE 5 - SUBCONTRACTORS

5.1 Definitions

5.1.1 A **Subcontractor** is a person or organization having a direct or indirect contract with the Contractor to perform any of the Work. The term Subcontractor is referred to throughout the contract Documents as if singular in number and neuter in gender and means a Subcontractor or an authorized representative thereof.

5.1.2 Nothing contained in the Contract Documents shall create any contractual relationship between Owner or the Architect and any Subcontractor.

5.2 Award of Subcontracts and Other Contracts for Portions of The Work

5.2.1 The Contractor shall, prior to the awarding of any subcontract, notify Owner in writing of the names of all Subcontractors proposed for the several parts of the Work and if Owner does not take exception in writing within seven (7) days of its receipt of such notification, such Subcontractor shall be deemed to be approved. The Contractor shall provide a Subcontractor list to the Owner with Contractor's first Application for Payment.

5.3 Subcontracts

5.3.1 **All** subcontracts shall be in writing Each subcontract shall contain a reference to this Contract and the terms of this Contract shall be made a part of such subcontract insofar as applicable to the Work covered thereby, and each subcontractor must agree for the benefit of Owner to be bound by the terms of all the Contract Documents insofar as applicable to its Work. Without limitation on the foregoing, each subcontract shall:

A) Preserve and protect the rights of Owner under this Contract with respect to the work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

B) Require submission to the Contractor of Applications for Payment on each subcontract to which the contractor is a party, in reasonable time to enable the Contractor to apply for payment; and

C) Obligate each Subcontractor specifically to consent to the provisions of Article 5.3 of these General Conditions.

5.3.2 Each subcontract shall provide for its annulment at the directive of Owner if, in Owner's opinion, the Subcontractor fails to comply with the requirements of the Contract Documents insofar as the same may be applicable to its Work, in which event the Subcontractor shall be removed immediately from the Work and shall not again be employed on the Work.

5.3.3 Each subcontract shall contain a provision for the benefit of the Owner, the Architect, the respective related and affiliated companies of each as well as the officers, agents and employees of each (collectively referred to hereinafter in this Paragraph as the "Indemnities") providing that the Subcontract there under shall indemnify and hold harmless the Indemnities from and against any and all claims, damages, losses, demands, liability, exposure, costs and expenses whatsoever, including attorneys' fees at all trial and appellate levels and in all arbitration and/or mediation proceedings, arising directly or indirectly out of or resulting from such Subcontractor's performance of the subcontract or Subcontractor's failure to fully and properly perform the subcontract by the Subcontractor or by any of its sub-subcontractors, laborers, employees, agents, material men or other persons for whom the Subcontractor may be responsible. Each subcontract shall recite a specific consideration to be paid by Contractor to Subcontractor in consideration of the foregoing indemnity, and such consideration shall be paid by Contractor out of the payments received by it under this Contract and in behalf of the Indemnities.

5.3.4 Contractor agrees that it shall make copies of and deliver to its subcontractors, sub-subcontractors, and suppliers, all Contract Documents necessary for said subcontractor, sub-subcontractor, or supplier to perform its scope of work. Contractor specifically agrees and represents as follows:

(A) All contractors, subcontractors, sub-subcontractors, and materials suppliers shall be bound by the terms of the Contract Documents an no provisions of those subcontracts shall be inconsistent with the provisions of the Contract Documents. In the event of any inconsistency between the terms of the Contract Documents and any subcontract agreement entered into by Contractor, the provisions of the Contract Documents shall prevail;

(B) Simultaneous with executing any subcontracts, Contractor shall require all subcontractors, sub-subcontractors and materials suppliers to execute an acknowledgment of delivery stating that said subcontractor, sub-subcontractor or materials supplier has received all contract Documents necessary to fully properly perform its scope of work;

(C) In the event of any delay or increased cost or expense attributable to the failure of subcontractor to receive information necessary to properly and timely perform its scope of work, Contractor agrees to be fully and solely responsible for all costs and expenses incurred in connection therewith.

ARTICLE 6 - CONSTRUCTION BY OTHER CONTRACTORS

6.1 Separate Contracts

6.1.1 Owner reserves the right to let other Contracts in connection with this work that Owner may consider proprietary in nature. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their material and equipment and the execution of their Work and shall properly connect and coordinate its Work with theirs.

5.1.2 If the execution or results of any part of the contractor's Work depends upon the Work of any other contractor, the Contractor shall inspect and promptly report to Owner any apparent discrepancies or defects in such Work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other Contractor's; Work as fit and proper to receive the Work of the Contractor, except as to defects which may develop in the other separate contractor's Work after the accomplishment of the Contractor's Work.

6.1.3 To ensure proper execution of its subsequent Work, the Contractor shall measure the Work already in place and shall at once report to Owner, in writing, any discrepancy between the executed Work and the Plans and Drawings.

6.1.4 Should the Contractor cause damage to the Work or property of any other separate Contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement, if it will so settle. If such other Contractor sues Owner or initiates other proceeding on account of any damage alleged to have been so sustained, Owner shall notify the Contractor who shall defend such proceeding at its own expense and if any judgment or award against Owner arises thereof, the Contractor shall pay or satisfy it an shall reimburse Owner for all attorney's fees and other costs which Owner has incurred at all trial and appellate levels and in all arbitration and/or mediation proceedings.

ARTICLE 7 - MISCELLANEOUS PROVISIONS

7.1 Governing Law

7.1.1 The Contract shall be governed by the law of the place where the Project is located.

7.2 Successors and Assigns

7.2.1 Owner and Contractor each binds itself, its partners, successors, assign and legal representatives to the other party hereto and to the partners, successors, assigns and legal representative of the other parties in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or its subcontracts without the written consent of Owner, nor shall the Contract be assignable as a matter of law. The Contractor shall not assign any monies due or to become due to it hereunder without the previous written consent of Owner. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

7.3 Written Notice

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by telegram, mailgram, Express Mail (or similar private services), by registered or certified mail, or by telecopy to the last business address known to the party who originate the notice.

7.4 Performance Bonds and Labor and Material Payment Bonds/liens

7.4.1 Owner shall have the right at any time to require the Contractor to furnish bonds written on such surety companies acceptable to Owner (in Owner's sole discretion) covering the faithful performance of the Contract and Contractor's payment of all obligations arising there under is such form and amount as determined by Owner. If such bonds are stipulated in the Bidding requirement, the premiums shall be paid by the Contractor. If required subsequent to the submission of quotations or bids, the cost shall be reimbursed by Owner. The Contractor shall promptly deliver the required bonds to Owner or submit evidence satisfactory to Owner that such bonds will be issued. Failure to produce the required bonds shall be cause for voiding the Contract.

7.4.2 Contractor agrees to bond off any liens filed against the Project within ten (10) days from the filing or recording of said lien, and to fully indemnify and protect Owner from any and all damages an claims, including attorney's fees at all trial an appellate levels and in all mediation and arbitration proceedings, related to said lien. In the event Contractor fails to post a bond to remove a lien from the Project, then Owner, in its sole discretion and without necessity of providing advance or prior notification to Contractor, shall have the

right to post a bond to remove any lien from the Project, to deduct the premiums, together with all costs related thereto, including, but not limited to, attorney's fees at all trial and appellate levels and in all mediation and arbitration proceedings, and to set-off said costs and expenses form any payments which would otherwise be due to contractor under the provisions of these General conditions or any other contract for any other project entered into by the parties hereto.

7.4.3 In the event the applicable law of the jurisdiction in which the project is located so allows, then this Contract shall be a "no lien" Contract and Contractor agrees to relinquish and release any and all rights it may otherwise have had pursuant to applicable state or federal law; subcontractors, sub-subcontractors and material suppliers, by virtue of incorporation of these Contract Documents into their subcontract agreements, similarly relinquish said rights to claim any and all liens against the Project.

7.5 Compliance with Codes

7.5.1 The Contractor shall, at no additional cost, comply with and abide by the provisions of any and all applicable codes and regulations adopted by public utilities under the supervision of the public utilities commission having jurisdiction, without limiting same, promulgated by municipal, county, state and federal governments.

7.6 Standard Specifications

7.6.1 Standard Specifications such as ASTM, ANSI, AASTO. AWWA, AISC, ASHRAE Commercial Standards, Federal Specifications, NBFU, NEMA, UL and like types of standard specifications, incorporated in the requirements of this Contract by reference, shall be those of the latest edition at the time of receiving bids. Contractor shall determine and ascertain, prior to placing Purchase Orders, that the manufacturers and producers (and the agents of each) of required materials either have such Specifications available for reference or are fully familiar with the requirements thereof as pertain to their product or material.

7.6.2 Gauges of metal indicated and/or specified shall be U. S. Standard for ferrous metal and non-ferrous metal, unless otherwise specified. Gauges required shall be prior to application of coatings such as galvanizing, plating or painting.

7.6.3 All capacities, sizes, methods of construction and installations as specified are the minimum which are acceptable regardless of whether such capacities, sizes or methods of construction and installation are or are not specified in any manufacturer's published literature. In the event that tests show that an Article does not meet the minimum requirements of capacities, sizes or other physical features specified, the Contractor shall remove and replace or alter such Work to meet the minimum requirements specified without cost to Owner.

7.7 Temporary Facilities and Services

7.7.1 Contractor Parking: The Contractor shall not park its equipment, nor allow its personnel to park, in any area except those specifically designated by the Owner, Landlord or building owner.

7.7.2 Temporary Electric Power: The Contractor shall provide normal temporary electric power as necessary for the execution of the Work.

7.7.3 Temporary Toilet Facilities: The Contractor shall provide temporary toilet facilities maintained in a sanitary condition.

7.7.4 Temporary Water: The Contractor shall provide all water required for work.

7.7.5 Temporary Telephone: The contractor shall be responsible for all temporary telephones. Temporary service shall not be disconnected until project is completed and Contractor leaves the site.

7.8 Procedure in the Event of Conflict in Contract Documents

7.8.1 In the event that there is a conflict among any of the Contract Documents, and such conflict is not observed prior to the commencement of the Work, such discrepancy shall be resolved in the following order of precedence and control among the Contract Documents:

(A) Contract Agreement,
(B) Special Conditions (if any),
(C) General conditions,
(D) Detail Drawings,
(E) Drawings,
(F) Specifications,
(G) Schedule of Work,
(H) Accepted Proposal (Owner's form only),
(I) Bonds

7.9 Captions

7.9.1 The captions of Articles and Paragraphs in the Contract Documents are for convenience only and shall in no way define the content or limit the meaning or construction of the wording of the Articles and Paragraphs.

7.10 Article and Paragraph References

7.10.1 Unless otherwise specified, Article and Subparagraph references appearing in these General conditions are to Articles, Paragraphs and Subparagraphs herein.

7.11 Invalid Contract Provisions

7.11.1 The invalidity of one or more provisions of the General conditions or the Contract Documents shall not otherwise affect the enforceability of the remaining Contract provisions, which shall remain fully enforceable.

ARTICLE 8 - TIME

8.1 Definitions

8.1.1 The **Contract Time** is defined in Article 3.1 of the Contract for Construction.

8.1.2 The date of commencement of the Work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract for Construction or such other date as may be established therein. Any costs incurred at the Contractor prior to receipt of the Notice to Proceed are not, incurred at the Contractor's risk in the event the Notice to Proceed is not issued.

8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by Owner when construction is sufficiently complete, in accordance with the Contract Documents and the permanent Certificate of Occupancy has been obtained, so

that Owner may occupy and use the Work or designated portion thereof for the use for which it is intended.

8.1.4 The term day as used in the Contract Documents shall mean calendar day.

8.2 Progress and Completion

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.3 Delays, Extension of Time, And Overtime

8.3.1 The time during which Contractor is delayed in the performance of the Work by the acts of omission or commission of the Owner, the Architect, or their employees or agents, or by Acts of God, or abnormal climatic conditions, which the contractor could not reasonably foresee or provide against, or other conditions beyond the Contractor's control which the Contractor could not reasonably foresee or provide against, or other conditions beyond the Contractor's control which the Contractor could not reasonably foresee or provide against, shall be added to the time for completion of the Work (i.e. the Contract Time) as set forth in the Contract for Construction provided, however, that the contractor shall not be entitled to any extension of time for delays resulting from such conditions unless it shall have notified Owner, in writing (which may be facsimile) within five (5) working days after commencement of each such cause of the occurrence thereof, and of the probable duration thereof. Owner shall ascertain the facts and the extent of the delay and determine and fix an extension of the time for completion of the Work when the facts justify such extension; the determination of Owner shall be final, conclusive and binding upon the parties.

8.3.2 The Contractor shall not be entitled to and hereby waives any and all costs and damages which it may suffer by reason of delay to the contractor in the performance of the Work, or any portion thereof, by any of the acts, omissions or defaults set forth in Subparagraph 8.3.1, the extension of time granted herein being the Contractor's sole remedy.

8.3.3 Whenever, in the opinion of Owner, the Work falls behind schedule (including any schedule and/or Contract Time extensions pursuant to the Contract Documents), except by reason of delays ordered by Owner, the Contractor shall, to the extent necessary to meet said schedule, increase its labor force and/or provide overtime, weekend and holiday Work, and shall have each Subcontractor do likewise, with no additional cost to or compensation from Owner.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 Contract Sum

9.1.1 The Contract Sum is stated in the Contract for Construction and is the tote! amount payable by Owner to the Contractor for the performance of the Work under the Contract Documents.

9.2 Progress Payments

9.2.1 If the Agreement specifically provides that payments are to be made on account of materials or equipment not incorporated in the Work, but delivered and suitably stored at the Job Site, or at some other location agreed upon in writing, such payment shall be conditioned upon submission by the Contractor of bills of sale, partial release of liens (Owner's form only) or such other procedures satisfactory to Owner to establish its title to such materials or equipment, or otherwise protect its interests, including applicable

insurance and transportation to the Job Site. Contractor shall bear the loss of any, and all materials stored on site until same are installed into the Work and accepted.

9.2.2 The Contractor warrants and guarantees that title to all Work, materials, and equipment covered by and Application for Payment, whether incorporated in the Work or not, will pass to owner upon receipt of such payment by the Contractor, free and clear of all liens, claims, security interest, or encumbrances, hereinafter referred as "liens", and that no Work, materials, or equipment covered by an Application for Payment will have been acquired by the Contractor or by any other person performing Work at the Job Site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or other person.

9.2.3 Property, title to which passes to Owner by virtue of Paragraph 9.2.2, shall remain subject to subparagraph 10.2.4 to extent of any loss occasioned by Contractor's act or omission.

9.2.4 Owner, at its sole option, may pay any amounts owed to Contractor by means of joint checks drawn jointly in favor of Contractor and any person furnishing any labor, materials, equipment, tools, machinery supplies, or transportation in connection with the Work. Any amounts so paid shall be deducted from any amounts owed to the Contractor under the Contract for Construction.

9.2.5 The acceptance by Contractor of any payment shall operate as, and shall be, a release of Owner from all claim and liability to Contractor for anything done, or furnished for, or relating to, the Work, or for any act or neglect of Owner relating to or affecting the Work hereunder through the date of acceptance of said payment.

9.2.6 No payment by Owner shall be construed as performance by Contractor of this Contract for Construction, either in whole or in part; nor shall it be construed as an approval or acceptance of defective Work or Work failing to comply with this Contract for Construction, or of any items and any requisition made or bill rendered. Further, no payment by Owner shall constitute a waiver of any of Owner's rights with respect to unsettled liens.

9.27 Owner is not required to make any payment to Contractor unless Contractor shall have previously provided such support documentation as may be required by Owner, including but not limited to, copies of requisitions from subcontractors, sub-subcontractors, and materials suppliers, payroll affidavits, receipts and vouchers, lien releases, and evidence of payment as applicable to all unions and union trust funds.

9.2.7 Owner may withhold payment in whole or in part in order to protect the Owner from loss because of (a) defective work not remedied, missing material not furnished, clean-up not performed; (b) claims filed or reasonable evidence indicating probable filing of claims, including claims covered by insurance until such claims are accepted by the insurance carrier, (c) failure of the Contractor to make payments properly to its subcontractors, sub-subcontractors, or suppliers or for labor, materials or equipment, transportation or shipping costs, taxes, fees or other claims arising out of or related to the Work; (d) reasonable doubt that the Work can be completed for the unpaid balance of the Contract Price; (e) damage to another contractor, (f) contractor's failure to deliver an updated progress schedule or reasonable indication that the Work will not be completed by the Contract time; (g) unsatisfactory prosecution of the Work; (h) failure to deliver "as-built" drawings, written guarantees or warranties; (in) failure to obtain approvals required by any authority having jurisdiction; (j) any dispute or controversy between the Owner and the Contractor; (k) non-compliance by Contractor or its subcontractors with any insurance requirement, and/or with the above lien release requirements; or (I) any event of default under Article 14 of these General Conditions.

9.2.8 Any and all funds payable to Contractor hereunder are hereby declared to constitute trust funds in the hands of the Contractor, to be applied first to the claims of its subcontractors, sub-subcontractors, suppliers, architects, engineers, surveyors, equipment lessors, laborers, and other bonds filed and premiums on insurance accruing during the construction of the described Work, before application to any other purpose.

9.2.9 Payments shall be made by Owner to Contractor according to the following procedures: The Contractor shall submit to Owner, an Application for Payment on the Work completed. The first request can be submitted twenty-one (21) days after this Contractor's portion of the Project is under full operation. This payment request shall deduct the aggregate of amounts previously invoiced by Contractor to Owner. Within fifteen (15) days after approval of the Application for Payment, Owner shall pay directly to the contractor the appropriate amounts for which the Application for Payment is made therein. Owner shall withhold retention in the sum of ten (10) percent of each progress payment.

9.3Substantial Completion and Final Payment

9.3.1 The Contractor shall request Final inspection at such time as the Work is substantially completed and the permanent Certificate of Occupancy has been obtained. When Owner, on the basis of an inspection, confirms the notification from the Contractor that the Work is substantially completed or without being notified by the Contractor, determines that the Work is substantially completed, Architect Construction Project Manager (CPM) shall list (the punch list) the items determined by Architect CPM to require completion and/or correct the items listed within seven (7) days of receipt of the punch list and submit all documents and other matters required by the Contract Documents to be submitted by the Contractor upon completion of the Work. In the event Contractor does not complete and/or correct those items not completed and/or corrected within the time fixed for completion and/or correction thereof, then Owner shall have the right to complete and/or correct those items not completed and/or corrected within the time fixed, or to cause the same to be corrected or completed by others, and shall offset the cost thereof against any amounts then or hereafter due the Contractor under the contract or any other monies due or to become due to Contractor. If the amounts then or thereafter due the Contractor are not sufficient to cover such cost, the Contractor shall pay the difference to Owner.

9.3.2 Neither the final payment nor any retainage shall become due until the Contractor submits the following properly executed documents to Owner:

(A) Final Application for Payment, Final Lien Waiver Tracking Form, Sworn Affidavit showing no funds due to subcontractors or suppliers, and Original final, notarized, unconditional lien waiver as supplied by Owner from Contractor showing amount paid to date, Lien Waivers to be provided on Owner's Form; Within 24-hours of receipt of final payment, Contractor to fax Owner a copy of the final General Contractor's Affidavit showing zero balance due to Contractor and a copy of the Final Notarized Waiver of Lien showing full amount paid with zero balance remaining. Hard copy to be submitted to Owner within one (1) week.

(B) Consent of sureties, if any, to final payment.

(C) A complete set of Plans and Specifications showing the Work as-built indicating dimensions and conditions of the project as it was actually constructed, including such items as exact locations of concealed or buried piping or utilities, locations of equipment and ductwork, etc. and any changes made during the course of construction which were not officially documented by the architect. Notwithstanding anything contained herein to the contrary, within fifteen (15) calendar days of completion of the Work, Contractor

shall deliver said As-built plans which shall be uploaded to Owner's website in accordance with Owner's instructions.

(D) Original final, notarized, unconditional lien waivers as supplied by Owner from all Subcontractors showing the full and total contract amount including change orders paid with zero balance remaining

(E) Subcontractor list providing contact persons. phone numbers and addresses of all subcontractors used on project.

(F) If required by Owner, other data establishing payment or satisfaction of all obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by Owner. If any subcontractor refuses to furnish a release or waiver required by Owner, the Contractor shall, at its own expense, if requested by Owner, furnish a bond satisfactory to indemnify it against any such lien. If any lien remains unsatisfied after all payments are made. the Contractor shall refund to Owner all monies that the latter may be compelled to pay in discharging such lien including all costs and reasonable attorney's fees.

(G) Final Certificate of Occupancy and any governmental certificates required by the Contract Documents, or to evidence compliance with all applicable laws, ordinances, rules, codes, or regulations.

(H) Operation and Maintenance Manual (For everything GC or Sub installs. Examples: fireplace, HVAC, water heater, sprinkler, alarm system, plumbing fixtures, flooring, exhaust fans, roofing, etc.)

The manual must include:

1.) Extended warranties on equipment supplied by GCs and subcontractors written on their company letterhead guaranteeing their work one (1) year from Certificate of Occupancy, not install
2.) The model and serial numbers of all equipment installed in unit submitted on owner provided list.
3.) Cut Sheets
4.) The HVAC subcontractor air balancing report performed by an independent testing & balancing company.

(I) Copy of the Completed Punchlist signed by the owner.

(J) Completed Bid Form including individual unit cost breakdowns

(K) All items as required in the Specifications.

(L) Proof of Water Test Sample.

9.3.3 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled at the time of final payment.

9.4 Beneficial Use and Occupancy by Owner

9.4.1 Owner reserves the right, at its option and convenience, to occupy or otherwise make use of all or any part of the Project premises at any time prior to completion. Beneficial Occupancy shall be subject to the following conditions:

(A) Owner shall use its best efforts to prevent its occupancy from interfering with the conduct of Contractor's remaining Work; and

(B) Contractor shall not be required to repair damage to the premises if the same was caused by Owner's occupancy or misuse of the premises.

9.4.2 Such occupancy or use shall not constitute acceptance by Owner of the completed Work or any portion thereof: not will it relieve the contractor from full responsibility for correcting defective Work. Such occupancy or use shall not be deemed to be the equivalent of completion. Beneficial Occupancy by Owner shall not entitle Contractor to any increase in the Contract Sum.

9.4.3 Beneficial Occupancy by Owner will establish the date of warranty on all approved items of equipment installed and being utilized by Owner in the occupied area.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions and Programs

10.1.1 The contractor shall be responsible for and abide by and maintain all safety precautions initiated by Owner in connection with the Work.

10.2 Safety of Persons and Property

10.2.1 The contractor shall take all reasonable precautions for the safety of and shall provide all reasonable protection to prevent damage, injury, or loss to:

(A) All employees on the Work and all other persons who may be affected thereby.

(B) All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the side, under the care, custody, or control of the Contractor or any of its subcontractors; and

(C) Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements. roadways, structures, and utilities not designated for demolition in the course of construction.

10.2.2 The contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public, quasi-public or other authority having jurisdiction for the safety of persons or property or for their protection against damage. injury of loss or designed to protect the environment. The contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities of the existence of hazards an of the safety regulations.

10.2.3 All damage or loss to any property referred to in Clauses 10.2 1(B) and 10.2.1(C) caused in whole or in part by the Contractor, a Subcontractor, or by anyone for whose acts any of them may be liable. shall be remedied by the Contractor, except damage or loss properly attributable solely to the acts or omissions of the Owner, or the Architect or anyone employed by them, or for whose acts many of them may be liable, and not properly attributable in whole or in part, to the fault or negligence of the Contractor.

10.2.4 Until final acceptance of the Work by Owner, the Contractor shall have the charge and care of and shall bear the risk of injury or damage, loss or expense to any part thereof, or to any materials stored on site, by the action of the elements or from any other cause whether arising from the execution or non-execution of the Work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the Work occasioned by any of the above causes before final acceptance and shall bear the expense thereof.

10.2.5 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety. No load shall be placed on a roof without the approval of the Architect.

10.2.6 Those parts of Work in place which are subject to damage because of operations being carried on adjacent thereto shall be covered, boarded up or substantially enclosed with adequate protection by the Contractor at Contractor's expense.

10.2.7 Permanent openings used as thoroughfares for the introduction of Work and materials to the structure shall have heads, jambs and sills well blocked and boarded by the Contractor. Owner retains the authority, but assumes no duty, to establish standards of protection, and to review the efficiency of protective measures taken by the Contractor.

10 2.8 Adequate traffic control, barricades and flagman services shall be furnished and maintained by the Contractor at all points where conveying equipment engaged on the Work regularly enters onto or crosses traffic-carrying roads.

10.3 Surface or Subsurface Water

10.3.1 Surface or subsurface water or other fluid shall not be permitted to accumulate in excavations or under the structures. Should such conditions develop or be encountered, the water or other fluid shall be controlled and suitably disposed of by contractor at Contractor's cost by means of temporary pumps, piping, drainage lines and ditches, dams or other methods approved by Owner. The proposed location and coordination of temporary channels and conduits conducting accumulated water from the Work area shall be submitted to owner and be approved prior to the Commencement of Work.

10.4 Health and Safety

10.4.1 The Contractor shall comply in every respect with the Federal Occupational Health and Safety Act of 1970 and all rules and regulations now or hereafter in effect under said Act, and the Contractor further agrees to comply with any and all applicable state laws and regulations pertaining to job safety and health.

10.4.2 The Contractor shall protect and keep Owner (including their agents and employees) free and harmless from any and all liability, public or private, penalties, contractual or otherwise, losses, damages, costs, attorney's fees, expenses, causes of action, claims or judgments resulting from the Federal Occupational Safety and Health Act of 1970 as amended or any rule or regulation promulgated there under or of any state laws or regulations pertaining to job safety and health arising out of or in any way connected with the performance of Work or Work to be performed under this contract, and Contractor shall indemnify Owner from any such claims, penalties, suits or actions, public or private, administrative or judicial, including attorney's fees paid or incurred by or on behalf of Owner, jointly or severally, and/or their agents and employees. The Contractor further agrees, in the event of a claimed violation of any federal or state safety and health law or regulation arising out of or in any way connected with the performance of Work or Work to be performed under this Contract, Owner may immediately take whatever action is deemed necessary by Owner to remedy the claimed violation. Any and all costs or expenses paid or incurred by Owner in taking such action shall be borne by contractor,

and Contractor agrees to protect, hold harmless and indemnify Owner against any and all such costs or expenses.

10.5 Environmental Compliance

10.5.1 Contractor and its subcontractors shall use, handle, transport and dispose of all hazardous materials (as defined in Paragraph 10.5.8) in compliance with all present federal, state and local environmental, health or safety law, including, but not limited to, all such statues, regulations, rules, ordinances, codes, and rules of common law.

10.5.2 Contractor further agrees that Contractor and its Subcontractors shall not cause the discharge, release or disposal of any hazardous material created by its work on or about the Job Site. In the event of any spill, release or any other reportable occurrence, contractor shall notify the appropriate governmental agency and shall take such action as may be necessary to minimize the deleterious effect of such spill on persons or property.

10.5.3 Contractor and its Subcontractors shall, upon completion of performance of all duties under this contract, remove all supplies, materials, and waste containing and hazardous material from the Job Site. Contractor shall bear full financial responsibility, as between the parties of this Contract, for the compliance of Contractor and its Subcontractors with the provisions of this Article 10.5.

10.5.4 Contractor agrees to indemnify, defend, protect and hold the Owner harmless from and against any claims including, without limitation, actual attorney's fees and any costs of investigation, soils testing, governmental approvals, remediation and clean-up arising out of or in any way connected with the failure of Contractor or its Subcontractors, or their agents, employees, officers, or representatives, to comply with the terms of this Article 10.5.

10.5.5 Should Contractor or its Subcontractors discharge, release or dispose of any hazardous material on or about the Job Site in violation of this Article, Contractor shall immediately so inform Owner in writing. In the event of any spill, release or any other reportable occurrence, contractor shall notify the appropriate governmental agency and shall take such action as may be necessary to minimize the deleterious effect of such spill on persons or property.

10.5.6 In the event Contractor or its Subcontractors encounter on the Premises any pipeline, underground storage tank or other container, of any kind, that may contain a hazardous material, or encounter material reasonably believed to be a hazardous material, Contractor shall immediately stop work in the area affected and report the condition to Owner in writing.

10.5.7 If Contractor or its Subcontractors do not comply with the requirements of the Article, Owner may, but is not obligated to, give written notice of violation to contractor. Should Contractor or its Subcontractors fail to comply with the requirements of this Paragraph within twenty-four (24) hours from the time Owner issues such written notice of noncompliance or within the time of an abatement period specified by any governmental agency, whichever period is shorter, contractor shall be in material default of this Contract.

10.5.8 "Hazardous material" means any substance: (a) the presence of which requires investigation or remediation under any present or federal, state or local statute, regulation, ordinance, rule, code, order, action, policy or common law, or (b) which is or becomes defined as a "hazardous waste", "hazardous substance", pollutant or contaminant under any present federal, state or local statue, regulation, rule or ordinance or amendments thereto including, without limitation, the comprehensive Environmental Response Compensation and Liability Act (42 U.S.C. Sections 9601 et seq.) And/or the Resource

conservation of Recovery Act (42 U.S.C. Sections 6901 et seq.), or (c) which is toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or otherwise hazardous and is regulated by an governmental authority, agency, department, commission, board, agency or instrumentality of the United States, the State in which the Premises are located or any political subdivision thereof, or (d) the presence of which on the Premises causes or threatens to pose a hazard to the health of safety of persons on or about the Premises, or (e) which contains gasoline, diesel fuel or other petroleum hydrocarbons, or (f) which contains polychlorinated biphenyls (PCBs), asbestos, lead or urea formaldehyde foam insulation.

10.5.9 All documentation for any hazardous material or hazardous material related work shall be sent to Owner immediately upon receipt of such documentation. All documentation shall be compiled for each material or instance and presented to Owner as Part of the completion of the Work.

ARTICLE 11 - INSURANCE 1

11.1 Contractor's Insurance

11.1.1 Contractor shall purchase and maintain Comprehensive General Liability and Workers' Compensation Insurance to provide protection for claims set forth below. The Comprehensive General Liability Insurance shall have at least a One Million Dollars ($1,000,000.00) combined single limit for personal injury and property damage. Such insurance must cover claims which may arise out of contractor's obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable. Coverage shall include:

(A) Claims under worker's or workman's compensation disability benefit and other similar employee Benefit acts;

(B) Claims for damages because of bodily injury, occupational sickness or disease, or health of its employees.

(C) Claims for damages because of bodily injury, sickness or disease, or death of any person other than its employees:

(D) Claims for damages insured by usual personal injury liability coverage, which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;

(E) Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom.

(F) Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

(G) Claims for damages because of premises operations (including explosion, collapse, and underground coverage, as well as escalators, as appropriate) of independent contractors, completed operations, and contractual liability, all including broad form property damage coverage.

11.1.2 Worker's Compensation Insurance shall include a policy endorsement providing an extension of the policy to cover the liability of the insured under the All State's Operations. Worker's compensation Insurance shall include policy endorsements providing an

extension of the policy to cover the liability of the insured under the "U.S. Longshoreman's and Harbor Workers' Compensation Act and "All State's Operations". In the event any of Contractor's or subcontractor's employees are not covered by the Workman's Compensation statue of the state wherein the Work is located, such contractor or Subcontractor shall provide Employer's Liability Insurance with limits of not less than One Hundred Thousand Dollars ($100,000.00).

11.1.3 The insurance required by Subparagraph 11.1.1 shall include Contractual Liability Insurance applicable to the contractor's obligations under Paragraph 11 6

11.1.4 Certificates of Insurance acceptable to Owner shall be filed with Owner prior to commencement of the Work. These Certificates of Insurance shall contain a provision that coverage afforded under the policies will not be canceled until at least thirty (30) days prior written notice has been given to Owner.

11.2 Cancellation: Additional Insured

11.2.1 Each contract of insurance required under Paragraph 11.1 of this Article shall contain clauses to the effect that the same may not be reduced or canceled on less than thirty (30) days written notice to Owner_ Each liability insurance policy required under Paragraph 11.1 of this Article shall name as additional insured Owner, the Architect, their respective parent companies, the subsidiary, related and affiliated companies of each of the foregoing and the officers, agents and employees of each of the foregoing. The insurance required by Paragraph 11.1 shall be primary with respect to any other insurance available to said additional insured.

11.3 Waivers

11.3.1 Any policy of insurance covering the Contractors or its Subcontractor's owned or rented machinery, tool, equipment, office trailers and vehicles against loss by physical damage shall include an endorsement providing that the underwriters waive their rights of subrogation against Owner, their respective parent companies, the subsidiary, related and affiliated companies of each and the respective officers, agents employees of each Contractor hereby waives, and it shall require its subcontractors to waive, any and all rights of recovery which its contractors or Subcontractors or the insurance carriers of contractors or Subcontractors may not or subsequently have against Owner, their respective parent companies, the subsidiary, related and affiliated companies of each and the respective officers, agents employees of each. Contractor hereby waives, and it shall require its subcontractors to waive, any and all rights of recovery which its Contractors or Subcontractors or the insurance carriers of Contractors or Subcontractors may now or subsequently have against Owner, their respective parent companies, the subsidiary, related and affiliated companies of each, and the respective officers, agents and employees of each, arising out of damage to said machinery, tools, equipment, office trailers or vehicles.

11.4 Claims

11.4.1 The Contractors and its Subcontractors shall assist and cooperate in every manner possible in connection with the adjustment of all claims arising out of the operations conducted under or in connection with the Work and shall co-operate with the insurance carrier or carriers of Owner an of the contractor and subcontractors in all litigated claim and demands which arise out of said operations and which the said insurance carrier or carriers are called upon to adjust or resist.

11.5 Safety Recommendations

11.5.1 The contractor and Subcontractors shall cooperate with safety engineers of Owner and/or interested insurance carriers and shall comply with their recommendations.

11.6 Indemnification and Risk of Loss

11.6.1 The Contractor shall indemnify and hold harmless Owner, the Architect, their respective parent companies, the subsidiary, related and affiliated companies of each, and the officers, agents and employees of each, from and against any and all claims, damages, losses and expenses whatsoever, including attorneys' fees at all trial and appellate levels and in all arbitration and mediation proceedings arising directly or indirectly out of or resulting from the Contractor's failure to full and properly perform its obligations, or the obligations of any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable under the Contract Documents of the performance of the Work. The Contractor shall not raise as a defense to its obligation to indemnify under this Subparagraph 11.6 any intervening or contributing negligence by any of those indemnified hereunder. No such intervening or contributing negligence shall relieve the Contractor from its liability to so indemnify nor entitle Contractor to any contribution, either directly or indirectly by those indemnified hereunder. In any and all claims against those indemnified hereunder by an employee of the Contractor, the Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Subparagraph 11.6 shall not be limited in any way by any limit on the amount or type of damage, compensation or benefits payable by or for the Contractor or any Subcontractor under Workman's Compensation acts, disability benefit acts, or their employee benefit acts. The provisions of this Subparagraph 11.6 shall survive the expiration or sooner termination of this Agreement.

11.7 Property Insurance

11.7.1 Owner shall purchase and maintain property insurance, as its interest may appear, as to its property as referred to in Sub-paragraphs 9.2.3. This insurance shall insure against the perils of fire and extended coverage and for physical loss or damage including, without duplication of coverage, theft, vandalism, and malicious mischief. Said insurance shall carry such appropriate deductible, as Owner shall determine advisable. Said insurance shall not cover loss to the Contractor's or any Subcontractor's owned or rented machinery, tools, equipment, materials, office trailers and vehicles which shall not have been incorporated into the Work as of the time of such casualty or loss or shall be and remain such Contractor's and any Sub-contractor's property notwithstanding this Contract.

ARTICLE 12 - CHANGES IN THE WORK

12.1 Change Orders

12.1.1 Owner may, without affecting the validity of the Contract Documents or any term or provision thereof, order Work or make other changes by altering, adding to or deducting from the Work (herein sometimes referred to as "Change in the Work"). The Contract Sum or Contract Time shall be adjusted accordingly, upwards, or downwards as the case may be, in the manner herein provided. The issuance of a written Change Order signed by Owner is a condition precedent to any payment for Changes in the Work, and proceeding upon oral orders is a waiver by the Contractor of any claim for compensation for any Changes in the Work done without prior written Change Order. Contractor quotations for Change Orders will be forwarded within five (5) working days of the receipt of the request for quotation, and mutual agreement on cost of the Work shall be determined pursuant to Paragraphs 12.1.1 and/or 13.1.2 as the case may be,

within ten (10) working days after the Contractors receipt of the request for quotation. All such Changes in the Work shall be executed under the conditions and requirements of the Contract Documents.

12.1 .2 The cost or credit to Owner to be applied against the Contract Sum resulting from a Change in the Work shall be determined in one or more of the following ways, in Owner's sole discretion:

(A) By unit prices stated in the Contract Documents or subsequently agreed upon.

(B) By cost and the percentage for overhead and profit as defined in the Contract Documents. Cost shall be documented by an itemized listing of all labor, material, quantity, and unit prices; or

(C) By mutual acceptance of a lump sum properly itemized.

12.2 Claims for Additional Cost

12.2.1 No claim by the Contractor for an increase in the Contract Sum or in any fee or reimbursement provided for in the Contract shall be valid unless made in accordance with this Paragraph: The Contractor shall give Owner written notice of the claim not later than five (5) working days after the occurrence of the event giving rise to such claim. Claims shall be made in writing and shall identify the instructions or other circumstances that are the basis of the claim and set forth the Contractor's best current estimate of the dollar amount claimed. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order. The parties acknowledge that the provisions of this Paragraph are included herein solely for the purpose of fixing and limiting the time within which, and the manner in which claims must be made, and that this paragraph does not grant to the Contractor any right to increases in the Contract Sum, not otherwise permitted or provided for by the other terms and provisions of the Contract Documents.

12.2.2 Owner shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum, or an extension of the Contract Time. Such changes may be affected by a written order and accepted by the Contractor in writing.

ARTICLE 13 - UNCOVERING AND CORRECTION OF WORK

13.1 Uncovering of Work

13.1.1 If any Work should be covered contrary to the request of Owner or the Architect or contrary to applicable codes or regulations, it must, if required by either of them, be uncovered for their observation and replaced at the Contractor's expense.

13.1.2 If any Work has been covered which has not been specifically requested for observation prior to being covered, Owner may request to see such Work and it shall be uncovered by the contractor. If such Work is found in accordance with the contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to Owner. If such Work were found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it is found that this condition was caused by a separate Contractor employed as provided in Article 6, and in that event Owner shall be responsible for payment of such costs.

13.2 Correction of Work

13.2.1 The Contractor shall promptly correct all Work rejected by Owner or the Architect as defective or as failing to confirm to the Contract Document whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all cost of correcting such rejected Work, including the cost of the Architect's additional services thereby made necessary.

13.2.2 If, within one (1) year after the Date of Substantial completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contract shall correct it promptly after receipt of a written notice from Owner to do so unless Owner has previously give the Contractor a written acceptance of such condition.

13.2.3 All such defective or non-conforming Work under Subparagraph 12.2.1 and 13.2.2 shall be removed from the Job Site if necessary, and the work shall be corrected to comply with the Contract Documents without cost to Owner.

13.2.4 If Contractor does not remove such defective or non-conforming Work within a reasonable time fixed by written notice from Owner, Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, Owner may, upon ten (10) additional days written notice, sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for additional architectural services. If such proceeds of sale do not cover all costs, which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to Owner. The obligations of the Contractor under this Paragraph shall be in addition to and not in limitation of any obligations imposed on it under any law or by any special guarantees under this Contract.

13.2.5 If the Contractor fails to correct such defective or non-conforming Work, Owner may correct it in accordance with Paragraph 1.5 of these General Conditions. In the event of a defect found after the Date of Substantial Completion which the Contractor is obligated to correct pursuant to subparagraph 13.2.2, Owner may, at its option. in lieu of giving the Contractor an opportunity to correct such defect, cause such corrective Work to be done by others and charge the contractor with the reasonable cost thereof. Such charge shall be due and payable on presentation.

13.3 Acceptance of Defective or Nonconforming Work

13.3.1 If Owner prefers to accept defective or non-conforming Work, it may do so instead of requiring its removal or correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract sum, or if the amount is determined after final payment, it shall be paid by the Contractor.

ARTICLE 14 - TERMINATION OF THE CONTRACT

14.1 Termination by Owner

14.1.1 If the Contractor is adjudged as bankrupt, or if it makes a general assignment for the benefit of its creditors or if a receiver is appointed on account of the Contractors insolvency, or if the Contractor should refuse or should fail, or be unable for any reason, to make prompt payment to subcontractors or for material or labor, or disregard laws, ordinances, governmental regulations or the instructions of Owner or the Architect, or

otherwise by guilty of a violation of or in default under any provision of the Contract documents, then Owner may, without prejudice to any right or remedy and after giving the Contractor and its surety, if any, two (2) working days written notice, terminate the employment of the contractor and take possession of the site and all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method Owner may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

14.1.2 The Owner may cancel or terminate the Contract at any time by delivering to the Contractor a written Notice of Termination or Cancellation specifying the extent of termination or cancellation and the effective date. If the Contract is canceled or terminated by the Owner pursuant to this paragraph, the Contractor will only be entitled to recover the costs the Contractor has insured on the Contract through the date off termination or cancellation plus a reasonable overhead and profit on the work actually performed through the date of termination or cancellation.

14.1.3 The Contractor acknowledges that the manning of the Job Site with a labor force adequate to perform the Contract Work diligently, expeditiously and properly is a material obligation of this Contract. The Contractor agrees that If its employees or agents, subcontractors or to perform Work on this Contract because of labor dispute, picket line, strike, or for any other reason, it will immediately secure sufficient temporary or permanent replacements to perform the contract Work in accordance with its obligation. It is agreed that if the Contractor fails to maintain at the Job Site a full labor force that is performing Contract Work for more than two (2) consecutive working days for more than five (5) working days in any calendar year month; Owner may, in addition to any other remedies it will have immediately terminate this Contract by written notice to the Contractor and award the unfinished Contract Work to another party. Upon receipt of such notice, the Contractor will immediately vacate the Job Site. In the event that this Contract is so terminated, the only obligation of Owner shall be to pay the Contractor within one (1) week after termination for the Work in place that is approved by the Owner, and for any usable materials stored on the Job Site desired by Owner, less any earlier payments, and less any damages or expenses suffered by Owner on account of the Contractors breach of this Contract.

14.1.4 If the unpaid balance of the Contract Sum exceeds the cost of the finishing the Work including compensation for any additional engineering, management, architectural, legal or administrative services, such excess shall, after completion of the Work, be paid by Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to Owner.

14.1.5 In all cases where Owner terminates the Contract pursuant to Paragraph 14.1.1, in addition to all other rights and remedies it may have in equity or at law, it shall have the same right to retain monies owing to the Contractor as it would have to retain such monies from and against final payments.

14.1.6 The remedies provide herein above are in addition to and not in limitation of any other rights or remedies available to Owner.

END OF GENERAL CONDITIONS

Division 01 – General Requirements

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 - PROJECT / WORK IDENTIFICATION:

1.01 SUMMARY BY REFERENCES: The Work of this Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, Drawings, Addenda and other modifications to the Contract Documents issued after the initial isse of this Project Manual, and including but not necessarily limited to printed material referenced by any of these. It is recognized that the Work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions and other forces in addition to these Contract Documents.

1.02 ABBREVIATED SUMMARY OF THE WORK: Briefly and without force and effect upon the Contract Documents, the Work of the Contract can be summarized to include the following, as indicated in the Drawings:

A. DEMOLITION, of existing structures and infrastructure.
B. SITEWORK, including site demolition, site improvements such as pavement, curbs and sitework appurtenances, installation or modification of site utilities; and new landscape and landscape irrigation system work throughout the Project site;
C. NEW BUILDING CONSTRUCTION to include general construction and finishes, with associated structural, fire-protection, mechanical, electrical and plumbing (MEP) systems:
D. ELECTRICAL POWER for phone/communications, controls, sound, security or data systems
E. FINAL CONNECTIONS of electrical, mechanical or plumbing services to casework, fixtures, signage, Food Service Equipment (FSE) and beverage dispensing equipment.

1.03 FOOD-SERVICE EQUIPMENT (FSE) COORDINATION AND WORK BY GENERAL CONTRACTOR: Unless otherwise indicated, FSE and beverage dispensing equipment will be furnished and installed by the Owner's FSE vendor and beverage suppliers, as applicable. The General Contractor is also required to provide the following:

FOOD SERVICE EQUIPMENT RESPONSIBILITY SCHEDULE

ITEM / DESCRIPTION	CFCI	OFCI	NIC	NOTES:
Pest Control			X	By Owner's pest control vendor after Substantial Completion
Stainless Steel Wall Paneling			X	Furnish and install by Owner's FSE vendor, typically only at hoods unless otherwise indicated
Stainless Steel Corner Guards	X			Coordinate with S/S wall paneling installation
Building penetrations and weather seals of walls or roofs for equipment connections	X			GC to provide weather sealed openings for ductwork, refrigeration lines, electrical and control wiring, as applicable
Water filters at FSE, beverage equipment and ice-making equipment:		X		Owner's FSE or beverage equipment supplier to provide appropriate water filter – at each unit or manifolded when indicated, to be installed by the GC's plumbing subcontractor.
Hot and cold water service supplies and connections	X			GC's plumbing subcontractor: Provide quarter-turn lever-handled wall shut-off valves with escutcheons, water-supply strainers, and similar accessories. Provide approved backflow prevention devices with shut-offs at beverage-dispensing equipment (including coffee brewers, soda dispensers, and ice makers) manifolded as appropriate Provide "interconnection" piping from separate but related FSE units, such as: water piping from a booster heater to a dishwasher or power-wash sink basin; from a waste disposer to the disposer cone and sinks troughs; from a dishwasher drain tempering kit; from water filters to ice machines, steamers and beverage dispensing equipment; and from control panels to water-wash hood systems.
Waste drains from FSE, beverage dispensing or ice-making equipment	X			GC's plumbing subcontractor: Install sink accessories such as basket-drains and lever-handled gate valves furnished by the Owner's FSE vendor, and provide gate-valves at hot-food and soup wells in convenient, accessible locations below units. Typically provide "indirect connections" with a code-compliant air-gap to above a waste drain (floor drain or floor sink) , unless indicated to have a "direct connection" with a P-trap, and make all drain connections required for FSE and beverage equipment.
HAND SINKS (wall mounted or counter-mounted)		X		Furnished by Owner's FSE vendor – including faucets unless otherwise indicated. Mount to wall or countertop and seal to wall finish all around by GC's plumbing subcontractor.

FOOD SERVICE EQUIPMENT RESPONSIBILITY SCHEDULE

ITEM / DESCRIPTION	CFCI	OFCI	NIC	NOTES:
- Soap dispenser, paper towel dispenser, waste receptacle, and hand-washing sign at hand sinks	X			GC to provide unless otherwise indicated. Install health-department approved "handwashing sign", at hand sinks or bathroom lavatories serving food-preparation areas.
SINKS: 3-compartment, prep and other food-service sinks			X	Install by Owner's FSE vendor (unless otherwise indicated) including anchorage and sealing to wall, with final water and drain connections installed by GC's plumbing subcontractor.
FSE with gas connections:		X		GC's plumbing subcontractor: Provide flexible gas hoses (unless otherwise indicated to be furnished by Owner's FSE vendor). Tighten and seal internal piping at manifolds of ranges, fryers, and similar equipment – which is typically provided only with "finger tight" internal connections.
Final electrical connections to FSE and beverage dispensing equipment	X			GC's electrical subcontractor: Provide flexible conduit, conductor and connections (except when FSE or beverage equipment is provided with a flexible power-cord "whip") and make final electrical power connection to a J-box unless furnished with a cord and plug. Provide power and control switches to booster heater at dishwashing equipment. Provide lamps in light fixtures within hoods and walk-in coolers and freezers.
Lamps in electrical light fixtures	X			GC's electrical subcontractor to provide appropriate lamps within light fixtures in exhaust hoods and walk-in coolers and freezers.
WALK-IN COOLERS / FREEZERS			X	Install by Owner's FSE vendor, including panel set-up and refrigeration system connections, except as follows:
- Floor preparation, insulated freezer floor, and floor finish at walk-in coolers and freezers	X			Provide level and smooth floor substrate aligned with floor finish outside of cooler / freezer units and provide floor finish inside walk-ins when a separate insulated floor is not indicated as part of walk-in system. Provide a separate, insulated floor-slab at walk-in freezers, as detailed on the drawings.
- Remote condensing units for walk-in coolers / freezers		X		Provide units by Owner's FSE vendor. GC to provide structural support and special inspections (when required), with final refrigerant connections by Owner's FSE vendor.
- Electrical door heater and light fixtures at walk-in coolers and freezers		X		Furnish as part of walk-in cooler system by Owner's FSE vendor, and connect to power by GC's electrical subcontractor
- Waste drains from walk-in cooler or freezer's condenser drip pans (located inside the walk-in compartment)	X			Provide by GC's plumbing subcontractor inside walk-in unit's compartments to nearest floor sink or drain outside of unit.
- Final electrical connections of walk-in coolers and freezers	X			GC's electrical subcontractor to make final electrical connections to both the interior walk-in's evaporator/fan coil unit, and to the condenser unit – whether on top of the unit, or remote on the roof.
- Heat-trace wrap of walk-in freezer unit's condenser pan drain line	X			GC's electrical subcontractor to provide heat-trace tape and insulation wrap around freezer unit's evaporator pan drain line until it exits the freezer compartment
HOTSY PRESSURE WASHER		X		GC needs to mount pressure washer and brackets on wall and land all electrical and plumbing at the specified termination point. Hotsy will make final connections. GC will terminate electrical at the Disconnect and Hotsy will wire from Disconnect to the pressure washer itself.

A. FSE / BEVERAGE EQUIPMENT COORDINATION MEETING: Conduct an on-site meeting with the Owner's FSE and beverage equipment supplier representatives, and with applicable subcontractor representatives that will perform final service connections to such equipment. Coordinate with and notify the Owner not less than fourteen (14) calandar days prior to the proposed meeting time and date. Within the meeting, review equipment items being provided, and the required installation requirements and final connections necessary to make them operational – to assure that all components necessary will be available on-site for installation, with responsibility for installation coordinated between all parties. .

B. FINAL SERVICE CONNECTIONS of fire-protection, plumbing, mechanical / controls, and electrical systems to FSE and beverage dispensing equipment, as required by the equipment indicated to be provided, and as indicated below:

1.04 CONTRACT TYPE: Unless otherwise indicated in the Owner / Contractor Agreement, this Work will be constructed under a single (prime) general construction contract.

1.05 BONDS: Labor and Material Payment bonds covering faithful performance of subcontracted work and payment of all obligations thereunder, if the Contractor is required to furnish such bonds to the Owner, and

1.06 LIABILITY INSURANCE purchased and maintained to protect the Contractor from claims for the same terms and liability limits that the Contractor is required to provide to Owner.

PART 2 - SEPARATE CONTRACTS:

2.01 THE OWNER RESERVES THE RIGHT TO AWARD Separate Contracts to furnish and/or to install portions of the Project, including but not necessarily limited to the following:

A. BUILDING SIGNAGE (except for building address numbers, and other code-required signs indicated herein
B. FOOD SERVICE EQUIPMENT (FSE) & Beverage Dispensing Equipment
C. FIXTURES AND FURNISHINGS including tables and chairs
D. TELECOMMUNICATIONS and/or data system network(s) within the building
E. SECURITY SYSTEM, including card-access controls, surveillance cameras, and a monitoring control system

2.02 THE ABOVE LIST may be affected by Alternates accepted or rejected by the Owner.

2.03 COOPERATE FULLY WITH SEPARATE CONTRACTORS so that work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

2.04 REVIEW SHOP DRAWINGS prepared by separate contractor(s) or suppliers of related Work for general conformance with the intent of the Construction Documents, and for service-connections and clearances if required. Verify that required rough-ins, connections and clearances will be provided, and report any discrepancies.

2.05 PROVIDE SCHEDULED DATES for delivery and installation to Separate Contractors or suppliers, and notify them when construction is ready for their delivery and installation Work. Provide openings, delivery access, and staging space for installation. Contact the Owner if scheduling or communication problems arise regarding separate contractor(s).

PART 3 - CONTRACT DOCUMENT FORMATS AND CONVENTIONS

3.01 SECTION IDENTIFICATION: The Specifications use Section numbers and titles to help cross-referencing within the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete as not all numbers are used. Consult the Table Of Contents at the beginning of the Project Manual to determine Section numbers and names of Specification Sections within the Contract Documents.

3.02 DIVISION-01 “GENERAL REQUIREMENTS” Sections apply to the Work of the entire Project, and to all Sections of the Specifications. When a more specific requirement is indicated within an individual Specification Section or is indicated with a note on the Drawings, that requirement takes precedence over the Division-01 requirement for that Section’s Work only.

3.03 CONTRACT DOCUMENT LANGUAGE: The Contract Documents (including the Drawings and Specifications) use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

3.04 ABBREVIATED LANGUAGE: Language used in the Contract Documents is abbreviated. Words and meanings will be interpreted as appropriate. Words implied, but not stated, will be inferred as the sense requires. Singular words will be interpreted as plural, and plural words will be interpreted as singular where applicable as the context of the Contract Documents indicates.

3.05 IMPERATIVE MOOD AND STREAMLINED LANGUAGE are generally used in the Contract Documents. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

3.06 THE WORDS "SHALL," "SHALL BE,", "SHALL COMPLY WITH," or “WILL, “MUST” or “MUST COMPLY WITH” - depending on the context, are implied where a colon (:) is used within a sentence or phrase.

3.07 CONSTRUCTION DOCUMENT TERMINOLOGY:

A. **C F C I:** Contractor Furnished, Contractor installed
B. **FURNISH**: Supply and deliver to the site, ready for unloading, unpacking, assembly, installation, or as applicable in each case.
C. **INSTALL:** To perform construction operations at the Project site, including but not limited to: unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
D. **N I C:** Not In Contract (Owner Furnished and Owner Installed)
E. **O F C I**: Owner Furnished, Contractor installed
F. **O F O I**: Owner Furnished and Owner installed
G. **PROVIDE**: To both furnish AND install by the Contractor (CFCI), complete and ready for the Owner’s use.
H. OWNER FURNISHED – CONTRACTOR INSTALLED (OFCI) PRODUCTS:

1. COORDINATE WITH AND INSTALL all Owner-Furnished products, including but not limited to providing schedule information regarding completion of prior work and allowable time periods for performance by the Separate Contractors, receiving at site, verifying receipt, handling, storage on-site, and mechanical/electrical/plumbing service connections, as applicable. The Owner will pay directly for the product costs including delivery to the Project Site. Provide all OFCI suppliers with an accurate address with accurate delivery directions and instructions.
2. AT DELIVERY, INSPECT PRODUCTS FOR DAMAGE at the Project Site. If items are damaged, defective or missing, mark the bill of lading as necessary. Contact the freight line and request a damage inspection of the items and submit a damage claim. Notify the owner within five (5) days of receipt of any missing, damaged or otherwise defective products – or replace/repair items at no cost to the Owner.

3. PROTECT PRODUCTS from damage, including damage from exposure to the elements. Replace or repair items damaged as a result of Construction operations. Damage resulting from inappropriate storage or handling, including but not limited to environmental conditions, will be the responsibility of the Contractor. No claim for additional costs due to damage to stored products or equipment will be considered. Repair damage to Owner-furnished products caused by construction operations to the Owner's satisfaction

END OF SECTION 01 11 00

SECTION 01 14 19 – USE OF SITE

PART 1 - CONTRACTOR WILL HAVE FULL USE of the Project Site for construction operations during the construction period. The Contractor's use of premises is limited only by the Owner's right to engage separate contractors for other work at the Project Site.

1.01 CONFINE OPERATIONS to areas within the Contract limits indicated and/or within the property lines of the site, and if not specifically indicated, within areas designated or approved for use by the Owner. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed. Confine stockpiling of materials and location of storage sheds, if any, to areas approved for such use.

A. Do not unreasonably encumber the site with materials or equipment. If additional storage is necessary, obtain and pay for such storage areas off-site.
B. Parking of workers's automobiles will be confined to defined areas.
C. Keep driveways and existing site entrances clear and unobstructed at all times. Do not use these areas for parking or storage of materials, except as otherwise authorized.
D. Schedule deliveries to minimize requirements for storage of materials.

1.02 PUBLIC STREET LIMITATIONS: Comply with AHJ representatives regarding regulations and/or restrictions on use of public streets.

1.03 POTENTIALLY DISRUPTIVE CONSTRUCTION ACTIVITIES: Limit the time and duration of potentially disruptive construction operations involving noise, vibration, odors, or any other activities that MAY be considered as objectionable by adjacent residential neighbors, and comply with rules and regulations of the AHJ as applicable. Coordinate as follows:

1.04 WORK HOURS: Limit exterior operations to occur between 6:00 AM and 6:00 PM on Mondays through Fridays, with weekend hours between 8:00 AM and 5:00 PM, except as otherwise authorized by the Owner in writing; and also comply with any local regulations.

1.05 NOTIFY THE OWNER and appropriate AHJ representatives not less than two (2) days in advance of ANY potentially disruptive operations.

1.06 OBTAIN THE OWNER'S WRITTEN PERMISSION before proceeding with potentially disruptive operations.

PART 2 - EXISTING UTILITY INTERRUPTIONS: Do not interrupt existing public utilities serving this site or other adjacent properties without the prior written approval of the Owner, and as follows:

2.01 NOTIFY OWNER AND UTILITY SERVICE PROVIDER not less than five (5) days in advance of the proposed utility interruption

2.02 OBTAIN WRITTEN AUTHORIZATION by the Utility Service provider before proceeding with utility interruptions.

2.03 PARTIAL OWNER'S USE: The Owner reserves the right to install fixtures, furnishings, equipment, signage, and communication systems, including phone, data networks, security or control systems within completed areas of the Work before Substantial Completion, provided that such use is acceptable to the AHJ, and it does not interfere with completion of the Work. This use will not constitute acceptance or partial acceptance of the Work.

PART 3 - DEVELOPER / LANDLORD APROVALS

3.01 OBTAIN THE DEVELOPER / LANDLORD'S CONSTRUCTION CRITERIA, Tenant Construction Manual, or other written construction requirements applicable to the Work of this Project (if it exists) and acknowledge receipt to the Owner. Become familiar with all construction rules and regulations of the Developer / Landlord: maintain a printed copy at the Project Site and comply with all requirements. No additional costs will be allowed for the Contractor's neglect of the Landlord's requirements.

3.02 USE OF COMMON AREA electrical power is not permitted, and access to existing public areas is subject to control by the Landlord for security purposes, and to protect existing finishes from damages.

3.03 DEVELOPER / LANDLORD REQUIRED DEPOSIT AND SUB-CONTRACTORS: A refundable Construction Damage Deposit may be required of the Contractor before start of construction activities. If so required and unless otherwise indicated, this deposit is refundable to the Contractor upon successful completion - unless there is damage to the existing Work. Include all costs for a construction damage deposits if required by the Developer / Landlord. The amount of the deposit will be considered an overhead expense of the Contractor and is not to be considered as a cost of the Work. Include all costs for use of all Developer / Landlord required sub-contractors (including but not limited to roofing modifications, fire-suppression, or building alarm and automation system work) within the Contract Sum.

END OF SECTION 01 14 19

SECTION 01 21 00 – ALLOWANCES

PART 1 - INCLUDE WITHIN THE CONTRACT SUM adequate budget and bonding (when required) for the following allowance amounts, covering products and materials not selected or well defined prior to bidding.

1.01 INCLUDE ALL COSTS for materials and equipment delivered to the site, including applicable taxes, less applicable trade discounts, unless otherwise indicated below. The cost of installation, including unloading, handling, labor, installation costs, overhead, profit and other expenses related to the following allowance amounts is to be included within the Contract Sum – and not within the following amounts.

PART 2 - SCHEDULE OF CASH ALLOWANCES:

2.01 **ALLOWANCE ITEM # 1 – N/A**.

END OF SECTION 01 21 00

SECTION 01 22 00 – UNIT PRICES

PART 1 - INCLUDE all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit. Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

1.01 UNIT PRICE NO. ONE (1) – ADDITIONAL SOIL EXCAVATION: ADD for additional excavation and legal disposal of unsatisfactory soil materials, to include replacement with engineered fill using satisfactory borrow materials in accordance with applicable Division-31 Section, requirements of the Geotechnical Report, and with the Owner's on-site geotechnical testing and inspection entity. Coordinate this unit price with applicable Allowance indicated above.

A. Unit of Measurement: Cubic yard of soil material excavated, based on survey of volume removed.

1.02 UNIT PRICE NO. TWO (2) – ADDITIONAL ROCK EXCAVATION: ADD for additional excavation and legal disposal of rock, to include replacement with engineered fill using satisfactory borrow materials in accordance with applicable Division-31 Section, requirements of the Geotechnical Report, and with the Owner's on-site geotechnical testing and inspection entity. Coordinate this unit price with applicable Allowance indicated above.

A. Unit of Measurement: Cubic yard of rock excavated, based on survey of volume removed.

1.03 UNIT PRICE NO. THREE (3) – OVER-EXCAVATION & ENGINEERED FILL BELOW FOUNDATIONS: Change the quantity as indicated in the Drawings when directed by the Owner's Soil's Engineer for excavation, controlled backfill and compaction of engineered fill below foundations, including legal disposal of excess unsatisfactory soil materials, ADD or DEDUCT per cubic yard.

1.04 UNIT PRICE NO. FOUR (4) – OVER-EXCAVATION & ENGINEERED FILL BELOW FLOOR-SLABS AND PAVEMENT: Change the quantity indicated in the Drawings when directed by the Owner's Soil's Engineer for excavation, controlled backfill and compaction of engineered fill below floor-slabs and pavement, including legal disposal of excess unsatisfactory soil materials, ADD or DEDUCT per cubic yard.

END OF SECTION 01 22 00

SECTION 01 23 00 – ALTERNATES

PART 1 - PROVIDE alternative proposals to be added to or deducted from the amount of the Base Bid amount if the corresponding change in scope is accepted by the Owner, in accordance with requirements listed herein. Include within the alternative proposal all associated costs, including but not limited to materials, labor, equipment and fees required to provide the Work item.

PART 2 - COORDINATE related Work and modify or adjust adjacent elements as necessary to ensure that the Work affected by each accepted alternate is complete and fully integrated into the Project. Immediately following Contract award, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates. Include as part of each alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

PART 3 - ALTERNATES

3.01 ALTERNATE # 1 - PROVIDE PERFORMANCE & LABOR/MATERIAL PAYMENT BONDS: If this Alternate is accepted by the Owner, provide bonds covering faithful performance of the Contract and payment of obligations arising thereunder, in amounts equal to one hundred percent (100%) of the Contract Sum. Obtain bonds through the Contractor's usual sources pending approval of Surety by the Owner. Deliver bonds to the Owner not later than three (3) days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, submit evidence satisfactory to the Owner that the bond will be provided.

END OF SECTION 01 23 00

SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 - THIS SECTION includes administrative and procedural requirements for substitutions of products, systems, equipment or installation methods, and product options.

1.01 DEFINITIONS:

A. BASIS-OF-DESIGN PRODUCT SPECIFICATION: Where a specific manufacturer's product is named and accompanied by the words "Basis Of Design", including make or model number or other designation, that product establishes the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for the purpose of evaluating comparable products of other named manufacturers, through the substitutions process.

B. COMPARABLE PRODUCT: A Product that is demonstrated and approved through the substitution process, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of a specified product.

C. NAMED PRODUCTS: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, current as of date of the Contract Documents.

D. SUBSTITUTION: A change in products, materials, equipment, or methods of construction from those required by the Contract Documents as proposed by Contractor.

E. SUBSTITUTIONS FOR CAUSE: Changes proposed by the Contractor that are required due to changed Project conditions, such as unavailability of a product, regulatory changes, or unavailability of required warranty terms.

F. SUBSTITUTIONS FOR CONVENIENCE: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but that may offer advantage to either the Contractor or to the Owner.

PART 2 - SUBSTITUTION REQUESTS:

2.01 SUBMIT ELECTRONIC MEDIA FORMATTED REQUESTS only from the Contractor for consideration by the Architect. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles, as applicable.

2.02 SUBSTITUTION REQUEST FORM: Use CSI Form 13.1A – most recent edition

2.03 DOCUMENTATION: Show compliance with requirements for substitutions and the following, as applicable:

2.04 A STATEMENT indicating why specified material or product cannot be provided.

2.05 COORDINATION INFORMATION including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

2.06 DETAILED COMPARISON of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

2.07 PRODUCT DATA, including drawings and descriptions of products and fabrication and installation procedures.

2.08 SAMPLES, where applicable or requested.

2.09 LIST OF SIMILAR INSTALLATIONS for completed projects with project names and addresses and names and addresses of architects and owners.

2.10 MATERIAL TEST REPORTS from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

2.11 RESEARCH/EVALUATION REPORTS evidencing compliance with building code in effect for Project, from a model code organization acceptable to AHJ representatives.

2.12 DETAILED COMPARISON OF CONSTRUCTION SCHEDULE using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

2.13 COST INFORMATION, including a proposal for change, if any, to the Contract Sum.

2.14 CONTRACTOR'S CERTIFICATION that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

2.15 CONTRACTOR'S WAIVER OF RIGHTS TO ADDITIONAL PAYMENT OR TIME that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

PART 3 - CONTRACTOR'S SUBSTITUTION ACTION (AFTER AWARD):

3.01 SUBSTITUTIONS FOR CAUSE: Submit immediately upon discovery of the need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

3.02 SUBSTITUTIONS FOR CONVENIENCE: Submit within sixty (60) days after award of contract or notice to proceed. After that period, requested will be considered or rejected at the sole discretion of the Architect. In addition to the above requirements, the proposed Substitution must provide a substantial advantage to the Owner in cost, time, energy conservation and other considerations after deducting the added Owner's costs, including but not limited to additional compensation to the Architect for evaluation and redesign, increased cost of other construction, and similar considerations.

PART 4 - CONSIDERATION OF SUBSTITUTION REQUESTS will be made only if in the Architect's opinion, the following items are well documented and substantiated with the Substitution Request:

4.01 It is consistent with the Contract Documents and will produce the indicated results, without extensive revision to the Contract Documents

4.02 That it will not adversely affect the Construction Schedule

4.03 That it has received necessary approvals of AHJ's

4.04 That it has been coordinated with other portions of the Work, and is compatible with other products or materials

4.05 That it provides the specified warranty

PART 5 - ARCHITECT'S ACTION: If necessary, the Architect may request additional information or documentation for evaluation within one week of receipt of a request for substitution. Contractor will be notified of acceptance or rejection of the proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later. Use the original product specified if no decision on use of a proposed substitution is made within the time indicated.

5.01 FORM OF ACCEPTANCE: Change Order.

END OF SECTION 01 25 00

SECTION 01 26 00 – CONTRACT MODIFICATION REQUIREMENTS

PART 1 - THIS SECTION SPECIFIES administrative and procedural requirements for handling and processing Contract modifications.

1.01 SUPPLEMENTAL INSTRUCTIONS will be issued by the Architect authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

PART 2 - PROPOSAL REQUESTS

2.01 OWNER-INITIATED PROPOSAL REQUESTS: The Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

2.02 PROPOSAL REQUESTS ISSUED BY ARCHITECT ARE FOR INFORMATION ONLY. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2.03 SUBMIT A QUOTATION estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change, within the time specified in Proposal Request after receipt.

2.04 INCLUDE A LIST OF QUANTITIES of products required or eliminated and unit costs, with total amount of purchases and credits to be made.

2.05 IF REQUESTED, FURNISH SURVEY DATA to substantiate quantities. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

2.06 INCLUDE AN UPDATED CONTRACTOR'S CONSTRUCTION SCHEDULE that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

PART 3 - CONTRACTOR-INITIATED PROPOSALS: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.

3.01 INCLUDE A STATEMENT OUTLINING REASONS FOR THE CHANGE and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

3.02 INCLUDE A LIST OF QUANTITIES OF PRODUCTS required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3.03 INDICATE APPLICABLE TAXES, delivery charges, equipment rental, and amounts of trade discounts.

3.04 INCLUDE AN UPDATED CONTRACTOR'S CONSTRUCTION SCHEDULE that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

3.05 COMPLY WITH DIVISION-01 SECTION "PRODUCT REQUIREMENTS" if the proposed change requires substitution of one product or system for product or system specified.

3.06 PROPOSAL REQUEST FORM: Use AIA Document G709 for Proposal Requests, or other form approved in advance by the Architect.

PART 4 - ALLOWANCE ADJUSTMENTS

4.01 TO ADJUST ALLOWANCE AMOUNTS, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

4.02 INCLUDE INSTALLATION COSTS in purchase amount only where indicated as part of the allowance.

4.03 PREPARE EXPLANATION AND DOCUMENTATION to substantiate distribution of overhead costs and other margins claimed, if requested.

4.04 SUBMIT SUBSTANTIATION OF A CHANGE IN SCOPE OF WORK, if any, claimed in Change Orders related to unit-cost allowances.

4.05 THE OWNER RESERVES THE RIGHT to establish the quantity of work-in-place by independent quantity survey, measure, or count.

4.06 SUBMIT CLAIMS FOR INCREASED COSTS because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 21 days after such authorization.

4.07 DO NOT INCLUDE CONTRACTOR'S OR SUB-CONTRACTOR'S INDIRECT EXPENSE in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

4.08 NO CHANGE TO CONTRACTOR'S INDIRECT EXPENSE IS PERMITTED for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 5 - CHANGE ORDER PROCEDURES

5.01 THE ARCHITECT WILL ISSUE CHANGE ORDERS on AIA Document G701 on a monthly basis (if necessary) for execution by the Owner and Contractor. Only those Proposal Requests or Requests for Proposals that have been previously approved by the Owner will be included.

END OF SECTION 01 26 00

SECTION 01 26 13 – REQUESTS FOR INTERPRETATIONS (RFI'S)

PART 1 - SUBMIT REQUEST FOR INTERPRETATION (RFI's) immediately up discovery of the need for a clarification after review of the Contract Documents and the field conditions. Include a detailed description of the issue encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A – "Request for Interpretation" or equivalent form approved for use in advance. Submit RFI's only from the Contractor – RFI's from subcontractors or suppliers must be forwarded to, reviewed by, approved by, and submitted directly from the Contractor.

1.01 SUBMIT RFI'S ONLY AFTER a thorough review of ALL applicable Contract Documents and the field-conditions, and ONLY if the Contractor is still not able to resolve the problem or clarify the issue based on the information contained therein.

1.02 RESPONSIBILITY FOR ADDITIONAL COSTS: If the information requested by the Contractor is apparent from field observations, or is in fact contained within the Contract Documents, or is reasonably inferable from either, the Contractor will be responsible to the Owner for all reasonable costs expended by the Owner, including the hourly costs of the Owner's Construction Representative and/or the professional fees and expenses of the Architect/Engineer, for the Additional Services required to provide such information.

1.03 RESPONSE TO RFI'S IS NOT AN AUTHORIZATION to proceed with additional or extra Work.

END OF SECTION 01 26 13

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 - 15 DAYS (MINIMUM) PRIOR TO SUBMITTAL OF THE INITIAL APPLICATION FOR PAYMENT, the following items must be submitted:

1.01 (1) listing of subcontractors and principal suppliers and fabricators,

1.02 (2) the progress schedule,

1.03 (3) preliminary schedule of values,

1.04 (4) performance and/or payment bonds, if required, and

1.05 (5) copies of acquired building permits for performance of the Work.

PART 2 - SCHEDULE OF VALUES: Provide a breakdown of the Contract Sum, as required by the General Conditions. Coordinate preparation and correlate line item breakdown with Specification Sections, and as required to facilitate continued evaluation of payment requests and progress reports. Break down principal subcontract amounts into several line items, to the approval of the Owner and/or Architect. Provide a separate line-item for each allowance, or for each unit-cost allowance as a product of the unit cost multiplied by the measured quantity. Indicate temporary facilities or other major cost items that are not a direct cost of actual work-in-place as separate line items. Show overhead and profit as a separate line item amount – to facilitate review of lien-waivers from sub-contractors and material suppliers. Round-off individual amounts to the nearest whole dollar, but with the total equal to the Contract Sum. Arrange the schedule with columns to indicate the generic name of the item, related specification sections, the subcontractor, supplier, manufacturer or fabricator, change orders (numbers) which have affected the value, the dollar value of the item, and the percentage of the Contract Sum to the nearest one- hundredth percent and adjusted to total 100 percent.

2.01 PRIOR TO INITIAL PAYMENT APPLICATION SUBMITTAL, the following are required:

A. List of subcontractors.
B. Schedule of Values.
C. Contractor's Construction Schedule.
D. Products list.
E. Schedule of unit prices.
F. Submittals Schedule .

G. List of Contractor's staff assignments, and principal consultants.
H. Copies of all applicable building permits (except for those obtained directly by the Owner)
I. Copies of authorizations and licenses from AHJ representatives for performance of the Work.
J. Initial progress report.
K. Report of preconstruction conference.
L. Certificates of Insurance (AIA G705) and evidence that Contractor's insurance has been secured.
M. Performance and payment bonds (if required).

2.02 APPLICATIONS FOR PAYMENTS: Submit AIA Document G703–1992 "Application and Certificate for Payment – Continuation Sheets" or an equivalent document approved in advance to the Architect. Complete every entry on the form, matching data on the Schedule of Values and correlated with the Contractor's Construction Schedule – using updated schedules if revisions have been approved. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Each Application must be consistent with previous applications. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements. Include amounts of Change Orders and Construction Change Directives as separate line-items.

2.03 TIMING: Unless otherwise noted in the Agreement Form, the required date for submittal will be the tenth (10^{th}) day of each month.

2.04 TIME PERIOD: Unless otherwise noted in the Agreement Form, the time-period covered by each Application for Payment starts on the first (1^{st}) day of a month and ends on the last day of the same month.

2.05 SUBMIT an email and deliver THREE (3) notarized originals for receipt within 24 hours of the email

2.06 ATTACHMENTS: Include a transmittal letter listing attachment and appropriate information regarding the Application, with an updated Schedule-of-Values and Construction Progress Schedule (if applicable) and partial lien-waivers (if required by Owner).

2.07 PARTIAL LIEN WAIVERS: At any time throughout the project, the Owner reserves the right to require submittal of partial lien waivers indicating that lien rights are "unconditionally released" for all amounts previously paid, and "conditionally released" or contingent only upon receipt and bank clearance of the current payment-application amounts then due. Unless otherwise required by the Owner, provide partial waivers from the Contractor, and for all subcontractors, sub-subcontractors, suppliers and any other entities lawfully entitled to file a lien more than One Thousand Dollars ($1,000.00) arising out of the Work of the Construction Contract. The Owner reserves the right to designate which entities involved in the Work must submit waivers. Submit all waivers on the 1990 Edition of the "Waiver and Release of Lien" form as issued by the Construction Industry Affairs Council of Greater Kansas City Inc (CIAC) or other form provided or approved by the Owner, fully executed in a manner acceptable to Owner.

PART 3 - PAYMENT APPLICATION AT SUBSTANTIAL COMPLETION: After the Certificate of Substantial Completion is issued, submit an Application for Payment showing 100 percent completion. Provide a copy of the Certificate of Occupancy from the applicable AHJ indicating that the Project can be occupied by the Owner, and a current accounting statement showing all changes to the Contract Sum.

3.01 INCLUDE WITH THE FINAL PAYMENT APPLICATION the following:

A. Unconditional lien-releases for all subcontractors and material suppliers
B. Evidence of completion of Project closeout requirements.
C. Insurance certificates for products and completed operations
D. Proof that all taxes, fees, and similar obligations were paid.
E. Updated final statement, accounting for final changes to the Contract Sum.
F. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
G. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
H. AIA Document G707, "Consent of Surety to Final Payment." Evidence that claims have been settled.
I. 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.
J. Final, liquidated damages settlement statement.

END OF SECTION 01 29 00

SECTION 01 31 00 – MANAGEMENT & COORDINATION

PART 1 - CONTRACT DOCUMENTS

1.01 CAREFULLY STUDY AND COMPARE the Contract Documents and drawings of the existing building (if available), with the existing conditions at the project-site. Report errors, inconsistencies or omissions discovered for clarification. The Contractor will be responsible for repair or correction costs if work is executed with knowledge that it involves an error, inconsistency or omission - without this notice.

1.02 CONTRACT DOCUMENTS ON-SITE: Maintain a complete set of the most recent Construction Documents (Drawings and Specifications) at all times, with all applicable contract modification documents including Supplemental Instructions and approved Change Orders applicable to the Work.

PART 2 - COORDINATION AND ADMINISTRATION

2.01 SCHEDULE AND COORDINATE THE WORK to assure an efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later. Prepare general coordination drawings, schedules, and control site utilization, from beginning of construction throughout project close-out.

2.02 COORDINATE CONSTRUCTION OPERATIONS included in the various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included that of other related Sections that depend upon each other for proper installation, connection, and operation.

2.03 SCHEDULE CONSTRUCTION OPERATIONS in 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.

2.04 COORDINATE INSTALLATION of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair. Make adequate provisions to accommodate items scheduled for later installation.

2.05 COORDINATE THE WORK of fire-suppression, HVAC, plumbing, electrical and communication / control systems so that conflicts do not occur. Do not relocate an exposed, finished surface unless approved in advance by the Architect.

2.06 PREPARE MEMORANDA for distribution to each party involved, outlining special procedures required for coordination, if necessary. Include such items as required notices, reports, and list of attendees at meetings. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

2.07 ADMINISTRATIVE PROCEDURES: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

A. Preparation of Contractor's Construction Schedule.
B. Preparation of the Schedule of Values.
C. Installation and removal of temporary facilities and controls.
D. Delivery and processing of submittals.
E. Progress meetings.
F. Pre-installation conferences.
G. Project closeout activities.

2.08 CONSERVATION: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

2.09 PREPARE COORDINATION DRAWINGS if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

A. Indicate relationship of components shown on separate Shop Drawings.
B. Indicate required installation sequences.
C. Refer to applicable Specification Sections for specific coordination drawing requirements for mechanical and electrical installations.

2.10 ADMINISTRATIVE AND SUPERVISORY PERSONNEL - STAFF NAMES: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent, personnel at Project site, and administrative and supervisory personnel at main office. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

2.11 IN ADDITION to the Project superintendent, provide administrative and supervisory personnel as required for proper performance of the Work. Include special personnel required for coordination of operations with other contractors.

2.12 PRECONSTRUCTION CONFERENCE: Schedule and conduct an “on-site” Pre-Construction Conference before starting construction activities, at a time and location convenient to the Owner - but no later than 15 days after execution of the Agreement. Arrange for “on-line” participation by parties not required to be on-site, including the Owner and the Architect (at their option), and for sub-contractor and supplier representatives not involved in the initial construction activities. On-site attendance is required of the Contractor’s superintendent, and major sub-contractor representatives. Minor sub-contractors, sub-subcontractors, manufacturers, suppliers and other concerned parties are to participate in the meeting on-line. Participants at the conference must be familiar with the Project and authorized to conclude matters relating to the Work. Discuss items of significance that could potentially affect progress, including but not limited to the following:

A. Identify responsible personnel of the Contractor and sub-contractors, and review their duties and responsibilities
B. Verify that all sub-contractors have a complete set of Contract Documents
C. Review the initial Construction Schedule, and any critical work sequencing, if applicable.
D. Review working hours for the construction project, and procedures necessary to work in non-typical hours
E. Review available temporary field-office and storage areas available for use
F. Review use of the existing site and/or building facility, and available parking stalls for workers, if any
G. Review requirements and responsibilities for temporary facilities and controls, and requirements for maintenance thereof
H. Review requirements for material and equipment deliveries to the site
I. Review policies and requirements established for safety, first-aid, and security of the construction site.
J. Review requirements of daily progress cleaning
K. Review procedures for processing field decisions or directives, supplemental instructions, and Change Orders.
L. Review requirements for submitting and processing submittals of Product Data, Shop Drawings, and samples
M. Review requirements for processing Applications for Payment – both periodic and for substantial and final completion
N. Review maintenance of “as-built” drawings during construction, and their documentation at project completion
O. Review requirements for completion of Punch-List Work determined at Substantial Completion
P. Review submittal of closeout documents after Substantial Completion,

2.13 CONSTRUCTION PROGRESS MEETINGS: Schedule and conduct periodic progress meetings at not less than once every two (2) weeks at the Project Site, and hold various other pre-installation and coordination conferences as required by construction activities. Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times at least five (5) working days prior to meetings. Prepare a meeting agenda, and distribute to all invited attendees. Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting. Discuss the following topics at each progress meeting, as appropriate:

A. Review and correct or approve minutes of previous progress meeting.
B. Review of work progress since previous meeting
C. Review the updating of the Record Documents of Work completed
D. Status of Contractor's Construction Schedule: Determine whether each activity is on time, ahead of schedule, or behind schedule. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
E. Review of pending work scheduled to be performed: If necessary, determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
F. Review construction quality, work standards and progress cleaning
G. Review any known problems and conflicts
H. Review status of Contractor's submittals
I. Review pending changes or Contract modifications, and documentation of supporting information
J. Proposed items for discussion at next meeting

END OF SECTION 01 31 00

SECTION 01 32 16 – CONSTRUCTION & SUBMITTAL SCHEDULE

PART 1 - SCHEDULE THE WORK OF THE ENTIRE PROJECT, including work performed by the Owner's separate contractors (as if affects the Work of this Contract) to assure an efficient and orderly sequence of installation of all elements – with provisions for accommodating items to be installed later.

1.01 CONSTRUCTION SCHEDULE: Prepare and submit a proposed progress schedule for the Work within fourteen (14) calendar days after award of Contract. Provide a separate line-item for each Work item listed in the Schedule of Values. Include appropriate time for project mobilization, procurement of products, review and approval of shop drawings, fabrication, installation, testing, and final cleanup. Identify each calendar day throughout the schedule. Highlight "critical path" elements of the schedule that are important to complete the Work on time. Correlate the schedule with critical "milestone dates" including but not limited to the Notice to Proceed, Substantial Completion, and the Final Completion dates.

1.02 REVISE CONSTRUCTION SCHEDULE after progress meetings when revisions to the schedule have been made or recognized. Issue a revised schedule concurrently with the report of each meeting.

1.03 COST-LOADED SCHEDULE: Show a two (2)-item cost correlation line, indicating both "pre-calculated" and "actual" costs as the Work progresses. This cost correlation line must show dollar-volume of work performed as of the same dates used for preparation of payment requests. In so far as it is practical, use the same units of Work in the Progress schedule as indicated in the "Schedule of Values" required by the General Conditions and further defined within these Specifications.

1.04 SUBMITTAL SCHEDULE: Submit a schedule of submittals, arranged in chronological order by dates required by the Construction Schedule. Coordinate the Submittal Schedule with the Construction Schedule, and include time required for review and re-submittal when establishing dates. Submit the Submittal Schedule concurrently with the Construction Schedule. Indicate if any submittals affect the "critical path" of the Construction Schedule, and those required early due to long lead time for manufacture or fabrication. Failure to provide a Submittal Schedule relieves the Architect and/or Engineer of responsibility for timely submittal review.

END OF SECTION 01 32 16

SECTION 01 32 26 – CONSTRUCTION PROGRESS REPORTING

PART 1 - SECTION INCLUDES administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.01 PROVIDE INFORMATIONAL SUBMITTALS, as follows:

A. Daily construction reports including count of all personnel at project site: submit at weekly intervals.
B. Material location reports: Submit at monthly intervals
C. Site condition reports: Submit at time of discovery of differing conditions
D. Special Conditions Reports: Submit at time of discovery of unusual event.
E. Work documentation, periodic site observations: Submit at weekly intervals.
F. Work documentation, construction progress photographs: submit at weekly intervals.

1.02 DAILY CONSTRUCTION REPORTS: Prepare daily construction reports recording the following information concerning events at Project site:

A. List of subcontractors at Project site.
B. List of separate contractors at Project site.
C. Approximate count of personnel at Project site.
D. Equipment at Project site.

E. Material deliveries.
F. High and low temperatures and general weather conditions, including presence of rain or snow.
G. Accidents.
H. Meetings and significant decisions.
I. Unusual events (see special reports).
J. Stoppages, delays, shortages, and losses.
K. Meter readings and similar recordings.
L. Emergency procedures.
M. Orders and requests of AHJ representatives.
N. Change Orders received and implemented.
O. Construction Change Directives received and implemented.
P. Services connected and disconnected.
Q. Equipment or system tests and startups.
R. Partial completions and occupancies.
S. Substantial Completions authorized.

1.03 MATERIAL LOCATION REPORTS: At monthly intervals, prepare and submit 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. Indicate the following categories for stored materials:

A. Material stored prior to previous report and remaining in storage.
B. Material stored prior to previous report and since removed from storage and installed.
C. Material stored following previous report and remaining in storage.

1.04 SITE CONDITION REPORTS: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit 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.

1.05 SPECIAL REPORTS: 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. Submit directly to Owner within one (1) day of the occurance, and advise the Owner in advance if these events are known or predictable. Distribute copies of report to parties affected by the occurrence.

1.06 UPDATE AND MAINTAIN THE RECORD-SET of Construction Documents at not less than weekly intervals, indicating differences between the Construction Documents and the actual installed Work. Mark revisions made during construction with colored pencil - do not conceal any Work before revisions have been recorded. Note actual routing of under-slab plumbing and utility lines, if different from design drawings. In addition, maintain copies of the Owner's separate contractor's submittals as applicable. Do not construct or install any portion of the Work related to these drawings at any time without such drawings being available at the site.

END OF SECTION 01 32 26

SECTION 01 32 33 – PHOTOGRAPHIC DOCUMENTATION

PART 1 - PROVIDE DIGITAL PHOTOGRAPHIC DOCUMENTATION of the work progress.

1.01 PROVIDE DIGITAL images in JPEG format, with minimum sensor size of 8.0 megapixels. Provide un-cropped digital images with date stamps typically. With each photo, digitally record the following information:

A. Project Name
B. Date
C. General Description - indicating location and direction (by compass point).

1.02 WALL ROUGH-IN PHOTOS: Before covering wall framing with drywall or other finishes, take photographs of the wall framing showing electrical devices, wiring, piping and other items that will be concealed in the final work.

1.03 PERIODIC CONSTRUCTION PHOTOGRAPHS: Take a minimum of TWENTY (20) photographs on a weekly basis. Select vantage points to best show status of construction and progress for that time period.

1.04 FINAL COMPLETION CONSTRUCTION PHOTOGRAPHS: Take a minimum of one (1) photo in each room or space and as many as are necessary to document finished conditions of the project before Owner occupancy. Take adequate exterior photos to indicate all areas of the outside of the completed building.

1.05 SUBMIT DIGITAL PHOTOS on a USB compatible flash-drive / memory stick on a monthly basis, coinciding with cutoff date associated with each Application for Payment.

1.06 RETAIN ONE PRINTED SET of photographs in Field Office at Project site, available at all times for reference.

END OF SECTION 01 32 33

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - PROCEDURE

1.01 MAKE SUBMITTALS of Product Data, Shop Drawings and Samples when required by other Sections of these Specifications (submittals not required may be returned without review or comment). Submittal review is a gratuitous

assistance to the Contractor, for purposes of general information, and to verify conformance with the design intent of the Contract Documents. Review of submittals does not relieve the Contractor from responsibility for errors which may exist in the submitted data.

1.02 "APPROVAL" OF SUBMITTALS will not be provided by the Architect, as the General Contractor is to approve submittals before submitting to the Architect per requirements of the General Conditions. Submittals may be marked by the Architect as "No Exceptions, Exceptions Noted, Revise and Resubmit or Rejected. If errors or omissions in submittals are subsequently discovered after review, revise and resubmit submittals as expeditiously as necessary not to delay the Work progress.

1.03 COORDINATE each submittal with other submittals and related activities that require sequential activity. Group transmittal of different kinds of submittals for the same unit of work so that information is available for checking each item when it is received.

1.04 CONSECUTIVELY NUMBER all submittals. When an item is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.

1.05 CONTENT: All submittals must contain the date of submission; the Project Title; the Contractor's name, the name of the sub-contractor, supplier or manufacturer, as applicable; identification of the product being submitted; clear identification of field dimensions, verified by the Contractor; relation to adjacent or critical features of the Work; applicable standards; identification of deviations from the Contract Documents; and a clear space for the Contractor's approval stamps.

1.06 STAMP & APPROVE all submittals with the Contractor's approval stamp, dated, and initialed or signed, certifying approval of the submittal, verification of the product being submitted, and verification that the product submitted complies with the requirements of the Contract Documents. Failure to properly verify conformance and conditions at the job site will not relieve the Contractor of the responsibility to properly install the Work.

1.07 ELECTRONIC PRODUCT-DATA & SHOP DRAWING SUBMITTALS: In order to conserve paper, limit delivery/courier expenses, and to expedite the review process, provide electronic Product-Data submittals. Maintain one (1) set of printed, approved Product-Data and shop-drawing submittals at the Project Site, complete with applicable review and approval comments, if they exist. Make and distribute as many copies of Product Data and Shop Drawings as necessary for records, coordination, construction operations, and for incorporation into the Operations and Maintenance Manual.

1.08 ARCHITECT'S ELECTRONIC MEDIA DATA (EMD) DRAWING FILES: Upon request and execution of an agreement form regarding use of EMD data files by the Contractor with the Architect, the Electronic Media Data (EMD) files of the Drawings will be provided one (1) time only from the Architect to the Contractor for use in preparing Shop Drawing Submittals at no cost. Per General Conditions Paragraph 1.6.2, the Architect makes no representations as to the accuracy or completeness of the EMD provided, as it is not considered to be a part of the Contract Documents. EMD information may be provided in either AutoCAD's .DWG format, or as a "Revit" electronic model. Additional transfers of EMD from the Architect will be provided upon receipt of a Service Fee of $250.00 per issue together with an executed EMD use agreement form (if not being issued to the Contractor directly).

1.09 QUANTITY OF SAMPLES TO BE SUBMITTED: Submit three (3) samples of products when required by the Contract Documents, for return of one (1) sample to the Contractor. Costs for submittal and return of samples must be paid by the Contractor. Approval of samples does not imply acceptance of the finished in-place product. Color, texture, and patterns must conform to the samples submitted and if the range of texture, color or pattern varies, the work will be rejected.

1.10 REQUIRED PROCESSING TIME: Allow time for submittal review, and time for re-submittals, within the Construction Schedule. Allow additional time if processing must be delayed to permit coordination with subsequent submittals – until that information is submitted. If submittals are incomplete, the Architect will advise the Contractor as soon as possible, and the processing time will start when the additional information is received. No extension of the Contract Time will be authorized because of failure to transmit submittals in advance of the Work to permit processing time.

A. ALLOW 10 BUSINESS DAYS for initial review of each submittal, and for processing each resubmittal.

PART 2 - SUBMITTALS REQUIRED

2.01 THE ARCHITECT requires the following submittals (in addition to any jurisdictional / code required special inspections). Refer to each Section for additional detailed information.

A. Concrete:
   1. Product Data
   2. Design Mixes
   3. Reinforcement Shop Drawings

B. Polished Concrete
   1. Product Data
   2. Installer Qualifications
   3. Maintenance Data

C. Unit Masonry
   1. Product Data
   2. Shop Drawings
   3. Reinforcing Steel
   4. Masonry Trim
   5. Material Samples For Product Verification
   6. Adverse-Weather Procedures

D. Stone Masonry

1. Product Data
2. Samples

E. Structural Steel Framing

1. Product Data
2. Shop Drawings
3. Welding Certificates
4. Qualification Data

F. Cold Formed Metal Framing

1. Product Data
2. Shop Drawings

G. Metal Fabrications

1. Shop Drawings
2. Structural Analysis Data

H. Wood Framing

1. Product Data
2. Material Certificates for dimensional lumber
3. Evaluation Reports
4. Wood-preservative-treated wood.
5. Fire-retardant-treated wood.
6. Engineered wood products.
7. Shear panels.
8. Power-driven fasteners.
9. Powder-actuated fasteners.

I. Sheathing
J. Product Data
K. Evaluation Reports
L. Casework
M. Product Data
N. Shop Drawings
O. Samples for Selections
P. Solid Surface Fabrications

1. Product Data
2. Shop Drawings

Q. Exterior Treated Wood Composite Trim

1. Product Data
2. Samples
3. Manufacturer Certification
4. Warranty Documentation
5. Shop Drawings

R. Dampproofing & Waterproofing
S. Product Data
T. Thermal Insulation
U. Product Data
V. Fluid Applied WRB
W. Submit Product Data F
X. Laboratory Test Data
Y. Submit Installer Qualifications
Z. Metal Ceiling Panels

1. Product Data
2. Shop Drawings

AA. Metal Composite Panel System

1. Product Data
2. Shop Drawings

BB. Membrane Roofing

1. Product Data
2. Shop Drawings
3. Installer Certificates
4. Manufacturer Certificates
5. Qualification Data
6. Maintenance Data
7. Warranties
8. Inspection Report

CC. Composite Wood Soffits

1. Product Data

DD. Sheet Metal Flashing and Trim
1. Product Data
2. Shop Drawings
3. Samples

EE. Joint Sealants
1. Product Data
2. Samples

FF. Metal Doors and Frames
1. Product Data
2. Door Schedule

GG. Access Doors
1. Product Data

HH. Entrance, Storefront & Curtain Wall
1. Product Data
2. Shop Drawings

II. Pass-Thru Window
1. Shop Drawings
2. Product Data
3. Samples
4. Instructions

JJ. Door Hardware
1. Product Data
2. Hardware Schedule
3. Keying Schedule
4. Test Reports
5. Operational Manuals

KK. Glass, Glazing and Mirrors
1. Product Data
2. Samples
3. Glazing Schedule
4. Test Reports

LL. Moisture Vapor Emission Control
1. Product Data

MM. Gypsum Board
1. Product Data

NN. Cement Plastering (Stucco)
1. Product Data
2. Shop Drawings
3. Samples For Verification
4. Maintenance Data
5. Submit Reports
    a. At start of “lath installation”
    b. At start of “plaster installation”, and
    c. At start of “finish coat installation”
    d. At completion of Work

OO. Tile
1. Product Data
2. Samples

PP. Acoustic Ceilings
1. Product Data

QQ. Resilient Base
1. Product Data

RR. Resinous Flooring
1. Manufacturer Certifications
2. Product Data
3. Samples
4. Maintenance Instructions

SS. Painting

1. Product Data
2. Material List
3. Manufacturer's Information
4. Samples
5. Qualification Data

TT. Signage
1. Shop Drawings

UU. Toilet Accessories
1. Product Data for Each Item

VV. Wall Protection
1. Product Data
2. Sample

WW. Fire Protection Specialties
1. Product Data

XX. Flagpole
1. Product Data

YY. Solar Shades
1. Product Data
2. Wiring Diagram
3. Window Treatment Schedule
4. Samples
5. Maintenance Data

END OF SECTION 01 33 00

SECTION 01 35 61 – VOLUNTARY SUSTAINABILITY GOALS

PART 1 - COMPLY WITH REQUIREMENTS of this Section regarding sustainable design and construction requirements, and provide submittal documents and reports to verify conformance with the Owner's voluntary sustainability goals.

1.01 MAXIMUM VOC CONTENT REQUIREMENTS: For all field-applied applications inside the building envelope, provide products that do not exceed the following values, in accordance with Federal Standard 40 CFR 59, Subpart D:

Wood Glues: ..... 30 g/L.
Metal to Metal Adhesives: ..... 30 g/L.
Adhesives for Porous Materials (Except Wood): ..... 50 g/L.
Subfloor Adhesives: ..... 50 g/L.
Plastic Foam Adhesives: ..... 50 g/L.
Carpet Adhesives: ..... 50 g/L.
Carpet Pad Adhesives: ..... 50 g/L.
VCT and Asphalt Tile Adhesives: ..... 50 g/L.
Cove Base Adhesives: ..... 50 g/L.
Gypsum Board and Panel Adhesives: ..... 50 g/L.
Rubber Floor Adhesives: ..... 60 g/L.
Ceramic Tile Adhesives: ..... 65 g/L.
Multipurpose Construction Adhesives: ..... 70 g/L.
Fiberglass Adhesives: ..... 80 g/L.
Contact Adhesive: ..... 80 g/L.
Structural Glazing Adhesives: ..... 100 g/L.
Wood Flooring Adhesive: ..... 100 g/L.
Structural Wood Member Adhesive: ..... 140 g/L.
Top and Trim Adhesive: ..... 250 g/L.
Plastic Cement Welding Compounds: ..... 250 g/L.
ABS Welding Compounds: ..... 325 g/L.
CPVC Welding Compounds: ..... 490 g/L.
PVC Welding Compounds: ..... 510 g/L.
Adhesive Primer for Plastic: ..... 550 g/L.
Other Adhesives: ..... 250 g/L.
Architectural Sealants: ..... 250 g/L.
Nonmembrane Roof Sealants: ..... 300 g/L.
Single-Ply Roof Membrane Sealants: ..... 450 g/L.
Other Sealants: ..... 420 g/L.
Sealant Primers for Nonporous Substrates: ..... 250 g/L.
Sealant Primers for Porous Substrates: ..... 775 g/L.
Modified Bituminous Sealant Primers: ..... 500 g/L.
Other Sealant Primers: ..... 750 g/L.
Flat Paints, Coatings, and Primers: ..... 50 g/L.
Nonflat Paints, Coatings, and Primers: ..... 150 g/L.

Clear Wood Finishes, Varnishes: ..... 350 g/L.
Clear Wood Finishes, Lacquers: ..... 550 g/L.
Floor Coatings: ..... 100 g/L.
Shellacs, Clear: ..... 730 g/L.
Shellacs, Pigmented: ..... 550 g/L.
Stains: ..... 250 g/L.
Flat Interior Topcoat Paints: ..... 50 g/L.
Nonflat Interior Topcoat Paints: ..... 150 g/L.
Clear Wood Finishes, Lacquers:..... 550 g/L.
Floor Coatings: ..... 100 g/L.
Shellacs, Clear: ..... 730 g/L.
Shellacs, Pigmented: ..... 550 g/L.
Primers, Sealers, and Undercoaters:..... 200 g/L.
Dry-Fog Coatings: ..... 400 g/L.
Zinc-Rich Industrial Maintenance Primers: ..... 340 g/L
Special Purpose Contact Adhesive (used to bond melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber or wood veneer 1/16 inch or less in thickness to any surface): ..... 250 g/L.
Aerosol Adhesive, General Purpose Mist Spray: ..... 65 percent by weight.
Aerosol Adhesive, General Purpose Web Spray: ..... 55 percent by weight.
Special Purpose Aerosol Adhesive (All Types): ..... 70 percent by weight.
Anticorrosive and Antirust Paints Applied to Ferrous Metals: ..... 250 g/L.
Anticorrosive and Antirust Paints Applied to Ferrous Metals: ..... 250 g/L.
Clear Wood Finishes, Varnishes and Sanding Sealers: ..... 350 g/L.
Pretreatment Wash Primers: ..... 420 g/L.

1.02 AROMATIC COMPOUNDS: Paints and coatings must not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

1.03 RESTRICTED COMPONENTS: Do not use any materials in the Project containing the following:

Acrolein	Acrylonitrile
Antimony	Benzene
Butyl benzyl phthalate	Cadmium
Di (2-ethylhexyl) phthalate	Di-n-butyl phthalate
Di-n-octyl phthalate	1,2-dichlorobenzene
Diethyl phthalate	Dimethyl phthalate
Ethylbenzene	Formaldehyde
Hexavalent chromium	Isophorone
Lead	Mercury
Methyl ethyl ketone	Methyl isobutyl ketone
Methylene chloride	Naphthalene
Toluene (methylbenzene)	1,1,1-trichloroethane
Vinyl chloride	

1.04 DO NOT USE COMPOSITE WOOD or agrifiber products or adhesives that contain any urea-formaldehyde resin.

PART 2 - EXECUTION

2.01 CONSTRUCTION WASTE MANAGEMENT: Comply with Division-01 Section “Construction Waste Management and Disposal.".

2.02 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT: Comply with "SMACNA IAQ Guideline for Occupied Buildings under Construction."

A. If the Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period, provide filter media having a MERV 8 rating per ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction. Replace all air filters immediately prior to occupancy.

END OF SECTION 01 35 61

SECTION 01 42 00 – DEFINITIONS & REFERENCES

PART 1 - REFER TO THE GENERAL CONDITIONS for basic Contract definitions, and as follows:

1.01 DIRECTED: A command or instruction by the Architect or the Architect’s consultants. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

1.02 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."

1.03 INSTALLER: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

1.04 EXPERIENCED: Having successfully completed a minimum of five (5) previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of AHJ representatives.

1.05 FURNISH: To supply and deliver to Project site, unload and inspect for damage, ready to install.

1.06 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'.

1.07 INSTALL: Operations at the Project Site, including but not limited to: temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, start up, protecting, cleaning, and similar operations making ready for use.

1.08 PROJECT SITE (or SITE): The designated interior-space or land-area upon which construction activities will be performed. The extent of the Project Site may not be identical to the legal description of the land on which Project is to be built.

1.09 PROVIDE: To furnish and install, complete and ready for the intended use."

1.10 REGULATIONS: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules,

1.11 conventions, and agreements within the construction industry that control performance of the Work.

1.12 SUPPLY: Same as Furnish.

1.13 CONSTRUCTION DOCUMENT SCOPE ABBREVIATIONS:

A. C F C I: Contractor Furnished, Contractor installed (typical unless otherwise indicated)
B. N I C: Not In Contract (O F O I)
C. O F C I: Owner Furnished, Contractor installed
D. O F O I: Owner Furnished and Owner installed, by the Owner or by separate Owner contractor(s)

1.14 ABBREVIATIONS AND ACRONYMS: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

1.15 INDUSTRY STANDARDS

A. APPLICABILITY OF STANDARDS: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
B. PUBLICATION DATES: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
C. CONFLICTING REQUIREMENTS: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding. The quantity or quality level shown or specified will be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
D. COPIES OF STANDARDS: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

END OF SECTION 01 42 00

SECTION 01 43 39 – MOCKUPS

PART 1 - THIS SECTION INCLUDES administrative and procedural requirements of the Contractor, for temporary construction and demolition of mockups at the Project Site.

1.01 MOCKUPS are full-size physical assemblies constructed on-site, to verify color and finish selections made, to demonstrate the full range of aesthetic effects and workmanship, and: to indicated qualities of material finishes and application or execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

A. CONSTRUCT MOCKUPS using the same workers that will be used during the construction of the Work, and with the same supervisory personnel.
B. CONSTRUCT MATERIAL MOCKUPS when required by other "technical" Sections at locations on-site approved by the Architect.

PART 2 - NOTIFY ARCHITECT not less than seven (7) days in advance of dates and times when mockups will be constructed, and ready for review and approval.

2.01 OBTAIN ARCHITECT'S APPROVAL OF MOCKUPS before starting any work, fabrication, or construction of finishes included within the mockup.

2.02 MAINTAIN MOCKUPS DURING CONSTRUCTION in an undisturbed condition as a standard for judging the completed Work.

2.03 APPROVAL OF MOCKUP DOES NOT CONSTITUTE approval of deviations from the Contract Documents unless such deviations are specifically approved by Architect in writing.

2.04 DEMOLISH AND REMOVE MOCKUP before Substantial Completion, except as otherwise permitted to remain as a part of the Work.

2.05 INCORPORATE CORRECTIVE MEASURES indicated by the test report into the final exterior wall assemblies.

END OF SECTION 01 43 39

SECTION 01 45 00 – QUALITY CONTROL

PART 1 - GENERAL QUALITY CONTROL

1.01 COORDINATE with the Owner's independent Testing and Inspection Laboratory to verify compliance of the Work with the Contract Documents. Specific tests are required in other applicable Sections of these Specifications.

1.02 COORDINATE with the Owner's "Special Inspector" in accordance with requirements of AHJ representatives. The "Special Inspector" will be responsible for submitting quality control test reports prepared the testing laboratory required above, to the AHJ, when necessary.

1.03 SHOP CERTIFICATION: Special inspections are not required when the work is done on the premises of a fabricator registered and approved to perform such work without special inspections, in accordance with requirements of the building code.

1.04 THE CONTRACTOR IS NOT RELIEVED of responsibility for compliance with all specified requirements of the Contract Documents by providing these services.

1.05 RE-TEST RESPONSIBILITY: The Owner' s cost for re-tests and repeat-inspections for items not meeting the requirements of the Contract Documents will be deducted from the Contract Sum. Re-testing and re-inspection must continue until satisfactory results are obtained, at no additional cost to the Owner.

1.06 SCHEDULE AND COORDINATE timing of tests required, to comply with the progress of the Work. When changes of construction schedule are necessary, notify testing laboratory in advance of operations for reassignment of required personnel.

1.07 FACILITATE inspections and tests, cooperate with laboratory personnel, and provide adequate quantities of representative samples of materials to be tested. Provide such auxiliary services as are reasonably requested, including, but not necessarily limited to taking samples or assistance with taking samples, delivery of samples to testing laboratories, and security and protection of samples and test equipment at the project site.

1.08 UPON COMPLETION of inspection, testing, sample-taking and similar services, repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes. Comply with other sections of these Specifications for Cutting and Patching. Protect work exposed by or for quality control service activities, and protect repaired work.

1.09 REMOVE AND REPLACE non-complying materials, and re-test until satisfactory tests are accomplished.

END OF SECTION 01 45 00

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide temporary construction facilities and controls, and remove upon completion of the Work.

1.02 INCLUDE ALL COSTS within the Contract Sum for installation, maintenance, fuel, operation and removal. Adjustments to costs or usage charges will be made only if the Contract Time is adjusted due to scope changes, and then through a Change Order.

1.03 ALLOW OTHER ENTITIES TO USE TEMPORARY FACILITIES without cost, including, but not limited to, the following:

A. Owner's separate contractors.
B. Architect and consulting Engineers,
C. Testing and Inspection agencies.
D. Personnel of AHJ's.

1.04 QUALITY ASSURANCE

A. STANDARDS: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
B. TRADE JURISDICTIONS: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
C. ELECTRIC SERVICE: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
D. TESTS AND INSPECTIONS: Arrange for representatives of AHJ's to test and/or inspect temporary utilities before use when required, and obtain required certifications and permits.
E. COMPLY WITH GOVERNING REGULATIONS and rules or recommendations of utility companies. Comply with specific requirements indicated and with applicable local industry standards including but not limited to the following:
    1. Building codes, including local requirements for permits, testing and inspection
    2. Health and safety regulations, including applicable federal statues, laws or regulations
    3. Police and Fire department rules and recommendations

4. Environmental protection regulations governing use of water and energy, and the control of dust, noise and other nuisances.

1.05 PROVIDE NONCOMBUSTIBLE CONSTRUCTION for offices, shops and sheds located within the construction area, or within 30 feet of building lines.

1.06 OPERATE temporary services and facilities in a safe and efficient manner. Do not overload temporary services or facilities, and do not permit them to interfere with the progress of the work. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

1.07 TEMPORARY SITE UTILITIES: For electrical, sewer, water or other utility services necessary for construction operations, engage the appropriate local utility service providers to bring temporary services to the Project Site. Obtain and pay for temporary permits or easements necessary, if permanent easements cannot be utilized for that purpose. Pay for all service, use and removal costs required.

1.08 UTILITY CHANGEOVER: At earliest feasible time, when acceptable to Owner, change over from use of temporary utility service to use of permanent services. Contractor will be responsible for operation, maintenance, and protection of permanent utility services until Substantial Completion.

1.09 CONDITIONS OF USE: Keep temporary services and facilities clean and neat. Relocate temporary utility services as required by progress of the Work.

1.10 CONNECT TO EXISTING BUILDING SYSTEMS for water, electrical power, lighting and heat necessary for construction operations, unless otherwise indicated. The Owner will pay for service / use costs through their existing service agreements.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT – GENERAL: Provide new or undamaged, previously used items in serviceable condition, suitable for use intended.

2.02 FIELD OFFICE: Maintain an on-site office for the management of the Work. Provide space to review project drawings and for storage of construction documents, shop drawings, and samples. Provide table, chairs and and on-site meeting room space for conferences for up to 10 people minimum. Costs of the space and furnishing thereof, including heating, cooling, power and lighting must be included in the Contract Sum.

2.03 TEMPORARY EXTERIOR ENCLOSURE: Provide a temporary weather-resistant building enclosure when existing building enclosure elements are removed. Enclosure must consist of a minimum 10 mil polyethylene sheet attached to a solid sheathing panel (non-combustible if existing building is non-combustible) with the supporting framework filled with minimum 3-1/2 inch thick fiberglass insulation when exterior temperatures are typically below 40 degrees.

2.04 TEMPORARY INTERIOR ENCLOSURE SCREEN (when applicable): Provide a dust-proof enclosure/screen separating the construction area from existing occupied areas. Relocate as required to facilitate construction operations. Completely remove at completion of the Work and arrange for legal disposal. Comply with Landlord requirements, when applicable.

A. Dust-resistant Barrier: Reinforced, fire-resistive 10-mil minimum thick polyethylene sheet, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

2.05 DUST-RESISTANT WALK-OFF MATS: Provide minimum 36 inch wide x 60 inch deep mats with dust-control adhesive surface at all entrances to construction work areas from existing interior finished areas, and at exterior entrances to finished new construction work.

2.06 EXTERIOR PROJECT IDENTIFICATION SIGN: Provide and maintain one (1) project identification sign at location indicated in the Drawings, or if not indicated, provide at a location approved by the Owner and applicable AHJ representatives, including but not limited to code and zoning officials. Construct sign as a part of the Construction Mockup required in other Division-1 Sections. Engage an experienced signage company to provide PSV graphics on the panel in accordance with a design designated by the Architect. In general, the sign will include the project name & logo (1/2 of total area), the name and logo of the Architect (1/4 of total area), and the name and logo of the General Contractor. No other signs will be allowed to be displayed at the project site.

A. Size: 8 feet high by 12 feet wide

2.07 FIRE EXTINGUISHERS: Provide UL rated Type ABC fire extinguishers mounted at locations reasonably effective in extinguishing fires, by personnel at project site. Comply with NFPA No. 10. Post warning and instructions at each extinguisher, and instruct personnel on proper use. Post fire department call number on each telephone at project site.

2.08 TEMPORARY HEAT AND VENTILATION: Unless the Owner authorizes use of permanent HVAC systems per requirements as follows, provide temporary units to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation and proper curing of materials, to protect materials and finishes from damage due to temperature or humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.

A. For new building areas, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control. Provide listed and labeled units, by a testing agency acceptable to the AHJ, and marked for intended use for type of fuel being consumed.
B. When new systems are operational, they may be used for temporary heating and cooling only if: (1) all registers diffusers and filters are cleaned before substantial completion, and (2) warranty periods remain unchanged, starting from the date of Substantial Completion.

2.09 POTABLE WATER: Provide portable containers of potable water for construction operations, except when specifically authorized to utilize existing systems by the Owner. If connecting to existing systems, provide branch piping with outlets located so that water is available by the use of hoses.

2.10 EXTERIOR SANITARY FACILITIES: Provide temporary exterior toilets, wash facilities and drinking water fixtures for the use of workers on the job site. Provide single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Provide separate facilities for male and female personnel when both sexes are working at project site. Provide containerized tap-dispenser, bottled-water drinking-water units, including paper cup supply. Comply with all applicable regulations of OSHA or health departments for the type, number, location, operation and maintenance of fixtures and facilities. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

2.11 EXISTING SANITARY FACILITIES may not be used by construction personnel, unless specifically approved by the Owner. If so used, such facilities must be checked by Contractor's supervisory personnel not less than two (2) times per day, and cleaning must be performed at completion of each day's construction operations.

2.12 TEMPORARY ELECTRICAL POWER: Provide a grounded power distribution system with overload protection, sufficient to accommodate construction operations requiring power, use of power tools, electrical heating, lighting, and start-up testing of permanent electric-powered equipment prior to its permanent connection to electrical system.

A. Locate multiple outlets (minimum of 4-gang) spaced so that the entire area of construction can be reached by power tools on a single extension cord of 50' maximum length.
B. Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
C. Where permitted and when overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

2.13 TEMPORARY LIGHTING: Provide temporary lighting fixtures in areas where ceilings and existing fixtures are removed. Re-use existing lighting fixtures when possible and suspend from the existing structure. Remove temporary lighting fixtures when permanent fixtures are operational.

2.14 PROVIDE TEMPORARY COMMUNICATIONS EQUIPMENT as follows:

A. Computer for use by and communications with the Contractor's Superintendent
B. Broadband internet service, and a secured, wireless router for use by the Architect and Owner's representatives

2.15 WASTE DISPOSAL: Provide dumpsters and collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

2.16 TEMPORARY SITE ENCLOSURE FENCE: Before construction operations begin, install a site enclosure fence around the entire Project site (or portion sufficient to accommodate construction operations), to prevent people and animals from easily entering except at gates. Maintain security by limiting the number of keys to gates and restricting distribution to authorized personnel, with one set of keys provided to the Owner. At partially completed Work, provide lockable entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security, and lock entrances at end of each work day.

A. TEMPORARY CHAIN-LINK FENCING: Minimum 2-inch (opening) x 0.148-inch- thick, galvanized-steel, chain-link fabric fencing mounted to a galvanized-steel pipe post framework of minimum 2-3/8-inch- OD line posts with 2-7/8-inch-OD corner and pull posts and 1-5/8-inch- OD top rails. When necessary, provide portable fencing units with galvanized-steel base supports.
B. Minimum Height: Eight (8) feet

2.17 TEMPORARY ROADS AND PAVED AREAS: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

A. TEMPORARY USE OF PERMANENT ROADS AND PAVED AREAS: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
    1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
    2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to applicable Division-31 "Earthwork" Sections.
    3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
    4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course per requirements of applicable Division-32 "Paving" Sections.

PART 3 - EXECUTION

3.01 REVIEW site conditions and factors which affect construction procedures and temporary facilities, including adjacent properties and public facilities which may be affected by execution of the Work.

3.02 INSTALLATION - GENERAL: Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.03 INSPECT and test services before placing temporary utilities in use. Arrange for required inspections and tests by AHJ representatives and obtain required certifications and permits for use.

3.04 OPERATE temporary services and facilities in a safe and efficient manner. Do not overload temporary services or facilities, and do not permit them to interfere with the progress of the work. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

3.05 SUPERVISION: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

3.06 MAINTENANCE: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

3.07 PROGRESS CLEANING: At all times, keep the project areas free from accumulation of waste materials or rubbish caused by construction operations. Maintain the premises and site in a reasonably neat and order condition. Keep electrical closets, pipe or duct shafts or chases, furred spaces and similar areas clean and free from rubbish, construction material debris, or dust and dirt at all times. Clean-up immediately upon completion of each trade's Work.

3.08 LOCK UP all site parked mobile equipment or make otherwise inoperable when not in use.

3.09 TEMPORARY FIRE PROTECTION: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; and manage fire-prevention program by:

A. Prohibit smoking in construction areas.
B. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of AHJ's.

3.10 TEMPORARY CONSTRUCTION CONTROLS:

A. BARRIERS: Provide barriers required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
B. POST DANGER SIGNS warning against hazards created by construction operations including but not limited to protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials.
C. PROVIDE RED WARNING LIGHTS for night time hours at such hazards that can be dangerous to foot traffic and vehicular traffic.

3.11 RAMPS: Provide temporary ramps if access is through existing parking area, to completely protect existing curbs, underground fuel storage tanks, etc.

3.12 SCAFFOLDING: Provide all scaffolding and construction aids required, including guard rails, lights and platforms necessary for the completion of the Work, and for the protection of the workmen and the public.

3.13 SITE ACCESS: Provide temporary access to the site from public thorough fares. Repair all damage to existing property, roads, curbs and parking areas by job related vehicles or personnel at no cost to the Owner. Provide temporary fencing with lockable gates to match existing to ensure that the facility remains secure at all times.

3.14 DEWATERING FACILITIES AND DRAINS: Comply with requirements of AHJ, maintaining Project Site, excavations, and construction free of water. Dispose of rainwater in a lawful manner that will not result in flooding the Project or adjoining properties or endanger permanent Work or temporary facilities. Remove snow and ice as required to minimize accumulations.

3.15 TEMPORARY EROSION, SEDIMENTATION & STORMWATER CONTROLS: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, in accordance with requirements of 2003 EPA's "Construction General Permit" or other requirements of the AHJ, whichever is more stringent. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.16 CONSTRUCTION NOISE: Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.17 MOISTURE & MOLD CONTROL:

A. PREPARE A MOISTURE-PROTECTION PLAN, to avoid trapping water in the finished work. Document visible signs of mold that may appear during construction. Comply with the following, as applicable:
B. AT EXPOSED CONSTRUCTION and before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect the Work as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. AT PARTIALLY ENCLOSED CONSTRUCTION after installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. AFTER BUILDING ENCLOSURE but before full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
4. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 24 hours are considered defective.
5. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
6. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.18 TERMINATION AND REMOVAL:

A. REMOVE TEMPORARY FACILITIES when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. The Owner reserves right to take possession of the Project identification signs – at the sole option of the Owner.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil.
3. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns.
4. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by AHJ representatives.
5. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division-01 Section "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - THIS SECTION includes administrative and procedural requirements for products, including delivery, storage, and handling; and manufacturers' warranties on products or special warranties. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1.01 DEFINITIONS

A. MANUFACTURER'S WARRANTY: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
B. SPECIAL WARRANTY: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.02 SUBMITTALS

A. SUBMIT A PRODUCT LIST, in tabular from, showing products, systems or equipment to be furnished. Include generic names of products, and manufacturer's name and proprietary product names for each product.
B. COORDINATE PRODUCT LIST with Contractor's Construction Schedule and the Submittals Schedule.
C. FORM: Tabulate information for each product, system or equipment item under the following column headings:

1. Specification Section number and title.
2. Generic name used in the Contract Documents.
3. Proprietary name, model number, and similar designations.
4. Manufacturer's name and address.
5. Supplier's name and address.
6. Installer's name and address.
7. Projected delivery date or time span of delivery period.
8. Identification of items that require early submittal approval for scheduled delivery date.

D. INITIAL SUBMITTAL: WITHIN THIRTY (30) DAYS after date of commencement of the Work, submit an initial product list. Include a written explanation for omissions of data and for variations from Contract requirements. At

Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

E. COMPLETED PRODUCT LIST: WITHIN SIXTY (60) DAYS after date of commencement of the Work, submit two (2) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.

F. ARCHITECT'S ACTION: The Architect will respond in writing to Contractor within fifteen (15) days of receipt of the initial Product List. Response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Lack of response does not constitute a waiver of requirement that products comply with the Contract Documents.

1.03 PRODUCT WARRANTIES

A. WARRANTIES SPECIFIED in other Sections are in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. SPECIAL WARRANTIES: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

1.04 SUBMITTAL TIME: Comply with requirements in Division-01 Section "Closeout Procedures."

1.05 QUALITY ASSURANCES FOR PRODUCTS

A. DELIVER, STORE, AND HANDLE PRODUCTS using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. SCHEDULE DELIVERY to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

C. 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.

D. DELIVER PRODUCTS 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.

E. INSPECT PRODUCTS ON DELIVERY to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

F. STORE PRODUCTS to allow for inspection and measurement of quantity or counting of units, and as follows:

1. Store materials in a manner that will not endanger the existing building structure.
2. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; with ventilation to avoid condensation
3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
4. Protect stored products from damage.

G. COMPATIBILITY OF OPTIONS: If Contractor is given option of selecting between two or more products for use, product selected must be compatible with products previously selected, even if previously selected products were also options.

H. PRODUCTS IN QUANTITIES must be alike and interchangeable. Where additional amounts of a product are likely to be needed by the Owner at a later date for maintenance and repair, provide standard, domestically produced products which are likely to be available to the Owner at such later date.

I. SUPPLY PRODUCTS COMPLETE with all standard devices, trim finish, and all accessories indicated in the latest edition of the manufacturer's catalog or brochure published at the date of the award of the Contract. Furnish such items complete with component parts necessary for the obvious and intended use and installation, whether or not descriptions or catalog numbers contain all supplemental information and/or numbers of such components.

J. EQUIPMENT NAMEPLATES: Provide permanent nameplates on each item of service-connected or power operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, rating, and similar essential operating data. Locate nameplates on an easily accessible surface.

K. LABELS: Locate required labels and stamps on an accessible surface which, in occupied spaces, is not conspicuous.

END OF SECTION 01 60 00

SECTION 01 62 00 – PRODUCT OPTIONS

PART 1 - WHEN PRODUCTS, SYSTEMS OR EQUIPMENT are identified in the Construction Document, they are indicated to establishing a standard of required function, availability, physical properties, dimension, color, appearance, quality, in-service performance, operation and maintenance.

1.01 NO SUBSTITUTIONS OF NAMED OR BASIS-OF-DESIGN PRODUCTS: When Construction Documents indicate a single product (including systems or equipment), manufacturer, or supplier (by reference to a manufacturer's or supplier's name or product name, make or model number, as applicable), provide only the indicated product that complies with indicated

requirements. If multiple manufacturers or vendors are indicated, provide products only by one of the listed manufacturers or vendors.

1.02 SUBMIT OTHER PRODUCTS or Manufacturers only as a “Substitution for Cause” / Substitution Request per other Sections of the General Requirements, and substantiate the cause in detail. Unless approved in advance by the Architectd, other products or manufacturers will not be considered, and are not acceptable.

1.03 FOR “OR-EQUAL” or “PERFORMANCE-BASED” products specified by performance requirements, characteristics, and/or referenced standards, provide products of any manufacturer or vendor meeting those requirements and characteristics, which will perform adequately the duties imposed by the specified item, and which will not cause a delay in the construction schedule due to procurement of such item. The burden of suitability is upon the Contractor, and products not meeting the intent of the Construction Documents may be rejected by the Architect.

END OF SECTION 01 62 00

SECTION 01 71 23 – FIELD ENGINEERING

PART 1 - GENERAL REQUIREMENTS

1.01 ESTABLISH REFERENCE LINES AND PERMANENT BENCH MARKS from which building lines and elevations will be taken. Identify existing survey control points and property line corner stakes, or building reference grids, as applicable. Verify layout information indicated within the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

1.02 ENGAGE A LAND SURVEYOR registered in the state where the Project is located, to perform the initial building-layout and verification, and to set new benchmarks and other control points at the site.

1.03 BENCHMARKS: Establish and maintain a minimum of 2 permanent benchmarks, referenced to data established by survey control points. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

1.04 EXISTING UTILITIES AND EQUIPMENT: The existence and location of underground and other utilities and construction indicated as existing is not guaranteed. Before beginning any work at the site, investigate and verify the existence and location of underground utilities and other construction. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping. Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with applicable AHJ representatives.

1.05 WORK FROM LINES AND LEVELS established from the property survey or existing building information. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project.

1.06 CALCULATE AND MEASURE required dimensions by instrumentation or other appropriate means, within indicated or recognized tolerances.

1.07 DO NOT SCALE DRAWINGS to determine dimensions unless directed to do so.

1.08 ADVISE ENTITIES ENGAGED IN CONSTRUCTION ACTIVITIES of marked lines and levels provided for their use. As construction proceeds, check every major construction component or element for line, level, and plumb.

1.09 MAINTAIN A LOG of controls and other survey work. Make this log available for reference. Record deviations from required lines and levels, and notify if deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

1.10 UPON COMPLETION of foundation walls, major site improvements, and other work requiring field-engineering, record actual dimensions, locations, angles, and elevations of construction and site-work, noting all deviations from the design intent.

1.11 FOR SITE IMPROVEMENTS, locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.

1.12 FOR BUILDING LINES AND LEVELS, locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels.

1.13 WORK LAYOUT: Establish and maintain new benchmarks, chalk-lines or other markers to set lines and levels for the Work as needed to properly locate all elements of the Project, including partitions, casework, electrical and plumbing connections and “fixed” casework or fixtures.

1.14 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.

1.15 MARK CASEWORK & FIXTURE locations with ceiling light fixtures temporarily marked on the floor substrate before construction of any partitions. Coordinate with casework or fixture shop drawings for size of units and alignment to fit the space as indicated.

END OF SECTION 01 71 23

SECTION 01 73 00 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 PERFORM INSTALLATION WORK by persons qualified to produce workmanship of specified quality, in accordance with manufacturer's installation recommendations and requirements.

1.02 UPON REQUEST BY THE ARCHITECT, arrange for the product, system or equipment manufacturer's representative to visit the site, to instruct tradespersons or mechanics in the recommended means and methods for installation, and to verify that the product, system or equipment item is installed in accordance with the Manufacturer's recommendations.

1.03 EXAMINATION AND ACCEPTANCE OF CONDITIONS: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present, for compliance with requirements for installation tolerances and other conditions affecting performance of the installed Work, and record observations:

A. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
B. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
C. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
D. Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work constitutes acceptance of that Work and assumption of responsibility for satisfactory installation.

1.04 INSPECT EACH ITEM OF MATERIAL OR EQUIPMENT immediately prior to installation. Reject damaged and defective items.

PART 2 - PREPARATION

2.01 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.

2.02 SPACE REQUIREMENTS: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

2.03 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a Request for Interpretation (RFI) to Architect per other Division-01 Sections.

PART 3 - GENERAL INSTALLATION REQUIREMENTS (applies to all Work and Specification Sections):

3.01 INSTALL DURING CONDITIONS of temperature, humidity, exposure, forecasted weather, and status of the project completion that will ensure the best possible results for each unit of Work. Maintain such conditions until Substantial Completion.

3.02 LOCATE THE WORK and components of the Work accurately, in correct alignment and elevation. Make vertical work plumb and make horizontal work level. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3.03 CONCEAL PIPES, DUCTS, AND WIRING in finished areas unless otherwise indicated. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces unless otherwise noted.

3.04 COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS and recommendations for installing products in applications indicated.

3.05 CONDUCT CONSTRUCTION OPERATIONS so that no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

3.06 SEQUENCE THE WORK and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

3.07 HARMFUL NOISE: Do not use tools or equipment that produce harmful noise levels.

3.08 TEMPLATES: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

3.09 ATTACHMENT: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

3.10 MOUNTING HEIGHTS: Where mounting heights are not indicated, mount components at industry-recognized standard mounting heights for the applications indicated. Refer questionable mounting height choices to Architect for final direction.

3.11 ALLOW FOR BUILDING MOVEMENT, including thermal expansion and contraction. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete

inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

3.12 JOINTS AND VISUAL EFFECT: Provide uniform joint widths in exposed Work, organized for the best possible visual effect. Fit exposed connections together to form hairline joints. Recheck measurements and dimensions of the Work, as an integral step of starting each installation. Refer questionable visual-effect choices to Architect for final decision of acceptability.

3.13 NON-HAZARDOUS MATERIALS: Use products, cleaners, and installation materials that are not considered hazardous.

3.14 BRACE PARTITIONS, suspend ceilings or soffits, and brace platforms, suspended items or similar construction only to structural elements – even if not specifically noted. Do not brace elements to the roof deck, plumbing / sprinkler pipes, ductwork, electrical conduit or similar elements.

3.15 AT PROJECTIONS OF FINISHED SURFACES, including pilasters or thickened walls, return all exposed surface finishes back to the primary surface even if not specifically noted.

3.16 ALIGN SURFACES of new finishes with existing finishes and match existing finish-surface conditions except as otherwise indicated. Patch existing surfaces and refinish to match adjacent existing surfaces, as applicable.

3.17 PROVIDE TEMPORARY COVERINGS AND PROTECTION after installation, to protect installed products from damage from traffic and construction operations, and remove when no longer required. Repair and replace damaged items, at no additional cost to the Owner. Additional time required to secure replacements and to make repairs will not be considered as justification for an extension of time to complete the Work.

PART 4 - PROGRESS CLEANING

4.01 SUPERVISE CONSTRUCTION OPERATIONS to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposures during the construction period.

4.02 CLEAN WORK AREAS DAILY, including the project site and common areas, as applicable. Enforce cleaning requirements strictly. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations. Use containers intended for holding waste materials of type to be stored.

4.03 CLEAN AREAS where work is in progress to the level of cleanliness necessary for proper execution of the Work. Remove liquid spills promptly. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

4.04 KEEP INSTALLED WORK CLEAN, cleaning 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.

4.05 IN CONCEALED SPACES, remove debris before enclosing the space.

4.06 CLEAN EXPOSED SURFACES in finished areas and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion. 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.

4.07 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.

PART 5 - STARTING AND ADJUSTING

5.01 START EQUIPMENT AND OPERATING COMPONENTS to confirm proper operation. Remove malfunctioning units, replace with new units, and retest. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

5.02 TEST EACH PIECE OF EQUIPMENT to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

5.03 PROVIDE FINAL PROTECTION AND MAINTAIN CONDITIONS that ensure installed Work is without damage or deterioration at time of Substantial Completion. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 73 29 – CUTTING & PATCHING

PART 1 - GENERAL

1.01 DEFINITION: "Cutting and patching" includes cutting into construction elements (either new or existing) to provide for the installation or performance of other work and the subsequent fitting and patching required to restore surfaces to their original condition. "Cutting and patching" is performed for coordination of the Work, to uncover Work for access or inspection, to obtain samples for testing, to permit alterations to be performed, or for other similar purposes.

1.02 DO NOT cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio. Do not cut and patch operating elements or safety related components in a manner that would result in reducing

their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety. Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

1.03 "CUTTING AND PATCHING" DOES NOT INCLUDE work performed during the manufacturing of products. It does not include the drilling of holes for installation of fasteners or similar operations. Demolition of selected portions of the building for alterations is included in Division-2 Specification Sections.

1.04 USE MATERIALS that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

1.05 INSPECTION: Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

1.06 PROVIDE TEMPORARY SUPPORT AND PROTECTION of Work to be cut. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

1.07 TAKE ALL PRECAUTIONS necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them. Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1.08 CUT existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition. Cut existing construction using methods least likely to damage elements to be retained or adjoining construction.

1.09 IN GENERAL, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.

1.10 BY-PASS UTILITY SERVICES such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

1.11 PATCH with durable seams that are as invisible as possible. Comply with specified tolerances. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. 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.

1.12 THOROUGHLY CLEAN all areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT & DISPOSAL

PART 1 - SUMMARY OF WORK: As a part of voluntary sustainability requirements for construction operations, , this Section includes administrative and procedural requirements for salvaging, recycling and disposing of non-hazardous construction waste and debris.

1.01 DEVELOP A WASTE MANAGEMENT PLAN that will salvage and recycle as much non-hazardous construction waste as possible, including but not limited to the following:

1.02 CONSTRUCTION WASTE: Site-clearing waste, Masonry and CMU, Lumber, Wood sheet materials, Wood trim, Metals, Roofing, Insulation, Gypsum board, Piping, and Electrical conduit

1.03 PACKAGING: salvage or recycle 100 percent of the following uncontaminated packaging materials: Paper, Cardboard, Boxes, Plastic sheet and film, Polystyrene packaging, Wood crates, and Plastic pails.

1.04 SUBMIT THE WASTE MANAGEMENT PLAN within fifteen (15) days of date established for commencement of the Work.

1.05 REGULATORY REQUIREMENTS: Comply with hauling and disposal regulations of applicable AHJ representatives.

1.06 WASTE MANAGEMENT CONFERENCE: Manage and administrate periodic conferences at the Project Site, for review of methods and procedures related to waste management.

1.07 THE WASTE MANAGEMENT PLAN must include the following:

A. WASTE IDENTIFICATION: anticipated types and quantities of site-clearing and construction waste generated by the Work, including estimated quantities and assumptions for estimates.

B. WASTE REDUCTION WORK PLAN: A listing of each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator, including points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, including methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, including a listing of their names, addresses, and telephone numbers.

3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include a listing of their names, addresses, and telephone numbers.
4. Recycled Materials: A listing of local receivers and processors and type of recycled materials each will accept, including names, addresses, and telephone numbers.
5. Disposed Materials: Indicating how and where materials will be disposed of, including name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Indicating methods to be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

1.08 PLAN IMPLEMENTATION

A. IMPLEMENT WASTE MANAGEMENT PLAN, providing handling, containers, storage, signage, transportation, and other items required during the entire duration of the Contract. Comply with Division-01 Section “Temporary Facilities & Controls” for operation, termination, and removal requirements.
B. TRAIN WORKERS, SUBCONTRACTORS, AND SUPPLIERS on proper waste management procedures, as appropriate for the Work occurring at Project site.
C. DISTRIBUTE WASTE MANAGEMENT PLAN to all entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

1.09 SITE ACCESS AND TEMPORARY CONTROLS:

A. CONDUCT WASTE MANAGEMENT OPERATIONS to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
B. DESIGNATE AND LABEL SPECIFIC AREAS ON PROJECT SITE necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
C. COMPLY WITH DIVISION 01 SECTION "TEMPORARY FACILITIES AND CONTROLS" for controlling dust and dirt, environmental protection, and noise control.

1.10 RECYCLING CONSTRUCTION WASTE

A. Recycle paper and beverage containers used by on-site workers.
B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
C. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
D. Inspect containers and bins for contamination and remove contaminated materials if found.
E. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
F. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
G. Store components off the ground and protect from the weather.
H. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

1.11 RECYCLING CONSTRUCTION WASTE

A. Packaging:
    1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
    2. Polystyrene Packaging: Separate and bag materials.
    3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
    4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
B. Site-Clearing Wastes: Chip brush, branches, and trees at landfill facility.
C. Wood Materials:
    1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
    2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
    1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

1.12 DISPOSAL OF WASTE

A. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to AHJ representatives.
B. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
D. Burning: Do not burn waste materials.
E. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 - FINAL CLEANING:

1.01 PRIOR TO OWNER OCCUPANCY, clean all surfaces including fixtures and equipment, for use by the Owner. Employ experienced workers or professional cleaners for final cleaning. Leave all metal surfaces, hardware, fixtures and equipment in a bright, clean and polished conditions. Comply with the manufacturer's instructions for operations.

1.02 CLEAN TRANSPARENT MATERIALS, including mirrors and glass in doors and windows, to a polished condition. Remove putty and other substances which are noticeable as vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

1.03 PROVIDE AND MAINTAIN PROTECTIVE MATS on finished floors to provide a path of travel through the project for inspection by the AHJ and for observation by the Architect and Owner. Provide non-staining reinforced Kraft paper or cardboard mats throughout the spaces, with adhesive surfaced walk-off “tack” mats at entrances from the exterior.

1.04 CLEAN EXPOSED EXTERIOR and interior hard-surfaced finishes to a dust-free condition, free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors and pavement broom clean. Vacuum carpeted surfaces.

1.05 MECHANICAL AND ELECTRICAL EQUIPMENT must be wiped clean. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

1.06 CLEAN THE PROJECT SITE, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas to a broom clean condition; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

PART 2 - SUBSTANTIAL COMPLETION PROCEDURES:

2.01 SET ALL TIME CLOCKS, thermostats and similar devices to the current local time. Provide a printed list of names, addresses and phone numbers of all sub-contractors and material suppliers used.

2.02 AFTER FINAL CLEANING is completed, and when the Project is ready for Owner occupancy, obtain an occupancy permit on behalf of the Owner, and arrange for inspections by other required AHJ representatives - including but not limited to health-department officials, when applicable (Contractor is not responsible for AHJ acceptance or approval of Work performed by Owner’s separate contractors).

2.03 SUBMIT WRITTEN REQUEST FOR INSPECTION per requirements of the General Conditions, certifying that the Work is Substantially Complete and is therefore ready for the Owner's beneficial use and occupancy. Accompany that request with the “comprehensive list” required by the General Conditions, of items yet to be completed or corrected before final completion (the initial “punch list”).

2.04 ARCHITECT’S ACTION: Following inspection of the Work, the Architect will either prepare a certificate of Substantial Completion, or will advise the Contractor of additional Work which must be completed before the certificate will be issued. Results of the Architect’s Substantial Completion inspection, together with the Contractor’s comprehensive list of items to be completed or corrected, will form the final “punch-list” for final completion.

PART 3 - PREREQUISITES TO FINAL COMPLETION:

3.01 COMPLETE ALL “PUNCH-LIST” WORK ITEMS as expeditiously as possible, providing labor at times when the facility is not in operation, if necessary. Coordinate with the Owner's representative and perform the Work so that it will not interfere with the Owner's operations.

3.02 COMPLETE FINAL TESTING of systems, and instruct Owner's personnel in the operation, adjustment, maintenance of all mechanical, plumbing, fire protection, monitoring and electrical systems.

3.03 REMOVE TEMPORARY FACILITIES and controls, and temporary utility services from the project site, along with construction tools, field office, mock-ups and similar elements.

3.04 TOUCH-UP AND REPAIR or restore marred exposed finishes. Deliver spare parts, tools, extra stock of materials and similar physical items.

3.05 SUBMIT FINAL CLOSEOUT SUBMITTALS before instruction of Owner’s personnel, and use the Operations & Owner’s Manuals as the basis for instruction.

3.06 INSTRUCTION OF OWNER'S PERSONNEL: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instructions in the proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives.

3.07 SUBMIT WRITTEN CERTIFICATION that: (1) the Contract Documents have been reviewed, (2) the Work has been inspected for compliance with the Contract Documents, (3) the Work has been completed in accordance with the Contract Documents, (4) equipment and systems have been tested in the presence of the Owner's representative and are operational, and (5) the Work is completed and ready for final inspection.

3.08 ARCHITECT’S ACTION: Following final inspection, the Architect will either prepare the certificate of final acceptance, or will advise the Contractor of additional Work which must be performed before the certificate will be issued.

3.09 RE-INSPECTION FEES: Should the Architect perform re-inspections (for either Substantial Completion or for Final Completion) due to the failure of the Work to comply with the claims of status of completion made by the Contractor, the Owner will compensate the Architect for such additional services and will deduct the amount of such compensation and the Owner’s direct costs from the final payment to the Contractor.

END OF SECTION 01 77 00

SECTION 01 78 00 – CLOSEOUT SUBMITTALS

PART 1 - PREPARE AND SUBMIT final Closeout Submittals as required within this Section.

1.01 ORGANIZE CLOSEOUT SUBMITTAL INFORMATION into suitable sets of manageable content and size, and identified within the file structure with the title of the subject matter (such as "OPERATION AND MAINTENANCE MANUAL" or "RECORD DRAWINGS" or "WARRANTIES", as applicable), and include the Project name, 4029 S Noland Rd, the name of the Contractor, and the date prepared/submitted.

1.02 FORMAT OF SUBMITTAL (USB FLASH-DRIVES): Submit two (2) sets of Electronic Media Formatted (EMF) closeout documents before Final Completion, with document contents prepared typically in PDF format. Provide each set of Closeout Documents on a single, USB type flash-drive of sufficient capacity to contain all files on a single EMF device. Attach a concise, clearly printed label or tag to the drive to identify its contents.

1.03 CLOSEOUT SUBMITTALS

A. CONTRACT CLOSEOUT DOCUMENTS: Submit the following:

1. FINAL OCCUPANCY PERMIT, and other legal releases necessary for the Owner' complete and unrestricted use.
2. FINAL LISTING of all sub-contractors and material suppliers, with their products as used on the project.
3. UPDATED FINAL STATEMENT accounting for additional changes (additions and deductions) to the Contract Sum. Identify amounts for change orders, liquidated damages (addition or deduction), deductions for uncorrected work, deductions for re-inspection payments, and previous payments.
4. THE FINAL PAYMENT REQUEST with final unconditional lien releases from all sub-contractors and material suppliers, and other supporting documentation not previously submitted or accepted.
5. LIEN WAIVERS indicating that lien rights are "unconditionally released" for all amounts previously paid by the Owner to the contractor, and "conditionally released" or contingent only upon receipt and bank clearance of the final payment amount yet due to the Contractor.
    a. PROVIDE LIEN WAIVERS FROM the Contractor, all subcontractors, sub-subcontractors, suppliers and any other entities lawfully entitled to file a lien more than One Thousand Dollars ($1,000.00) arising out of the Work of the Construction Contract. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
    b. FORM OF WAIVER: Submit lien waivers on the 1990 Edition of the "Waiver and Release of Lien" form by the Construction Industry Affairs Council of Greater Kansas City Inc (CIAC) or other form provided or approved by the Owner, fully executed in a manner acceptable to Owner.
6. FINAL, COMPLETED PUNCH-LIST(s) with the Contractor's signed statement indicating that all items have been completed or otherwise resolved for acceptance.
7. EVIDENCE OF CONTINUING INSURANCE COVERAGE complying with requirement of the Contract Documents, including certificates of on-going insurance for products and completed operations coverage.
8. RECORD DRAWINGS: Maintain and submit one (1) set of blue- or black-line white "prints" of the Contract Drawings and Shop Drawings.
    a. IDENTIFY AND DATE each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
    b. DO NOT USE PROJECT RECORD DRAWINGS for construction purposes. Protect Project Record Drawings from deterioration and loss. Provide access to Project Record Drawings for Architect's reference during normal working hours.
    c. MARK RECORD DRAWINGS 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 Drawings. Give particular attention to information on concealed elements that cannot be readily identified and recorded later. Accurately record information in an understandable drawing technique. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations. 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 Record Drawings.
        (1) MARK WITH ERASABLE, RED-COLORED PENCIL. Use other colors to distinguish between changes for different categories of the Work at the same location.
        (2) MARK IMPORTANT ADDITIONAL INFORMATION that was either shown schematically or omitted from original Drawings.
        (3) NOTE CONTRACT MODIFICATION REFERENCES, including Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
    d. RECORD SPECIFICATIONS: Submit one (1) copy of the 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) MARK COPY with the proprietary name and model number of products, materials, and equipment actually furnished, including substitutions and product options selected.
        (2) NOTE related Change Orders, Record Drawings, and Product Data, where applicable.
9. RECORD PRODUCT DATA:

a. SUBMIT ONE (1) COPY of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
b. INCLUDE SIGNIFICANT CHANGES in the product delivered to Project site and changes in manufacturer's written instructions for installation.
c. NOTE related Change Orders, Record Drawings, and Record Specifications, where applicable.

10. 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.
    b. SUBMIT OTHER MARKED-UP RECORD DOCUMENTS (whether prepared by the GC or by the Owner's direct suppliers), Operations and Maintenance manuals, damage or settlement survey, extra copies of drawings and specifications, and similar final record information. Provide one-set of half-size drawings at the Project Site for the Owner's use.
11. ELECTRONIC PROJECT RECORD DOCUMENTS: Immediately before the Architect's inspection for Substantial Completion, review the marked-up Record Documents with the Architect. When authorized, scan paper originals of the reviewed Record Drawings, Record Specifications, Record Product Data and miscellaneous Record Submittals to PDF files for the Owner's record and future use.

1.04 OPERATION AND MAINTENANCE (O&M) MANUALS

A. ASSEMBLE A COMPLETE SET of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
    1. OPERATION DATA:
        a. Emergency instructions and procedures.
        b. System, subsystem, and equipment descriptions, including operating standards.
        c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
        d. Description of controls and sequence of operations.
        e. Piping diagrams.
    2. MAINTENANCE DATA:
        a. Manufacturer's information, including list of spare parts.
        b. Name, address, and telephone number of Installer or supplier.
        c. Maintenance procedures.
        d. Maintenance and service schedules for preventive and routine maintenance.
        e. Maintenance record forms.
        f. Sources of spare parts and maintenance materials.
        g. Copies of maintenance service agreements.
        h. Copies of warranties and bonds.

1.05 WARRANTIES

A. SUBMITTAL TIME: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
B. 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 Owner 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.
D. PROVIDE COPIES OF EACH WARRANTY within applicable sections of the Operation and Maintenance Manuals.

END OF SECTION 01 78 00

SECTION 01 79 00 – DEMONSTRATION AND TRAINING

PART 1 - SECTION INCLUDES administrative and procedural requirements for instructing the Owner's personnel, including the following:

1.01 Demonstration of operation of systems, subsystems, and equipment.

1.02 Training in operation and maintenance of systems, subsystems, and equipment.

1.03 Preparation of DVD formatted videos of training program, for future employees of the Owner

1.04 SUBMITTALS

A. PROGRAM OUTLINE: Submit two (2) 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. AT COMPLETION OF TRAINING, submit two (2) sets of the complete training manual for Owner's use.
C. DEMONSTRATION AND TRAINING DVD: Submit two (2) original DVD's of demonstration and training program at completion of Work.

1.05 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 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.06 COORDINATION

A. COORDINATE INSTRUCTION SCHEDULE with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
B. 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 the Owner.

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, and as follows:
   1. Motorized doors, including automatic entrance doors.
   2. Equipment, including projection screens, food-service equipment, and residential appliances, as applicable
   3. Fire-protection systems, including alarm and extinguishing systems
   4. Security systems.
   5. HVAC systems, including air-distribution systems, terminal equipment and devices, boilers, pumps, chillers, cooling towers, condensers and piping systems.
   6. HVAC instrumentation and controls.
   7. Electrical service and distribution, including transformers, panelboards, and motor controls.
   8. Sign and Lighting equipment and controls.
   9. Communication systems, including phone and television systems

2.02 TRAINING MODULES

A. 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. DOCUMENTATION: Review the following items in detail:
      a. Emergency manuals.
      b. Operations manuals.
      c. Maintenance manuals.
      d. Maintenance service agreements and similar continuing commitments.
   2. EMERGENCIES: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.
      e. Sequences for electric or electronic systems.
      f. Special operating instructions and procedures.
   3. OPERATIONS: Include the following, as applicable:
      a. Startup procedures.
      b. Equipment or system break-in procedures.
      c. Routine and normal operating instructions.
      d. Regulation and control procedures.
      e. Control sequences.
      f. Safety procedures.
      g. Instructions on stopping.
      h. Normal shutdown instructions.
      i. Operating procedures for emergencies.
      j. Operating procedures for system, subsystem, or equipment failure.
      k. Seasonal and weekend operating instructions.
      l. Required sequences for electric or electronic systems.
      m. Special operating instructions and procedures.
   4. ADJUSTMENTS: Include the following:
      a. Alignments.
      b. Checking adjustments.
      c. Noise and vibration adjustments.
      d. Economy and efficiency adjustments.
   5. TROUBLESHOOTING: Include the following:
      a. Diagnostic instructions.
      b. Test and inspection procedures.
   6. MAINTENANCE: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

7. REPAIRS: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.

PART 3 - EXECUTION

3.01 PREPARATION

A. ASSEMBLE EDUCATIONAL MATERIALS necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
B. SET UP INSTRUCTIONAL EQUIPMENT at instruction location.

3.02 INSTRUCTION

A. FACILITATOR: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
B. ENGAGE QUALIFIED INSTRUCTORS to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

3.03 SCHEDULING: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

A. Schedule training with Owner with at least seven days' advance notice.

3.04 DEMONSTRATION AND TRAINING VIDEO: Digitally record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

3.05 CLEANUP: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems

END OF SECTION 01 79 00

SECTION 01 91 00 – COMMISSIONING

PART 1 - GENERAL

1.01 WORK INCLUDED: Commission various, completed building systems to verify that they are installed in accordance with the Contract Documents, and to verify and demonstrate proper operation and control in accordance with the requirements indicated. Provide all labor, equipment, materials and physical activities necessary to perform building system commissioning indicated herein.

1.02 COMMISSIONING AGENT (CA): The Contractor is to engage the CA as part of the Work of this Section.

1.03 DEFINITIONS

A. COMMISSIONING AGENT (CA): An entity who must plan, manage and coordinate the overall energy-system commissioning process. The CA is also to provide an unbiased and objective opinion of energy related systems installation, operation, and performance to the Owner and to the Contractor. Activities and duties of the CA do do not affect the Contractor's responsibility to provide a finished and complete project, installed and fully functional in accordance with requirements of the Contract Documents.

1. The CA will prepare appropriate energy-system "pre-functional checklists" before commissioning operations begin.

B. COMMISSIONING TEAM: Members include representatives of the General Contractor and appropriate trade subcontractors, including but not limited to the Building Automation System (BAS) controls subcontractor, as well as the Testing, Adjusting and Balancing (TAB) subcontracted entity. During the commissioning process, The Contractor and appropriate representatives of each trade subcontractor must be present on-site when commissioning activities involve their Work or equipment.

1.04 SYSTEMS REQUIRED TO BE COMMISSIONED

A. MECHANICAL - ENERGY RELATED SYSTEM COMMISSIONING: Inspect, test and certify that the building's energy related mechanical systems are complete and operational as intended by the system design, and then operate in the presence of the CA. Commission the following energy related elements:
B. DUCTS AND AIR HANDLING SYSTEMS: Perform installation and verification checks of ductwork insulation and seals, and confirm completion of flow balancing operations, and duct-system leak testing.
C. SUPPLY, RETURN, RELIEF, & EXHAUST FANS: Perform installation and verification checks of rotation, sound levels, motor current draw, airflows, and pressures, as applicable.

D. AIR HANDLING UNITS: Perform installation and verification checks of units, including performance of checkout and start-up procedures by the manufacturer's representative; complete with documented capacity tests for heating, cooling, air flow, and static pressures; operation of all controls; and sound levels.
E. ENERGY RECOVERY UNITS: Work includes installation inspections and checks, checkout and start-up by manufacturer's representative as specified; documented capacity tests for heating, cooling, air flow, and static pressures; operation of all controls; and sound levels.
F. BUILDING AUTOMATION SYSTEMS (BAS): Perform installation and verification checks and operation of all controlled devices; point-to-point verification of control units; calibration of all control sensors and devices, providing graphical trend logs of all HVAC systems, complete operation of all control sequences; in coordination with commissioning of all controlled systems.

1.05 PROVIDE TREND LOGS prepared by the "Controls" subcontractor after all equipment has passed its functional testing. Prepare in graphical format, including all control points requested by the CA. Trending must occur over seven (7) consecutive days at 15 minute intervals. Print trend logs in color, and provided copies to the CA and include in the O&M Manual.

1.06 THE CA WILL INDICATE which equipment is to be trended. The Controls Contractor will include in the project scope, trending of each piece of equipment installed, however the CA may only select a sampling of certain types of equipment.

1.07 MONITOR CONTROL POINTS continuously and maintain on the BAS hard drive for a minimum of thirty (30) consecutive days. The Owner must be able to obtain trend logs of any control point.

PART 2 - TEAM MEMBER RESPONSIBILITIES:

2.01 COMMISSIONING AGENT (CA) RESPONSIBILITIES:

A. Plan, organize, and implement the commissioning process for energy-related systems.
B. Prepare commissioning plan and pre-functional checklists, and ensure distribution for review and comment,
C. Revise commissioning plan as required during construction
D. In conjunction with activities of the General Contractor, coordinate commissioning activities among all sub-contractors, sub-trades, and suppliers.
E. Monitor execution of pre-functional checklists and ensure that results are documented.
F. Monitor controls point-to-point checks done by control subcontractor and ensure that results are documented.
G. Observe sampling of start-up and initial system operational tests and checks.
H. Direct the Contractor to operate equipment and systems as required to ensure that all functional tests required are carried out for verification purposes.
I. Witness all functional tests and document results.
J. Review and comment on all trend logs prepared and submitted by the controls subcontractor.
K. Document all deficiencies for the Contractor to correct.
L. Re-evaluate all corrected deficiencies as tested and trended by the controls subcontractor.
M. Prepare and submit a Commissioning Report which documents all checks and tests done throughout the commissioning process and the results from each.

2.02 GENERAL CONTRACTOR RESPONSIBILITIES: The General Contractor is responsible for the overall completion of the Project, and must:

A. Participate in the Commissioning process.
B. Ensure that the appropriate subcontractors perform assigned commissioning responsibilities as specified herein.
C. Ensure the cooperation and participation in the commissioning process of other sub-contractors as applicable.
D. The General Contractor will submit the name of the person assigned as their representative to the CA, the Architect, the Mechanical Contractor and to the Owner within one month after executing the construction Contract. This person will have the authority to make decisions on behalf of the General Contractor regarding details and the scheduling of the commissioning process.
E. In the event that any scheduled equipment of system start-up or functional tests are terminated because the CA or the Mechanical Engineer discover deficient or incomplete Work, or because of non-attendance of required personnel at required activities, the Contractor will be responsible for paying the reasonable, additional costs for time and travel by the CA (if engaged by the Owner), the Mechanical Engineer, and the Architect if they were physically present to witness the start-up or functional testing.

2.03 TESTING AND BALANCING (TAB) AGENCY RESPONSIBILITIES:

A. Attend commissioning meetings scheduled by CA prior to and during on-site TAB work being done.
B. Submit proposed TAB procedures to the CA and to the Mechanical Engineer for review and acceptance.
C. Provide the Owner and the Mechanical Engineer a TAB progress reports listing deficiencies discovered during the TAB process that need to be corrected before completing final TAB report.
D. At the completion of the TAB Work, submit the final TAB report to the Owner with copies to the CA and to the Mechanical Engineer.
E. Participate in verification of the TAB report for diagnostic purposes and in solving field problems.

2.04 MECHANICAL SYSTEMS SUBCONTRACTOR

A. The Mechanical Subcontractor and all mechanical sub-subcontractors or suppliers within the Mechanical Division must cooperate with the CA to facilitate successful completion of the commissioning process.
B. The Mechanical Subcontractor must submit the name of the person assigned as their representative to the CA, the Architect, the Mechanical Engineer and the Owner within one month after signing the construction contract. This person will attend all commissioning meetings and have the authority to make decisions on behalf of the mechanical subcontractor regarding details and the scheduling of the commissioning process.

C. Each subcontractor or sub-subcontractor will include in their quotes the cost of participating in the commissioning process as specified.
D. Ensure that the automatic temperature control subcontractor performs the commissioning responsibilities as indicated.
E. Ensure participation of major equipment suppliers in appropriate start-up, testing, and training activities.
F. Notify the CA two weeks in advance of scheduled equipment and system start-up so that the CA may witness functional testing and equipment and system start-ups.
G. Provide sufficient personnel to assist the CA as required during functional testing.
H. Prior to start-up of equipment and/or systems requiring CA verification, inspect, check and confirm that the installation is correct and complete. Document the results of all inspections, complete the check lists provided in the commissioning plan, and sign them.
I. Provide equipment and systems start-up resources as specified or required.
J. Carry out performance checks to ensure that all equipment and systems are fully functional and ready for the CA to witness the formal Functional Tests (FT).
K. Operate equipment and systems for FT's in accordance with the commissioning plan and as directed by the CA. If improper functionality, incomplete work, or other deficiencies affecting system performance are discovered, the FT will be suspended by the CA. Those responsible for the deficient or incomplete work will be responsible for the costs in accordance with this Section. Correct all deficiencies, retest the systems to confirm correct operation and notify the CA to schedule another FT.

2.05 CONTROLS SUBCONTRACTOR:

A. Include the cost of commissioning requirements in the quoted price.
B. Review design for controllability with respect to equipment selected for the project;
C. Review and confirm in writing that a proper hardware specification exists to permit functional testing as required by the specifications and sequence of operation.
D. Review and confirm in writing that proper safeties and interlocks are included in design.
E. Ensure the proper sizing of control valves and actuators based on design pressure drop and flow. Ensure that the control valve authority will result in capacity control as specified. Include valve sizing and authority information in submittals.
F. Ensure the proper sizing of control dampers. Ensure control damper authority to control air flows as specified. Review and confirm in writing proper damper positions for mixing and to prevent stratification. Ensure correct actuator vs. damper movement for smooth operation. Include damper sizing, control authority and actuator selection in submittals.
G. Ensure the proper selection of sensor ranges and include data with submittals.
H. Clarify all questions concerning sequences of operation with the mechanical engineer.
I. Attend all commissioning meetings.
J. Inspect, check, and confirm the proper installation and performance of controls/BAS hardware, and software provided by others.
K. Integrate installation and programming scheduling with construction and commissioning schedules.
L. Inspect, check and confirm the correct installation and operation of input and output field point and devices through documented and signed off point-to-point checkouts.
M. In conjunction with the mechanical subcontractor, demonstrate system performance to the CA including all modes of system operation (i.e. occupied, unoccupied, and emergency) during the functional tests (FTs). If improper functionality, incomplete work, or other deficiencies affecting system performance are discovered, the FTs will be stopped by the CA. Those responsible for deficient or incomplete work will be responsible for costs in accordance with this Section.
N. Provide trend logs of all equipment as requested by the CA.
O. Provide control system technician to assist during system verification and functional testing.
P. Provide support and coordination with TAB subcontractor on all interfaces between controls and TAB scope of work. Provide, at no additional cost to the TAB and commissioning agent, all devices, such as portable operator's terminals and all software for the TAB agency to use in completing TAB procedures.

2.06 ELECTRICAL SUBCONTRACTOR:

A. Include the cost of commissioning requirements in the quoted price.
B. Review design with respect to providing power to the equipment.
C. Verify that proper hardware specifications exist for functional performance and sequence of operation required by the specifications
D. Verify that proper safeties and interlocks are included in the design of electrical connections to the equipment.
E. Attend commissioning meetings scheduled by the CA.
F. Schedule work so that required electrical installations are completed and performance of all electrical service provided.
G. Provide electrical system technicians to assist during system verification and functional performance testing.

END OF SECTION 01 91 00

SECTION 01 91 19 – EXTERIOR ENCLOSURE COMMISSIONING

PART 1 - WORK INCLUDED: Provide labor, equipment, temporary materials and procedures necessary to pressure test the exterior enclosure of the building (without occupants), and to substantiate compliance with the International Energy Conservation Code (IECC), as follows:

1.01 MAXIMUM ALLOWABLE LEAKAGE RATE: 0.40 CFM/SF (Cubic Feet per Minute per Square Foot) at a pressure differential of 0.3 inches water gauge (WG) per ASTM E 779, or an equivalent AHJ approved method.

1.02 PROVIDE THE SERVICES OF a "Certified Professional" in air-barrier testing methods and procedures by the National Environmental Balancing Bureau (NEBB - www.NEBB.org), who will determine the testing means and methods and who will supervise the on-site testing operations.

1.03 IF TEST RESULTS exceed the maximum allowable air-leakage rate indicated, evaluate the installed enclosure system, and provide immediate corrective improvements and re-testing until satisfactory compliance is achieved, at no additional cost to the Owner.

PART 2 - CALCULATION METHODS:

2.01 APPLICABLE BUILDING AREAS: Add the "footprint" area in square feet (SF) of the bottom floor, plus the area of the top floor's ceiling or roof membrane (depending on where the air-barrier is located), and add overhanging soffits of conditioned spaces that are enclosed by the air-barrier system, plus the area of exterior wall surfaces between the top and bottom layers (including below-grade walls and fenestrations consisting of storefront, doors, or windows).

2.02 CALCULATE A BASE-LINE VALUE representing the maximum air-leakage rate permitted.

2.03 THE LEAKAGE RATE is the quantity of air-leakage in CFM divided by the sum of the above SF areas.

PART 3 - EXECUTION

3.01 PREPARE THE BUILDING as required by the referenced standards, installing tightly sealed blower units at exterior doors typically on the leeward side of the building. Isolate and close-off any areas not applicable to testing, such as adjacent tenant spaces or other existing areas that are not a part of this Project, as applicable. Seal-off fans with back-draft or motorized dampers and exhausts for equipment requiring combustion air, including kitchen equipment. Seal-off floor drains and plumbing traps, and elevator pressure relief openings.

3.02 TEST AIR-LEAKAGE in accordance with the required, referenced standard, and document the average, actual leakage rate per the above requirements. Take not less than ten (10) leakage readings at setpoint pressures averaged over a ten (10) second period, or as otherwise required by the referenced standard.

3.03 PROVIDE CERTIFIED, SATISFACTORY TEST RESULTS copied electronically to the Architect, MEP Engineer and to the Owner, within 48 hours of testing.

END OF SECTION 01 91 19

Division 02 - Existing Conditions

SECTION 02 22 00 – EXISTING CONDITIONS ASSESSMENT

PART 1 - PRIOR TO COMMENCEMENT OF WORK, verify existing conditions, control points, principal lines and elevations, the presence of underground utilities, at or related to the site and the existing building, and also examine adjacent facilities upon which the work is in any way dependent.

PART 2 - SURVEY THE EXISTING BUILDING prior to the start of construction, to document any existing defects. This record shall serve as a basis for determination of subsequent damage resulting from the Contractor's operations at the site.

PART 3 - IN THE EVENT OF ANY INCONSISTENCY or conflict, between existing conditions and the Construction Documents, immediate notify the Architect of the inconsistency or conflict. Do not undertake any phase of the Work affected by such inconsistency or conflict, pending the issuance of Supplemental Instructions by the Architect.

PART 4 - ELEVATIONS OF EXISTING GRADES, floors, tops of walls, parapets, beams and locations of existing columns, walls and similar elements are based on drawings of the existing building and limited verification by the Architect. However, the Architect or Owner assumes no responsibility for the accuracy of that information. It is the intent of the Contract Drawings to integrate new Work with the existing work and the Contractor must verify and confirm the actual building conditions.

PART 5 - REVIEW CONDITIONS of other existing construction elements to be reused in the new construction, and verify that they will provide an acceptable substrate for new materials and finishes indicated.

PART 6 - REPORT all un-acceptable substrate or existing materials to the Architect in writing.

END OF SECTION 02 22 00

SECTION 02 26 00 – HAZARDOUS MATERIALS ASSESSMENT

PART 1 - GENERAL

1.01 THE PRESENCE OF HAZARDOUS MATERIALS is not anticipated by the Owner.

1.02 IF HAZARDOUS MATERIALS ARE DISCOVERED, PROVIDE PROPOSED WORK PLANS for the removal, abatement or remediation of materials discovered, for review and approval by the Owner, as a change in scope to the Construction Contract. Include in the Work Plan, a description of the proposed means and methods to be used, and an assessment of alternative methods, costs and logistics, including recommended steps to perform site cleanup and follow-up monitoring for residual contaminates, as applicable.

1.03 PROVIDE an ENVIRONMENTAL SITE ASSESSMENT & RECOMMENDATIONS REPORT of the site and existing building, in accordance with ASTM E 1903 to include testing for petroleum hydrocarbons, heavy metals (including lead and mercury), pesticides, solvents, asbestos and mold, including priority pollutants and other hazardous or regulated materials, and in accordance with requirements of this Section.

1.04 HAZARDOUS MATERIALS INSPECTION AGENCY: Engage the Professional Services of a company legally qualified and certified to provide EPA Phase II and III site and building inspections, to take samples of existing site and building materials for testing and analysis, and to make recommendations to the Owner regarding the recommended scope of hazardous materials removal or remediation Work. Provide an inspection agency, or multiple agencies, employing the following individuals:

1.05 FOR ASBESTOS INSPECTIONS, provide an individual who has EPA Model Accreditation Plan (MAP) "Building Inspector" training; accreditation as required by 40 CFR 763 - Subpart E, Appendix C, and who possesses an EPA/State certification or license as a “Building Inspector".

1.06 FOR HEAVY METALS INSPECTIONS, including Lead-Based Paints and Paints Containing Leads (LBPs) inspections, employ a Certified Industrial Hygienist (CIH) who has been certified for comprehensive practice by the American Board of Industrial Hygiene, or a Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals.

A. This facility was constructed prior to 1978, and is therefore likely to have painted surfaces containing lead-based paints.

1.07 FOR POLYCHLORINATED BIPHENYLS (PCBs) inspection, provide a person who is a Certified Industrial Hygienist (CIH) certified for comprehensive practice by the American Board of Industrial Hygiene, and with demonstrable experience in removal of PCBs.

1.08 FOR MICROBIAL (MOLD) INSPECTIONS, the Inspection Agency (IA) must employ an individual who is an Industrial Hygienist (IH) that is qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational and indoor air quality hazards. Education must include a minimum 12 semester hours or quarter hour equivalent of chemistry and 18 additional semester hours or quarter hour equivalent of courses in any combination of chemistry, physics, engineering, health physics, environmental health, biostatistics, biology, physiology, toxicology, epidemiology, or industrial hygiene. An IH for mold inspections must be supervised by a CIH, who is also trained and experienced in mold hazards in accordance with current federal, State, and local regulations.

1.09 ENGAGE A TESTING LABORATORY (TL) or multiple laboratories (if necessary) to perform testing and analysis of building materials taken for Hazardous Materials Assessments.

A. For testing ACMs, use an OSHA approved and accredited laboratory by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA).
B. For testing lead materials, use a laboratory accredited under the EPA National Lead Laboratory Accreditation Program (NLLAP) by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA) and that is successfully participating in the Environmental Lead Proficiency Analytical Testing (ELPAT) program to perform sample analysis. Laboratories selected to perform blood lead analysis shall be OSHA approved.

1.10 THE OWNER RESERVES THE RIGHT to engage a separate Hazardous Inspector and Testing Laboratory to review and consult with the Owner in regards to the assessments and recommendations specified herein.

END of SECTION 02 26 00

SECTION 02 41 16 – STRUCTURE DEMOLITION

PART 1 - GENERAL

1.01 WORK INCLUDED: Demolish and remove the existing building structure and site improvements, as indicated on the Drawings, as required to facilitate the new construction, and as specified herein. Backfill excavations, when applicable.

1.02 MATERIALS OWNERSHIP: The Owner reserves the right to claim any existing product or material from the project site for reuse, at their discretion. Except for items or materials so claimed, demolished materials will become the Contractor's property and must be removed from the site with further disposition at the Contractor's option.

1.03 PROMPTLY REPAIR DAMAGE to existing conditions and facilities caused by demolition operations and restore to original operational conditions.

1.04 PROTECTION:

A. PROVIDE TEMPORARY BARRICADES and other forms of protection as required to protect adjacent Work, the Owner's personnel or the public from injury due to demolition work.
B. EXISTING TO REMAIN: Protect construction indicated or intended to remain against damage and soiling during selective demolition. Items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.05 QUALITY ASSURANCES:

A. TRAFFIC: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with other adjacent occupied or used facilities.
B. REGULATORY REQUIREMENTS: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of applicable AHJ representatives.

1.06 PROJECT CONDITIONS

A. EXISTING CONDITIONS: The Owner and the Architect do not accept or assume any responsibility for the condition of items or building elements intended to be demolished.
B. HAZARDOUS MATERIALS: It is not expected that asbestos, PCB's, lead-based paints or other hazardous materials will be encountered. If any material is uncovered that is suspected to contain a hazardous material, do not disturb the material – and notify the Architect immediately.
C. CONDITIONS EXISTING at time of inspection for bidding purpose will be maintained by the Owner to the greatest extent practical.
D. STORAGE OR SALE OF REMOVED ITEMS or materials on-site will not be permitted.

1.07 EXAMINATION

A. EXAMINE areas and conditions under which the Work of this Section will be performed. Do not proceed if conditions exist that are detrimental to proper and timely completion. Commencement of this Work will be construed as acceptance of existing conditions, and assumption of responsibility for satisfactory completion.

1.08 UTILITY SERVICES

A. MAINTAIN EXISTING UTILITIES in service and protect them against damage during demolition operations.
B. DO NOT INTERRUPT EXISTING UTILITIES serving any occupied or operating facilities, except when authorized in writing by the Owner.
C. UTILITY REQUIREMENTS: Locate, identify, disconnect, and seal or cap off indicated utility services serving structures to be demolished. Arrange to shut off indicated utilities with utility companies.
D. VERIFY THAT UTILITIES have been disconnected and capped before start of demolition operations.

PART 2 - PREPARATION - GENERAL:

2.01 CONDUCT DEMOLITION OPERATIONS and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities

2.02 CONDUCT DEMOLITION OPERATIONS TO PREVENT INJURY to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways.

2.03 PROVIDE AND MAINTAIN SHORING, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings or elements to be demolished and to adjacent buildings or elements intended to remain. Strengthen or add new supports when required during progress of demolition.

PART 3 - PREPARATION FOR BUILDING DEMOLITION:

3.01 DO NOT CLOSE OR OBSTRUCT STREETS, walks, or other adjacent occupied or used facilities without permission from the Owner.

3.02 PROVIDE ALTERNATE ROUTES around closed or obstructed roads if necessary.

3.03 PROTECT EXISTING SITE IMPROVEMENTS, appurtenances, and landscaping to remain.

3.04 ERECT A FENCE around drip line of individual trees or around perimeter drip line of groups of trees to remain.

3.05 BELOW-GRADE DEMOLITION WORK: Demolish foundation walls and other below-grade construction, as follows:

A. REMOVE BELOW GRADE CONSTRUCTION, including foundation walls, completely.
B. BELOW GRADE CONCRETE SLABS: break up and remove in entirety.

PART 4 - DISPOSAL OF DEMOLISHED MATERIALS

4.01 PROMPTLY DISPOSE of demolished materials. Do not allow demolished materials to accumulate on-site.

4.02 DO NOT BURN demolished materials on-site.

4.03 TRANSPORT DEMOLISHED MATERIALS off the property and legally dispose of.

END OF SECTION 02 41 16

SECTION 02 41 19 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 WORK INCLUDED: Demolish and remove existing site improvements and building components, as indicated on the Drawings, as required to facilitate the new construction Work, and as specified herein.

1.02 RELATED SECTIONS: Division-31 “Earthwork” Section for backfill of excavations, when applicable.

1.03 MATERIALS OWNERSHIP: The Owner reserves the right to claim any existing product or material for reuse, at their discretion. Except for items or materials so claimed, demolished materials will become the Contractor's property and must be removed from the site with further disposition at the Contractor's option.

1.04 PROMPTLY REPAIR DAMAGE to existing conditions and facilities caused by demolition operations and restore to original operational conditions.

1.05 QUALITY ASSURANCES:

A. TRAFFIC: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with other adjacent occupied or used facilities.
B. REGULATORY REQUIREMENTS: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of applicable AHJ representatives.

1.06 PROJECT CONDITIONS

A. EXISTING CONDITIONS: The Owner and the Architect do not accept or assume any responsibility for the condition of items or building elements intended to be demolished.
B. HAZARDOUS MATERIALS: It is not expected that asbestos, PCB’s, lead-based paints or other hazardous materials will be encountered with this Project. If any material is uncovered that is suspected to contain a hazardous material, do not disturb the material – and notify the Architect immediately.
C. CONDITIONS EXISTING at the time of inspection for bidding will be maintained by the Owner to the greatest extent practical.

1.07 STORAGE OR SALE OF REMOVED ITEMS or materials on-site will not be permitted.

A. PROVIDE REPAIR MATERIALS identical to existing materials, whose installed performance equals or surpasses that of the exiting materials. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

PART 2 - EXECUTION

2.01 EXAMINATION

A. EXAMINE areas and conditions under which the Work of this Section will be performed. Do not proceed if conditions exist that are detrimental to proper and timely completion. Commencement of this Work will be construed as acceptance of existing conditions, and assumption of responsibility for satisfactory completion.
B. SURVEY EXISTING CONDITIONS and correlate with requirements indicated to determine extent of selective demolition required.
C. INVENTORY AND RECORD THE CONDITION of items to be removed and reinstalled and items to be removed and salvaged. Photograph existing damage to structural surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Architect prior to starting work.
D. IF UNANTICIPATED mechanical, electrical, or structural elements which conflict with the intended function of design are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Architect in written, accurate detail. Pending receipt of directive from the Architect, rearrange selective demolition schedule as necessary to continue overall job progress without delay.
    1. SURVEY THE CONDITION OF THE BUILDING to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

2.02 PROTECTION:

A. PROVIDE TEMPORARY BARRICADES and other forms of protection as required to protect adjacent Work, the Owner's personnel or the public from injury due to selective demolition work.
B. EXISTING TO REMAIN: Protect construction indicated or intended to remain against damage and soiling during selective demolition. Items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

2.03 BUILDING SERVICES

A. MAINTAIN EXISTING SERVICES in operation and protect them against damage during demolition operations.
B. DO NOT INTERRUPT EXISTING SERVICES serving any other occupied or operating facilities, except when indicated in the Drawings or so authorized in writing by the Owner and with concurrence of AHJ representatives.
C. PROVIDE TEMPORARY SERVICES during interruptions of existing services, acceptable to the Owner and to AHJ’s.
D. LOCATE, IDENTIFY, DISCONNECT AND SEAL OR CAP OFF services associated with selective demolition operations, and verify that services have been disconnected and capped before start of selective demolition operations.

2.04 PREPARATION - GENERAL:

A. CONDUCT SELECTIVE DEMOLITION OPERATIONS and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities
B. CONDUCT OPERATIONS TO PREVENT INJURY to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways.
C. PROVIDE AND MAINTAIN SHORING, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings or elements to be demolished and to adjacent buildings or elements intended to remain. Strengthen or add new supports when required during progress of demolition.
D. PROVIDE TEMPORARY WEATHER PROTECTION, during interval between demolition and removal of existing construction, on exterior surfaces to ensure that no water leakage or damage occurs to structure or interior areas.

2.05 PREPARATION FOR SELECTIVE SITE DEMOLITION:

A. DO NOT CLOSE OR OBSTRUCT STREETS, walks, or other adjacent occupied or used facilities without permission from the Owner, and if required, from AHJ's.
B. PROVIDE ALTERNATE ROUTES around closed or obstructed roads if required by AHJ's.
C. PROTECT EXISTING SITE IMPROVEMENTS, appurtenances, and landscaping to remain.
D. ERECT A FENCE around drip line of individual trees or around perimeter drip line of groups of trees to remain.
E. PREPARATION FOR INTERIOR SELECTIVE DEMOLITION:
F. PROTECT WALLS, CEILINGS, FLOORS, and other existing finishes that are to remain and are exposed during demolition operations.
G. COVER AND PROTECT furniture, furnishings, and equipment that have or will not be removed. Protect air-handling equipment from dust or debris.
H. ERECT AND MAINTAIN DUSTPROOF PARTITIONS and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise. Construct dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and 2-inch fire-retardant plywood on the demolition side. Insulate partition to provide noise protection to occupied areas. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.

2.06 POLLUTION CONTROLS:

A. UTILIZE water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations, as applicable.
B. DO NOT CREATE HAZARDOUS or objectionable conditions, such as ice, flooding, and pollution, when using water, and do not create objectionable odors from use of chemicals.
C. REMOVE AND TRANSPORT DEBRIS in a manner that will prevent spillage on adjacent surfaces and areas. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.

PART 3 - SELECTIVE DEMOLITION OPERATIONS: Demolish and remove existing construction elements only to the extent required by new construction or as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:

3.01 NEATLY CUT OPENINGS AND HOLES plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain

3.02 CUT OR DRILL FROM THE EXPOSED OR FINISHED SIDE into concealed surfaces to avoid marring existing finished surfaces. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Maintain adequate ventilation when using cutting torches

3.03 REMOVE DECAYED, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

3.04 RETURN ELEMENTS OF CONSTRUCTION AND SURFACES TO REMAIN to condition existing before start of demolition operations.

3.05 DEMOLISH CONCRETE AND MASONRY in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.

3.06 REMOVE RESILIENT FLOOR COVERINGS and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and Addendum. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

3.07 REMOVE AIR-CONDITIONING EQUIPMENT without releasing refrigerants.

3.08 BELOW-GRADE DEMOLITION WORK: Demolish foundation walls and other below-grade construction, as follows:

A. REMOVE BELOW GRADE CONSTRUCTION, including foundation walls completely.
B. BELOW GRADE CONCRETE SLABS: break up and remove unless otherwise indicated to remain..

3.09 PATCHING AND REPAIRS

A. PROMPTLY PATCH AND REPAIR holes and damaged surfaces caused to adjacent construction by selective demolition operations. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
B. RESTORE EXPOSED FINISHES of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

C. PATCH AND REPAIR FLOOR AND WALL SURFACES in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance. Closely match texture and finish of existing adjacent surface. Patch with durable seams that are as invisible as possible.
D. WHERE PATCHING SMOOTH PAINTED SURFACES, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat
E. REMOVE EXISTING FLOOR AND WALL COVERINGS and replace with new materials, if necessary, to achieve uniform color and appearance.

3.10 DISPOSAL OF DEMOLISHED MATERIALS

A. PROMPTLY DISPOSE of demolished materials. Do not allow demolished materials to accumulate on-site.
B. DO NOT BURN demolished materials on-site.
C. TRANSPORT DEMOLISHED MATERIALS off the property and legally dispose of.

3.11 CLEANING

A. SWEEP THE SITE AND BUILDING broom clean on completion of selective demolition operation.
B. CHANGE FILTERS ON AIR-HANDLING EQUIPMENT on completion of selective demolition operations.

END OF SECTION 02 41 19

Division 03 – Concrete

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide cast-in-place concrete, complete, in place, as indicated on the Drawings, as specified herein, and as required for a complete and proper installation. Install embedded inserts, anchors, sleeves and other devices to be cast-in-place within concrete that are furnished as part of the Work of other Sections.

1.02 REFERENCED STANDARDS: Comply with applicable provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:

A. AMERICAN CONCRETE INSTITUTE (ACI)

1. ACI 301: Specifications for Structural Concrete for Buildings
2. ACI 302: Floor and Slab Construction"
3. ACI 304: Measuring, Mixing and Placing Concrete
4. ACI 305: Hot Weather Concreting
5. ACI 306: Cold Weather Concreting
6. ACI 315: Reinforcement Detailing
7. ACI 318: Manual of Standard Practice
8. ACI 347: Recommended Practice for Concrete Formwork

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS

1. ASTM C33: Specification for Concrete Aggregates
2. ASTM C42: Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
3. ASTM C117: Test Method for Material Finer than 75 microns (No. 200) Sieve in Mineral Aggregates by Washing
4. ASTM C138: Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete."
5. ASTM C140: Test Method for Concrete Masonry Units
6. ASTM C150: Specifications for Portland Cement"
7. ASTM C172: Practice for Sampling Fresh Concrete"
8. ASTM C260: Specification for Air-Entraining Admixtures for Concrete"
9. ASTM C494: Specification for Chemical Admixtures for Concrete"
10. ASTM C595: Specification for Blended Hydraulic Cements" (Types IP or IS only)
11. ASTM C618: Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete."
12. ASTM C989: Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars."
13. ASTM C1077: Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and criteria for Laboratory Evaluation."
14. ASTM D1557: Tests for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10 Pound Rammer and 18-inch Drop."
15. ASTM E329: Standard Recommended Practice for Inspection and testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction."

C. CONCRETE REINFORCING STEEL INSTITUTE

1. CRSI's "Manual of Standard Practice"

PART 2 - SUBMITTALS

2.01 PRODUCT DATA: For each type of manufactured material and product indicated.

2.02 DESIGN MIXES: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

2.03 SUBMIT REINFORCEMENT SHOP DRAWINGS for fabrication, bending, and placement of reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.

2.04 QUALITY ASSURANCE

2.05 INSTALLER QUALIFICATIONS: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

2.06 READY-MIX MANUFACTURER QUALIFICATIONS: A firm experienced in manufacturing ready-mixed concrete products and complying with ASTM C 94 requirements for production facilities and equipment.

2.07 SOURCE LIMITATIONS: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

2.08 RETAIN A TESTING LABORATORY to perform material evaluation tests and to design concrete mixes. Materials and installed work may require testing and retesting, as directed by Owner, at any time during progress of Work. Allow free access to material stockpiles and facilities. Remove and replace work found to be defective and provide new acceptable work.

2.09 MOCKUP: Before casting concrete with special exposed finish (sandblasted, board-formed, or similar), build a field mockup to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following, using materials indicated for the completed Work:

A. Demonstrate curing, cleaning, and protecting of cast-in-place architectural concrete, finishes, and contraction joints, as applicable.
B. In presence of Architect, damage part of the exposed surface of cast-in-place architectural concrete for each finish, color, and texture required, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces.
C. Obtain Architect's approval of mockup before casting related concrete Work.
D. Maintain mockup during construction in an undisturbed condition as a standard for judging the completed Work.
E. Demolish and remove mockup when directed.
F. Approved mockups may become part of the completed Work if undisturbed and in acceptable condition at time of Substantial Completion.

2.10 DELIVER, STORE, AND HANDLE steel reinforcement to prevent bending and damage.

2.11 PRODUCTS

A. FORM-FACING MATERIALS

1. SMOOTH-FORMED FINISHED CONCRETE: Form-facing panels that will provide continuous, true, and smooth concrete surfaces, furnished in largest practicable sizes to minimize number of joints. Provide plywood, metal, or other approved panel materials.
2. EXTERIOR-GRADE PLYWOOD, suitable for concrete forms without a wood-grain surface or texture, complying with DOC PS 1, and as follows:
    a. High-density overlay, Class 1, or better.
    b. Medium-density overlay form surface: Class 1, or better, mill-release agent treated and edge sealed.
    c. Structural 1, B-B, or better, mill oiled and edge sealed.
    d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
3. FORMS FOR BOARD-FINISHED EXPOSED CONCRETE: LUMBER STANDARD: Softwood lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review. Provide dressed lumber, S4S, unless otherwise indicated, and in board widths of two (2) inch typical in nominal thickness, and as indicated on the Drawings.
4. FORM-LINER: Use a reusable form liner only if specifically approved by the Architect. Submit Product Data, and if tentatively approved by the Architect, prepare an on-site mockup casting of the proposed form liner installation, including a sample of the joint treatment(s) between form-liner units, for the Architect’s approval of the mockup.
5. ROUGH-FORMED FINISHED CONCRETE: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
6. FORMS FOR CYLINDRICAL COLUMNS, PEDESTALS, AND SUPPORTS: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
7. PAN-TYPE FORMS: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
8. CHAMFER STRIPS: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
9. RUSTICATION STRIPS: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
10. VOID FORMS: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
11. FORM-RELEASE AGENT: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
    a. Formulate form-release agent with rust inhibitor for steel form-facing materials.
12. CONCRETE FORM TIES: Factory-fabricated, adjustable length units with removable or snap-off metal or glass-fiber-reinforced plastic form ties, designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal. Furnish units that will leave no corrodible metal closer than 1-1/2 inch to the plane of the exposed concrete surface.

B. REINFORCING MATERIALS:

1. REINFORCING BARS: ASTM A-6l5, Grade 60, deformed.
2. LOW-ALLOY-STEEL REINFORCING BARS: ASTM A 706, deformed.
3. GALVANIZED REINFORCING BARS: ASTM A 615, Grade 60, deformed bars, ASTM A 767, Class I zinc coated after fabrication and bending.
4. EPOXY-COATED REINFORCING BARS: ASTM A 615, Grade 60 ASTM A 706, deformed bars, ASTM A 775 epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.
5. STEEL BAR MATS: ASTM A 184, fabricated from ASTM A 615, Grade 60, deformed bars, assembled with clips.
6. PLAIN-STEEL WIRE: ASTM A 82, as indicated.
7. DEFORMED-STEEL WIRE: ASTM A 496.
8. EPOXY-COATED WIRE: ASTM A 884, Class A, Type 1 coated, as indicated steel wire, with less than 2 percent damaged coating in each 12-inch wire length.

9. PLAIN-STEEL WELDED WIRE REINFORCEMENT: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
10. DEFORMED-STEEL WELDED WIRE REINFORCEMENT: ASTM A 497, flat sheet.
11. GALVANIZED-STEEL WELDED WIRE REINFORCEMENT: ASTM A 185, plain, fabricated from galvanized-steel wire into flat sheets.
12. EPOXY-COATED WELDED WIRE REINFORCEMENT: ASTM A 884, Class A coated, Type 1, deformed steel.
13. ANCHOR BOLTS: ASTM F 1554, Grade 36 bolts with standard heads, in length and projections indicated on the drawings.
14. STEEL WIRE: ASTM A-82, plain, cold-drawn.
15. WELDED WIRE FABRIC: ASTM A-l85, welded steel.
16. REINFORCEMENT ACCESSORIES
17. JOINT DOWEL BARS: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
18. EPOXY-COATED JOINT DOWEL BARS: ASTM A 615, Grade 60, plain-steel bars, ASTM A 775 epoxy coated.
19. EPOXY REPAIR COATING: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.
20. ZINC REPAIR MATERIAL: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
21. BAR SUPPORTS: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
    a. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
    b. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair.

C. CONCRETE MATERIALS

1. PORTLAND CEMENT: ASTM C 150, Type I/II gray, low alkali. Use only one brand throughout project
2. FLY ASH: ASTM C 618, Class C or F, limited to 20% of total cementitious materials by weight
3. NORMAL-WEIGHT AGGREGATE: ASTM C 33, uniformly graded, and as follows:
4. CLASS: Severe weathering region, but not less than 3S.
5. NOMINAL MAXIMUM AGGREGATE SIZE:
    a. Typical slab-on-grade: 18-8 combined aggregate gradation (re below) with 1-1/4 inch maximum or 1/3 slab thickness if thicker than 4 inch (to reduce water content and shrinkage)
    b. Foundations: 1 inch maximum
    c. All other concrete: 3/4 inch maximum
6. COMBINED AGGREGATE GRADATION (at slab-on-grade): Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
7. FINE AGGREGATES: Natural washed hard sand varying from fine to particles passing a 3/8" screen, of which at least 12 % must pass a 50 - mesh screen.
8. WATER: Potable and complying with ASTM C 94.
9. ADMIXTURES: Products certified by Manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
    a. AIR-ENTRAINING ADMIXTURE: ASTM C 260.
    b. WATER-REDUCING PLASTICIZER ADMIXTURE: ASTM C 494, Type A.
    c. RETARDING ADMIXTURE: ASTM C 494/C 494M, Type B.
    d. WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494, Type D.
    e. HIGH-RANGE, WATER-REDUCING ADMIXTURE: ASTM C 494, Type F.
    f. HIGH-RANGE, WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494, Type G.
    g. PLASTICIZING AND RETARDING ADMIXTURE: ASTM C 1017, Type II.
    h. SET-ACCELERATING CORROSION-INHIBITING ADMIXTURE: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494, Type C. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
        (1) Axim Italcementi Group, Inc.; CATEXOL CN-CI.
        (2) BASF Construction Chemicals - Building Systems; Rheocrete CNI.
        (3) The Euclid Chemical Company
        (4) Grace Construction Products, W. R. Grace & Co.; DCI.
        (5) Sika Corporation; Sika CNI.
    i. NON-SET-ACCELERATING CORROSION-INHIBITING ADMIXTURE: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

(1) BASF Construction Chemicals - Building Systems; Rheocrete 222+.
(2) Cortec Corporation; MCI- 2000 or 2005NS.
(3) Grace Construction Products, W. R. Grace & Co.; DCI-S.
(4) Sika Corporation; FerroGard 901.

D. RELATED CONCRETE MATERIALS

1. WATERSTOPS: Manufactured self-expanding, rectangular or trapezoidal strip of butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch. Provide adhesive and two (2) inch long concrete cut-nails at all joints, for positive securement. Available Products:
   a. Colloid Environmental Technologies Company; Volclay Waterstop-RX – P: 708-392-4600)
   b. Concrete Sealants Inc.; Conseal CS-231.
   c. Greenstreak; Swellstop.
   d. Henry Company, Sealants Division; Hydro-Flex.
   e. JP Specialties, Inc.; Earthshield Type 20.
   f. Progress Unlimited, Inc.; Superstop.
   g. TCMiraDRI; Mirastop.
2. UNDER-SLAB VAPOR RETARDER (typical below all concrete slabs-on-grade): Minimum 15 mil thick sheet meeting ASTM E 1745 - Class A, complete with manufacturer's recommended 3.75 inch wide joint seaming tape and waterproof mastic. Approved Products / Manufacturers include:
   a. "Griffolyn 15 Mil Green" by Reef Industries Inc.
   b. Moistop Ultra 15 by Fortifiber Building Systems Group
   c. "15 Mil Stego Wrap", by Stego Industries LLC
   d. Perminator 15 mil, by W.R. Meadows / SealTight
   e. "VaporBlock VB15" by Raven Industries Inc.
   f. "VaporCheck 15" by Viper
   g. Yellow Guard 15 Mil Class A, by Poly-America
3. JOINT-FILLER: Preformed asphalt-saturated cellulosic fiber meeting ASTM D 1751, or cork or self-expanding cork meeting ASTM D 1752 in minimum 1/2 inch thickness unless otherwise indicated.
4. STRIP-TOP JOINT FILLER: Provide joint-filler strips with pre-cut or perforated, removable top edge for installation of sealant material, at locations where a sealed surface joint will be provided.
5. EPOXY JOINT FILLER: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.
6. CONTROL JOINT SEALER: Federal Spec. TT S 00230C, Type II, Class A.
7. BONDING AGENT: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
8. EPOXY-BONDING ADHESIVE: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements. Provide Type IV or Type V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
9. REGLETS: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
10. DOVETAIL ANCHOR SLOTS: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
11. CURING MATERIALS (wet-cure only):
    a. ABSORPTIVE COVER: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
    b. MOISTURE-RETAINING COVER: Waterproof paper, or polyethylene film, or polyethylene-coated burlap, meeting ASTM C-171
12. REPAIR MATERIALS
    a. REPAIR UNDERLAYMENT: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
       (1) Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
       (2) Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
       (3) Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
       (4) Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
    b. REPAIR TOPPING / OVERLAYMENT: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch minimum and that can be filled in over a scarified surface to match adjacent floor elevations:
       (1) Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
       (2) Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
       (3) Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
       (4) Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109.
13. CONCRETE MIXES

a. PREPARE DESIGN MIXES for each type and strength of concrete determined by either laboratory trial mix or field test databases. Proportion normal-weight concrete according to ACI 211.1 and ACI 301. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
b. FOOTINGS, FOUNDATION WALLS, PIERS AND GRADE BEAMS: Proportion normal-weight concrete mixture as follows:
   (1) Minimum Compressive Strength: 3500 psi at 28 days.
   (2) Minimum Cementitious Materials Content: 500 lb/cu. yd.
   (3) Slump Limit: 4 inches plus or minus 1 inch.
   (4) Air Content: 3 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
c. SLABS-ON-GRADE: Proportion normal-weight concrete mixture to limit overall moisture within the slab, by maximizing aggregate and cementitious materials in the mix, as follows:
   (1) Minimum Compressive Strength: 4000 psi at 28 days.
   (2) Minimum Cementitious Materials Content: 560 lb/cu. Yd.
   (3) Maximum water/cement ratio = 0.44
   (4) Slump Limit: 4 inches plus or minus 1 inch.
   (5) Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
d. SUSPENDED SLABS: Proportion normal-weight concrete mixture as follows:
   (1) Minimum Compressive Strength: 5000 psi at 28 days.
   (2) Minimum Cementitious Materials Content: 600 lb/cu. yd.
   (3) Slump Limit: 4 inches plus or minus 1 inch.
   (4) Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
e. CONCRETE TOPPINGS (1-1/2 inch or more): Proportion normal-weight concrete mixture to limit overall moisture within the slab, by maximizing aggregate and cementitious materials in the mix, as follows:
   (1) Minimum Compressive Strength: 4500 psi 4000 psi at 28 days.
   (2) Minimum Cementitious Materials Content: 560 lb/cu. yd.
   (3) Maximum water/cement ratio = 0.44
   (4) Slump Limit: 4 inches plus or minus 1 inch.
   (5) Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
f. CONCRETE STRUCTURAL FRAME MEMBERS: Proportion normal-weight concrete mixture as follows:
   (1) Minimum Compressive Strength: 5000 psi at 28 days.
   (2) Minimum Cementitious Materials Content: 600 lb/cu. yd.
   (3) Slump Limit: 4 inches plus or minus 1 inch.
   (4) Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
g. EXTERIOR CONCRETE, CURBS & GUTTERS: Unless otherwise indicated, proportion normal-weight concrete mix as follows:
   (1) 4000 PSI compressive strength (at 28 Days)
   (2) Maximum water/cement ratio = 0.50
   (3) Slump: 4 inch +/- 1 inch natural slump or 8 inches maximum slump for concrete with high-range water-reducing admixture added to 2- to 4-inch natural slump concrete
   (4) Air Content: 6%
h. CONCRETE EXPOSED TO DEICERS: LIMIT CEMENTITIOUS MATERIALS other than Portland cement by percentage of weight according to ACI 301 requirements.
i. AIR CONTENT: Provide air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, to provide 6 percent air content for 1-inch- nominal maximum aggregate size. Do not air entrain concrete on trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
j. FLY ASH: Limit percentage, by weight, of fly ash to 15 percent typically, and with 25 percent at exterior exposed concrete.
k. LIMIT WATER-SOLUBLE, CHLORIDE-ION CONTENT in hardened concrete to 0.15 percent by weight of cement.
l. ADMIXTURES:
   (1) USE ADMIXTURES according to manufacturer's written instructions.
   (2) USE WATER-REDUCING ADMIXTURE or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
   (3) USE WATER-REDUCING AND RETARDING ADMIXTURE when required by high temperatures, low humidity, or other adverse placement conditions.
   (4) USE WATER-REDUCING ADMIXTURE in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
m. FABRICATE STEEL REINFORCEMENT according to CRSI's "Manual of Standard Practice."
n. CONCRETE MIXING

(1) READY-MIXED CONCRETE: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
(2) WHEN AIR TEMPERATURE is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 FORMWORK

A. DESIGN, ERECT, SHORE, BRACE, AND MAINTAIN FORMWORK, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
B. CONSTRUCT FORMWORK so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
C. LIMIT CONCRETE SURFACE IRREGULARITIES, designated by ACI 347R as abrupt or gradual, to 1/8 inch (Class A).
D. CONSTRUCT FORMS TIGHT enough to prevent loss of concrete mortar.
E. FABRICATE FORMS FOR EASY REMOVAL without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
F. DO NOT USE RUST-STAINED steel form-facing material.
G. SET EDGE FORMS, BULKHEADS, AND INTERMEDIATE SCREED STRIPS for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
H. PROVIDE TEMPORARY OPENINGS for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
I. CHAMFER EXTERIOR CORNERS and edges of permanently exposed concrete.
J. FORM OPENINGS, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
K. CLEAN FORMS AND ADJACENT SURFACES to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
L. RETIGHTEN FORMS AND BRACING BEFORE PLACING CONCRETE, as required, to prevent mortar leaks and maintain proper alignment.
M. COAT CONTACT SURFACES OF FORMS with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

A. PLACE AND SECURE ANCHORAGE DEVICES and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
B. INSTALL ANCHOR BOLTS, accurately located, to elevations required.
C. INSTALL REGLETS to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
D. INSTALL DOVETAIL ANCHOR SLOTS in concrete structures as indicated.

3.03 REMOVING AND REUSING FORMS

A. FORMWORK MAY BE REMOVED after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if the formwork is no longer supporting the concrete weight, the concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
B. CLEAN AND REPAIR SURFACES of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
C. WHEN FORMS ARE REUSED, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.04 INSTALLATION OF VAPOR BARRIER: Place, protect, and repair according to ASTM E 1643, per Manufacturer's written instructions, and as follows:

A. Unroll with the longest dimension parallel with the direction of the pour.
B. Lap sheets over footings and seal to foundation walls.
C. Overlap joints six (6) inch minimum and seal with manufacturer’s recommended pressure-sensitive tape.
D. Seal all penetrations (including pipes) with pipe-boots per manufacturer’s instructions.
E. No penetrations of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
F. Repair damaged areas by cutting patches and overlapping damaged areas by six (6) inches minimum, and tape sealing all edges before placing concrete.

3.05 STEEL REINFORCEMENT

A. COMPLY WITH CRSI'S "Manual of Standard Practice" for placing reinforcement.
B. CLEAN REINFORCEMENT of loose rust and mill scale, earth, ice, and other foreign materials.
C. ACCURATELY POSITION, SUPPORT, AND SECURE reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
D. SHOP- OR FIELD-WELD REINFORCEMENT according to AWS D1.4, where indicated.

E. SET WIRE TIES with ends directed into concrete, not toward exposed concrete surfaces.
F. INSTALL WELDED WIRE FABRIC in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
G. EPOXY-COATED REINFORCEMENT: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
H. ZINC-COATED REINFORCEMENT: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.
I. INSTALL WATERSTOPS where indicated, and at all concrete joints below adjacent grade elevation typically. Install per manufacturer's written instructions using both adhesive bonding and mechanical fastening, in longest lengths practicable.

3.06 JOINTS

A. CONSTRUCT JOINTS TRUE TO LINE with faces perpendicular to surface plane of concrete.
B. CONSTRUCTION JOINTS: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
C. PLACE JOINTS PERPENDICULAR to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
D. FORM FROM preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
E. SPACE VERTICAL JOINTS in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
F. USE A BONDING AGENT at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
G. CONTROL JOINTS IN SLAB-ON-GRADE: Construct to form panels to divide slab into controlled areas of concrete pours not exceeding 20’-0” OC each-way typically or as otherwise indicated in the Drawings. Construct to a depth equal to at least one-third of concrete thickness, as follows:
H. GROOVED JOINTS: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
I. SAWED JOINTS: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
J. SLAB ISOLATION JOINTS: Install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
K. INSTALL STRIP-TOP EXPANSION JOINT-FILLERS where joint sealant will be installed.
L. DOWEL JOINTS: Install dowel sleeves and dowels, dowel bar and support assemblies, or dowel plates and support assemblies at joints where indicated. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.07 CONCRETE PLACEMENT

A. BEFORE PLACING CONCRETE, VERIFY that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
B. DO NOT ADD WATER TO CONCRETE during delivery, at Project site, or during placement.
C. DEPOSIT CONCRETE CONTINUOUSLY or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
D. DEPOSIT CONCRETE IN FORMS IN HORIZONTAL LAYERS no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
E. CONSOLIDATE PLACED CONCRETE with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
F. DO NOT USE VIBRATORS TO TRANSPORT CONCRETE inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
G. DEPOSIT AND CONSOLIDATE CONCRETE FOR FLOORS AND SLABS in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
H. CONSOLIDATE CONCRETE DURING PLACEMENT OPERATIONS so concrete is thoroughly worked around reinforcement and other embedded items and into corners. Maintain reinforcement in position on chairs during concrete placement.
I. SCREED SLAB SURFACES with a straightedge and strike off to correct elevations. Slope surfaces uniformly to drains where required.
J. BEGIN INITIAL FLOATING using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
K. COLD-WEATHER PLACEMENT:

1. COMPLY WITH ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. DO NOT USE frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

L. HOT-WEATHER PLACEMENT:

1. PLACE CONCRETE ACCORDING TO RECOMMENDATIONS IN ACI 305R and as follows, when hot-weather conditions exist. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. COVER STEEL REINFORCEMENT with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

M. FINISHING FORMED SURFACES

1. ROUGH-FORMED FINISH (only for surfaces not exposed to view): As-cast concrete texture imparted by form-facing material with tie holes and with defects repaired and patched. Remove fins and other projections that exceed 1/4 inch.
2. SMOOTH-FORMED FINISH (TYPICAL): As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height. Apply smooth-formed finish typically to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting, unless otherwise indicated to be a rubbed finish on the Drawings.
3. RUBBED FINISHES (where indicated): Apply the following in addition to the smooth-formed finish noted above, where indicated on the Drawings:
4. SMOOTH-RUBBED FINISH: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
5. GROUT-CLEANED FINISH: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part Portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
6. CORK-FLOATED FINISH: Wet concrete surfaces and apply a stiff grout. Mix one part Portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
7. RELATED OR ADJACENT UNFORMED SURFACES: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
8. ABRASIVE-BLAST FINISH: Apply the following to as-cast surface finishes where indicated on Drawings:
    a. Perform abrasive blasting after compressive strength of concrete exceeds 2000 psi (13.8 MPa).
    b. Coordinate with formwork removal to ensure that surfaces to be abrasive blasted are treated at the same age.
    c. Surface Continuity:
        (1) Perform abrasive-blast finishing as continuous operation, maintaining continuity of finish on each surface or area of Work.
        (2) Maintain required patterns or variances in depths of blast to match mockups.
    d. Abrasive Blasting:
        (1) Abrasive-blast corners and edges of patterns carefully, using backup boards to maintain uniform corner and edge lines.
        (2) Determine type of nozzle pressure and blasting techniques required to match field sample.
        (3) Depth of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surfaces to match field sample, as follows:
            1. Light Texture: Expose fine aggregate with occasional exposure of coarse aggregate and uniform color, with maximum reveal of 1/16 inch (1.5 mm).
        (4) Maintain required patterns or variances in reveal projection to match mockups.

N. FINISHING FLOORS AND SLABS

1. COMPLY WITH RECOMMENDATIONS IN ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
2. FLOAT FINISH: Apply float finish to slab surfaces that are to receive trowel finish, and to surfaces which are to be covered with membrane waterproofing or roofing. Do not work surfaces after screeding, consolidating, and leveling slabs, until ready for floating. Begin floating when surface water has disappeared or when the concrete

has stiffened sufficiently to permit operation of a power-driven floats. Consolidate surface with power driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level the surface plane to a tolerance not exceeding 1/4" in ten (10) feet, in two different angles. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a smooth, uniform, granular texture.

3. TYPICAL TROWEL FINISH (provide unless otherwise indicated on the Drawings): Apply trowel finish to interior and exterior concrete slab surfaces that are to be exposed to view and to slab surfaces that are to be covered with resilient flooring, carpet, ceramic or quarry tile, wood flooring or other floor-finishes.
4. AFTER FLOAT FINISHING per above, apply first trowel finish and consolidate concrete by hand or power-driven trowel.
    a. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
    b. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
    c. Begin final troweling when surface produces a ringing sound as trowel is moved over the surface.
    d. Consolidate concrete surface by final hand troweling operation, free from trowel marks, uniform in texture and appearance.
5. PLACE AND FINISH to achieve flatness and levelness using the F-number system for “floor flatness” (FF), and “floor levelness (FL) as described in ACI 117 and as follows, unless otherwise indicated.
    a. Non-critical mechanical / electrical room floors, parking structure slabs:
    b. Class 2: FF=20 / FL=15 (overall and local)
    c. Carpeted areas: Class 2: FF=25 / FL=20 (overall and local)
    d. For areas with thin-set Flooring: Class 3: FF=35 / FL=25 (overall and local)
    e. For ground / polished finished floors: FF-50 / FL35

3.08 MISCELLANEOUS CONCRETE ITEMS

A. FILLING IN: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
B. CURBS, EQUIPMENT BASES & HOUSEKEEPING PADS: Coordinate sizes and locations of concrete bases with actual equipment provided. Construct concrete bases 4 inches or 5-1/2 inches high (as indicated) unless otherwise indicated; and extend base not less than 12 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
C. INSTALL DOWEL RODS to connect concrete base to concrete floor. Install dowel rods on 18-inch centers around the full perimeter of the concrete base, unless otherwise indicated.
D. SET ANCHORAGE DEVICES for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
E. PROVIDE MONOLITHIC FINISH to interior curbs and pads by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
F. STEEL PAN STAIRS: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.09 CONCRETE PROTECTION AND CURING

A. PROTECT FRESHLY PLACED CONCRETE from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
B. FORMED SURFACES: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moisture cure after loosening forms. If removing forms before end of curing period, continue curing by moisture curing.
C. UNFORMED SURFACES: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
D. SCHEDULE OF CURING METHODS:
    1. EXTERIOR CURBS, GUTTERS, & STANDARD EXTERIOR SLABS: Moisture cure & anti-spalling treatment.
    2. TYPICAL INTERIOR FLOORS: Moisture cure or moisture-cover cure
    3. INTERIOR FLOOR SLABS WITH CERAMIC TILE FINISH: Moisture cure or moisture-cover cure
E. SANDBLASTED CONCRETE FINISH: Where indicated on the Drawings, finish exposed surfaces of concrete walls and columns by sandblasting to a depth between l/8 to l/4 inch in a uniform, consistent textured pattern, and as follows:
F. MOCKUP: Provide a mockup area of the proposed finish for approval by the Architect, before proceeding with the remainder of the work. Locate mockup where it can be concealed if unsatisfactory – below grade or inside of building as appropriate.
G. CLEANING: After sandblasting operations are completed, clean sandblasted concrete surfaces with a weak acid solution to smooth rough ends left by the blasting operation.
H. SEALING: Seal exposed sandblasted concrete surfaces with a water-repellent sealer per applicable Division-07 Section

3.10 JOINT FILLING

A. PREPARE, CLEAN, AND INSTALL JOINT FILLER according to manufacturer's written instructions. Defer joint filling as long as possible, and do not fill joints until construction traffic has permanently ceased.
B. REMOVE dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.11 CONCRETE SURFACE REPAIRS

A. DEFECTIVE CONCRETE: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to specifications indicated or, Architect's approval.
B. PATCHING MORTAR: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
C. REPAIRING FORMED SURFACES: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
D. IMMEDIATELY AFTER FORM REMOVAL, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
E. REPAIR DEFECTS ON SURFACES EXPOSED TO VIEW by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
F. REPAIR DEFECTS ON CONCEALED FORMED SURFACES that affect concrete's durability and structural performance as determined by Architect.
G. REPAIRING UNFORMED SURFACES: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
H. REPAIR FINISHED SURFACES CONTAINING DEFECTS, including spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions. After concrete has cured at least 14 days, correct high areas by grinding.
I. CORRECT LOCALIZED LOW AREAS during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
J. CORRECT OTHER LOW AREAS SCHEDULED TO RECEIVE FLOOR COVERINGS with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
K. CORRECT OTHER LOW AREAS SCHEDULED TO REMAIN EXPOSED with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
L. REPAIR DEFECTIVE AREAS, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
M. REPAIR RANDOM CRACKS AND SINGLE HOLES one (1) inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
N. PERFORM STRUCTURAL REPAIRS OF CONCRETE, subject to Architect's approval, using epoxy adhesive and patching mortar. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.12 FIELD QUALITY CONTROL

A. a QUALIFIED INDEPENDENT TESTING AND INSPECTING AGENCY will be engaged by the Owner to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in these requirements.
B. CONCRETE Testing of composite samples of fresh concrete will be obtained according to ASTM C 172, in accordance with the following requirements:
    1. Testing Frequency: One (1) set of composite samples each day for any mix installed exceeding 5 cubic yards (CY) but less than 25 CY, and additional sets for each additional 50 CY or fraction thereof
    2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
    3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
    4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
    5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

6. Compression test specimens: ASTM C 31; cast one set of four standard cylinder specimens to be laboratory-cured and one set of four standard cylinder specimens to be field-cured for each composite sample.
7. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens and two field-cured specimens at 7 days and two at 28 days. A compressive-strength test must be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, the Contractor must evaluate operations and provide immediate corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 PSI.
10. Test results will be reported in writing to the Architect, the concrete manufacturer, and to the Contractor within 48 hours of testing. Reports of compressive-strength tests will contain the Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: The testing and inspecting agency will make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. The tTesting and inspecting agency will conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

C. COSTS FOR ADDITIONAL TESTS will be deducted from the Contract Sum.

END OF SECTION 03 30 00

SECTION 03 35 43 – POLISHED CONCRETE FINISHING

PART 1 - SUMMARY

1.01 Section Includes: Products and procedures for bonded abrasive polished concrete floors using multi-step wet/dry mechanical process, and accessories indicated, specified, or required to complete polishing.

1.02 DEFINITIONS

A. Terminology: As defined by Concrete Polishing Council (CPC) glossary.
B. Polished Concrete: The act of changing a concrete floor surface, with or without surface exposure of aggregate, to achieve a specified level of appearance.
C. Bonded Abrasive Polished Concrete: The multi-step operation of mechanically grinding, honing, and polishing a concrete floor surface with bonded abrasives to cut a concrete floor surface and to refine each cut to the maximum potential to achieve a specified level of appearance as defined by the CPC.

1.03 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.
B. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 "Quality Assurance" Article.
C. Maintenance Data: For inclusion in maintenance manual required by Division 01.
    1. Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
    2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.04 QUALITY ASSURANCE

A. Polisher Qualifications:
    1. Experience: Company that has successfully completed five projects similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
    2. Supervision: Maintain a competent supervisor who is at Project during times specified work is in progress, and is currently certified as Craftsman - Level I or higher by CPAA, CPC Craftsman, or equivalent.
    3. Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.
B. Field Mock-up: Before performing work of this Section, provide following field mock-up to verify selections made under submittals and to demonstrate aesthetic effects of polishing. Approval does not constitute approval of deviations from Contract Documents, unless Architect specifically approves deviations in writing.
    1. Form, reinforce, and cast concrete slab for 10 foot square field mock-up.
    2. Concrete shall be same mix design as scheduled for Project.
    3. Placement and finishing work shall be performed by same personnel as will place and finish concrete for Project.
    4. Mock-up shall be representative of work to be expected.
    5. Perform grinding, honing, and polishing work as scheduled for Project using same personnel as will perform work for Project.
    6. Approval is for following aesthetic qualities:
        a. Compliance with approved submittals.
        b. Compliance with specified aggregate exposure class.
        c. Compliance with specified appearance level.
        d. Compliance with specified color.
    7. Obtain Architect's approval before starting work on Project.
    8. Protect and maintain approved field mock-ups during construction in an undisturbed condition as a standard for judging completed work.
C. Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct conference at Project to comply with requirements of applicable Division 01 Sections.
    1. Required Attendees:
        a. Owner.
        b. Architect.
        c. Contractor, including supervisor.
        d. Concrete producer.
        e. Concrete finisher, including supervisor.
        f. Concrete polisher, including supervisor.
        g. Technical representative of liquid applied product manufacturers.
    2. Minimum Agenda: Polisher shall demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
        a. Tour field mock-up and representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of procedures, and other preparatory work performed by other installers.

b. Review Contract Document requirements.
c. Review approved submittals and field mock-up.
d. Review procedures, including, but not limited to:

1.05 Applicable Division 03 Section on cast-in-place concrete

A. Specific mix design.
B. Specified curing methods/procedures.
C. Projected 3, 14, and 28 day compressive strength test for finished floor and project phasing.
D. Protection of concrete substrate during construction and prior to polishing process.
E. Project phasing and scheduling for each step of grinding, honing and polishing operations including, but not limited to:

1. Quality of qualified personnel committed to project.
2. Quality and size of grinders committed to project.
3. Proper disposal of concrete slurry and/or concrete dust.
4. Details of each step of grinding, honing, and polishing operations.
5. Application of liquid applied products.
6. Protecting polished concrete floors after polishing work is complete.
7. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.06 FIELD CONDITIONS

A. Damage and Stain Prevention: It is the responsibility of others to prevent damage and staining of concrete surfaces to be polished.

1. Prohibit use of markers, spray paint, and soapstone.
2. Prohibit improper application of liquid membrane film forming curing compounds.
3. Prohibit vehicle parking over concrete surfaces.
4. Prohibit pipe-cutting operations over concrete surfaces.
5. Prohibit storage of any items over concrete surfaces for not less than 28 days after concrete placement.
6. Prohibit ferrous metals storage over concrete surfaces.
7. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces.
8. Protect from acids and acidic detergents contacting concrete surfaces.
9. Protect from painting activities over concrete surfaces.

B. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting liquid applied product application.

PART 2 - PRODUCTS

2.01 LIQUID APPLIED PRODUCTS

A. A. Liquid Densifier: An aqueous solution of silicon dioxide dissolved in one of the following hydroxides that penetrates into the concrete surface and reacts with the calcium hydroxide to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the concrete.

1. 1. Sodium Silicate
2. 2. Potassium Silicate
3. 3. Lithium Silicate
4. 4. Alkali solution of Colloidal Silicates or Silica

2.02 ACCESSORIES

A. Repair Material: A product that is designed to repair cracks and surface imperfections. The specified material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion resistance equal to or greater than the surrounding concrete substrate.
B. Grout Material: A thin mortar used for filling spaces. Acceptable products shall be:

1. Epoxy, urethane, polyurea, or polyaspartic resins.
2. Latex or acrylic binders mixed with cement dust from previous grinding steps.
3. Silicate binders mixed with cement dust from previous grinding steps.

2.03 POLISHING EQUIPMENT

A. Field Grinding and Polishing Equipment:

1. A multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.
2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments to meet OSHA requirements.
3. If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.

B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces the same results, without noticeable differences, as field grinding and polishing equipment.
C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.
D. Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous, ceramic, etc) that are attached to rotating heads to refine the concrete substrate.

1. Bonded Abrasive: Abrasive medium that is held within a bonding that erodes away to expose new abrasive medium as it is used.
2. Metal Bond Tooling: Diamond tooling that contains industrial grade diamonds with a metallic bonded matrix that is attached to rotating heads to refine the concrete substrate. These tools are available in levels of soft, medium, and hard metallic matrices that are matched with contrasting concrete substrates (i.e. hard matrix/soft concrete, medium matrix/medium concrete, soft matrix/hard concrete) and are typically used in the grinding and early honing stages of the polishing process.
3. Resin Bond Tooling: Diamond tooling that contains industrial grade diamonds within a resinous bonded matrix (poly-phenolic, ester-phenolic, and thermoplastic-phenolic) that is attached to rotating heads to refine the concrete substrate. Resin bond tooling does not have the soft/medium/hard characteristics of metal bond tooling and are typically used for the later honing and polishing stages of the polishing process.
4. Hybrid Tooling: Diamond tooling that combines metal bond and resin bond that has the characteristics of both types of tooling. These types of tools are typically used as either transitional tooling from metal bond tools to resin bond tools or as a first cut tool on smooth concrete surfaces.
5. Transitional Tooling: Diamond tooling that is used to refine the scratch pattern of metal bond tooling prior to the application of resin bond tooling in an effort to extend the life of resin bond tooling and to create a better foundation for the polishing process.
6. Abrasive Pad: An abrasive pad, resembling a typical floor maintenance burnishing pad that has the capability of refining the concrete surface on a microscopic level that may or may not contain industrial grade diamonds. These pads are typically used for the maintenance and/or restoration of previously installed polished concrete flooring.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to be polished for compliance with requirements and other conditions affecting performance.

a. Concrete finished floor flatness according to applicable Division 03 Section on cast-in-place concrete.
b. Concrete curing methods according to applicable Division 03 Section on cast-in-place concrete.
c. Concrete compressive strength according to applicable Division 03 Section on cast-in-place concrete.

B. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
C. Starting work within a particular area will be construed as acceptance of surface conditions.

3.02 PREPARATION

A. Cleaning New Concrete Surfaces:

1. Prepare and clean concrete surfaces.
2. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.03 POLISHING CONCRETE FLOORS

A. Perform all polishing procedures to ensure a consistent visual appearance from wall to wall.
B. Initial Grinding:

1. Use grinding equipment with metal or semi-metal bonded tooling.
2. Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.
3. Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.
4. Achieve maximum refinement with each pass before proceeding to finer grit tools.
5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
6. Continue grinding until aggregate surface exposure matches approved field mock-up.

C. Treating Surface Imperfections:

1. Mix patching compound or grout material with dust created by grinding operations, manufacturer's tint, or sand to match color of adjacent concrete surfaces.
2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.
3. Work compound and treatment until color differences between concrete surface and filled surface imperfections, compared to mockup, are not reasonably noticeable when viewed from 20 feet away under lighting conditions that will be present after construction.

D. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow curing according to manufacturer's instructions.
E. Grout Grinding:

1. Use grinding equipment and appropriate grit and bond diamond tooling.
2. Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.
3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

F. Honing:
   1. Use grinding equipment with hybrid or resin bonded tooling.
   2. Hone concrete in one direction starting with 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling reaching maximum refinement with each pass before proceeding to finer grit tooling.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

G. Final Polished Concrete Floor Finish:
   1. Aggregate Exposure Class D – Full aggregate exposure
   2. Appearance Level 2 – Satin (Honed):
      a. Procedure: Recommended not less than 4 step process with full refinement of each diamond tool with one application of densifier.
      b. Measurement: Determine the Image Clarity Value,%, and the Haze Index:
         (1) Image Clarity Value, %: An average value of 10 to 39 measured in accordance with ASTM D5767 prior to the application of sealers.
         (2) Haze Index: An average value less than 10 measured in accordance with ASTM D4039 prior to the application of sealers.
   3. The minimum number of tests distributed across the polished surface should be three, for areas up to 1000 ft2 and one additional test for each 1000 ft2 or fraction thereof. This applies to both the Image Clarity Value and Haze Index.

3.04 PROTECTION

A. PROTECT polished concrete with protective kraft-paper until occupancy. If polished floors are soiled prior to Occupancy, clean and recondition with a cleaner as recommended by the polished concrete system manufacturer.

END OF SECTION 03 35 43

Division 04 - Masonry

SECTION 04 20 00 – UNIT MASONRY

PART 1 - GENERAL

1.01 PROVIDE UNIT MASONRY where indicated on the drawings and as specified herein. Install steel lintels and shelf angles for unit masonry where indicated.

1.02 PRODUCTS INSTALLED, BUT NOT FURNISHED, under this Section include the following:

A. Steel lintels and shelf angles for unit masonry, furnished under Division-05 Section "Metal Fabrications."

1.03 REFERENCES

A. ACI 530/ASCE 5/TMS 402-99: Building Code Requirements for Masonry Structures.
B. ACI 530.1/ASCE 6/TMS 602-99: Specifications for Masonry Structures.
C. ASTM A153/A153M-98: Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
D. ASTM A580/A580M-98: Standard Specification for Stainless Steel Wire.
E. ASTM C144-99: Standard Specification for Aggregate for Masonry Mortar.
F. ASTM C150-98: Standard Specification for Portland Cement.
G. ASTM C207-97: Standard Specification for Hydrated Lime for Masonry Purposes.
H. ASTM C270-99: Standard Specification for Mortar for Unit Masonry.
I. International Masonry Institute All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.04 SUBMITTALS

A. PRODUCT DATA: For each different masonry unit, accessory, and other manufactured product specified.
B. SHOP DRAWINGS: Show fabrication and installation details for the following:
C. REINFORCING STEEL. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
D. MASONRY TRIM: Indicate profiles of custom-fabricated trim units
E. MATERIAL SAMPLES FOR PRODUCT VERIFICATION:

1. FULL-SIZE UNITS of each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. CUSTOM BRICK SHAPES required for the Project
3. WEEP HOLES/VENTS in color to match mortar color.
4. ACCESSORIES EMBEDDED in the masonry

F. LIST OF MOCKUP MATERIALS: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.
G. ADVERSE-WEATHER PROCEDURES: Detailed description of methods, materials, and equipment to be used to comply with either cold- or hot-weather requirements.

1.05 QUALITY ASSURANCE

A. SOURCE LIMITATIONS FOR MASONRY UNITS: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
B. SOURCE LIMITATIONS FOR MORTAR MATERIALS: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
C. PRECONSTRUCTION TESTING: Provide the services of a qualified independent testing agency to perform preconstruction testing indicated below as a part of the Work of this Section.

1. Concrete Masonry Unit Test: For each concrete masonry unit indicated, per ASTM C 140.
2. Mortar Test: For mortar properties per ASTM C 270.
3. Grout Test: For compressive strength per ASTM C 1019.

D. FIRE-RESISTANCE RATINGS: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

1.06 MOCKUP:

A. PROVIDE MASONRY MATERIALS for construction of a field mockup of each different exposed masonry material and color indicated, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction. Materials include but are not limited to:

1. MASONRY UNITS of each different exposed masonry unit, including special shapes, if applicable.
2. WEEP HOLES/VENTS
3. ACCESSORIES EMBEDDED in the masonry

B. BEFORE INSTALLING UNIT MASONRY, build mockup to verify selections made under sample Submittals and to demonstrate aesthetic effects. Refer to Division-1 Section Quality Requirements for general requirements of Mockup. Clean exposed faces of mockup panels with masonry cleaner indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. STORE MASONRY UNITS on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
B. PROTECT CONCRETE MASONRY UNITS from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
C. STORE CEMENTITIOUS MATERIALS on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
D. DELIVER PREBLENDED, DRY MORTAR MIX in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
E. STORE MASONRY ACCESSORIES, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.08 PROJECT CONDITIONS

A. WEATHER PROTECTION: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
B. DO NOT APPLY UNIFORM FLOOR OR ROOF LOADS for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
C. PREVENT GROUT, MORTAR, AND SOIL FROM STAINING the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface. Protect sills, ledges, and projections from mortar droppings. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
D. COLD-WEATHER REQUIREMENTS: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
E. HOT-WEATHER REQUIREMENTS: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS (CMU's):

A. PROVIDE NORMAL WEIGHT (unless otherwise indicated) ASTM C 90 open-ended per allowable shrinkage rate of C-90 paragraph 5.2, with minimum average net-area compressive strength of 1900 PSI; face size: 8 inches nominal - 7-5/8 inches actual height x 16" nominal – 15-5/8 inch actual width, in total nominal wall thickness as indicated in the Drawings. Provide manufacturer's standard light-gray colored units with "smooth" (not textured) exposed face surface suitable for painting typically, and, provide textured-face units made with gap-graded aggregates where units are indicated to receive a direct application of plaster or similar material.
B. PROVIDE SPECIAL SHAPED CMU'S at lintels, corners, jambs, sash, control joints, headers, bonding, and other similar conditions.
C. PROVIDE BULLNOSE CORNER CMU'S at all exposed outside corners, unless otherwise indicated.
D. PRECAST CMU LINTELS OR BOND BEAMS: Provide either prefabricated concrete lintels or built-in place masonry lintels using bond beam shapes with reinforcing bars indicated and filled with coarse grout. Fabricate from concrete matching CMU color, texture, joint pattern and compressive strength, and with reinforcing bars as required. Cure precast lintels by same method used for the concrete masonry units.

2.02 FACE BRICK:

A. PROVIDE CLAY UNITS complying with ASTM C 216, Grade SW, Type FBX, FBS, FBA, with initial rate of absorption less than 30 g/30 sq. In. per minute when tested per ASTM C 67, "not effloresced" when tested per ASTM C-79, and with no observable surface coloring difference in applied finish when viewed from 10 feet after 50-cycles of freezing and thawing per ASTM C-67 (except for flashed or sand-finished units).
B. MODULAR UNIT SIZE: Provide units manufactured to actual dimensions of 3-1/2 to 3-5/8 inches wide x 2-1/4 high by 7-1/2 to 7-5/8 inches long, except when indicated otherwise.
C. MANUFACTURER/PRODUCT COLOR & TEXTURE: Provide brick as indicated in the Drawings. Do not substitute materials or colors indicated without approval of the Architect.

2.03 STRUCTURAL HOLLOW BRICK:

A. PROVIDE CLAY UNITS complying with ASTM C 652, Grade SW, Type HBX or better; minimum compressive strength 9,000 psi; initial rate of absorption less than 30 g/30 sq. In. per minute when tested per ASTM C 67; "not effloresced" when tested per ASTM C-79; and with no observable surface coloring difference in applied finish when viewed from 10 feet after 50-cycles of freezing and thawing per ASTM C-67 (except for flashed or sand-finished units).
B. Provide brick units by Manufacturer/Series and in size, color and texture as indicated on the Drawings.
C. Provide special brick shapes where standard units cannot be modified by saw-cutting. Do not expose saw-cut surfaces.
D. At sills or caps, provide uncored or unfrogged units with all exposed surfaces finished.
E. Provide special shapes at corners, jambs, sash, headers, bonding, and other special conditions. Provide square-edged units at outside corners.

2.04 MORTAR AND GROUT MATERIALS for CMU and FACE BRICK

A. PORTLAND CEMENT-LIME MIX: Provide pre-packaged blend of natural or white Portland cement (as required to produce mortar color required), complying with ASTM C 150, Type I or Type II (except that Type III may be used for cold-weather construction), with hydrated lime complying with ASTM C 207, Type S. Masonry cement mixes are not acceptable.
B. PROVIDE INTEGRAL WATER-REPELLENT ADMIXTURE factory blended in mix complying with ASTM E-514 when tested as a wall assembly obtaining a Class E Rating, at all exterior masonry wall construction (including masonry veneers).
C. PRE-PACKAGED COLORED CEMENT: Provide pre-packaged Portland cement-lime mix containing pigments to produce color indicated, or if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of Portland cement by weight.
D. AGGREGATE FOR MORTAR: ASTM C 144. For mortar exposed to view, use washed aggregate consisting of natural sand or crushed stone. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve. Provide natural white sand if necessary to produce required mortar color.
E. AGGREGATE FOR GROUT: ASTM C 404.

2.05 MORTAR AND GROUT MATERIALS for STRUCTURAL HOLLOW BRICK

A. PORTLAND CEMENT-LIME MIX: Provide pre-packaged blend of natural or white Portland cement (as required to produce mortar color indicated), complying with ASTM C 270, Type S and as follows:
    1. Proportion Specification:
        a. 1 part Portland cement (ASTM C 150 Types I, IA, II,
            (1) IIA, III, IIIA or V) less than 6 months old
            (2) ½ part hydrated lime (ASTM C-207)
            (3) 3- ½ to 4- ½ parts sand (ASTM C-144)

            OR
        b. Property Specification:
            (1) Portland cement - lime mortar
            (2) Compressive strength 1800 psi
            (3) Water retention 75% minimum
            (4) Air content 12% maximum
            (5) Sand: 2 ¼ -3 ½ the sum of the separate volumes of cementitious materials sand (ASTM C-144)
B. PROVIDE INTEGRAL WATER-REPELLENT ADMIXTURE factory blended in mix complying with ASTM E-514 when tested as a wall assembly obtaining a Class E Rating, at all exterior masonry wall construction (including masonry veneers).
C. PRE-PACKAGED COLORED CEMENT: Provide pre-packaged Portland cement-lime mix containing pigments to produce color indicated, or if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of Portland cement by weight.
D. AGGREGATE FOR MORTAR: ASTM C 144. For mortar exposed to view, use washed aggregate consisting of natural sand or crushed stone. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve. Provide natural white sand if necessary to produce required mortar color.
E. AGGREGATE FOR GROUT: ASTM C 404.

2.06 OTHER MORTAR AND GROUT COMPONENTS

A. COLD-WEATHER ADMIXTURE: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated Available products include:
    1. Accelguard 80; Euclid Chemical Co.
    2. Morseled; W. R. Grace & Co., Construction Products Division.
    3. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc.
B. WATER-REPELLENT ADMIXTURE: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer. Available products include:
    1. Mortar Tite; Addiment Inc.
    2. Dry-Block Mortar Admixture; W. R. Grace & Co., Construction Products Division.
    3. Rheopel Mortar Admixture, BASF/Master Builders.
C. WATER: Potable.

2.07 RELATED MASONRY MATERIALS:

A. REINFORCING STEEL: Uncoated steel reinforcing bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60 (Grade 400).

B. JOINT REINFORCEMENT: ASTM A 951, hot-dip galvanized, carbon-steel wire for both interior and exterior walls, with W2.8 or 0.188-inch diameter side-rods and W2.8 or 0.188-inch diameter cross-rods. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches o.c. At multi-wythe masonry, provide ladder type with perpendicular cross rods spaced not more than 16 inches o.c. and 1 side rod for each face shell of hollow masonry units more than 4 inches (in width, plus 1 side rod for each wythe of masonry 4 inches (or less in width).

C. TIES AND ANCHORS - GENERAL: ASTM A-82 hot-dip galvanized carbon-steel wire with ASTM A 153, Class B-2 coating; ASTM A-653 steel sheet with G60 hot-dipped galvanized coating, and ASTM A-36 steel plates, shapes, and bars with G60 hot-dipped galvanized. coating.

D. BENT WIRE TIES: Rectangular units with closed ends and not less than 4 inches wide. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal. Fabricated from 3/16-inch- diameter, hot-dip galvanized steel wire.

E. ADJUSTABLE ANCHORS FOR CONNECTING TO STEEL FRAME: Two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall. Fabricate anchor section of crimped 1/4-inch- diameter, hot-dip galvanized steel wire for welding to steel. Fabricate tie section of triangular-shaped 0.1875-inch diameter hot-dip galvanized steel wire, sized to extend within 1 inch of masonry face.

F. ANCHORS FOR CONNECTING TO CONCRETE: Two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall. Fabricate dovetail anchor section from 0.0966-inch- thick, steel sheet, galvanized after fabrication. Fabricate tie section from triangular-shaped 0.1875-inch-diameter, hot-dip galvanized steel wire, sized to extend within 1 inch of masonry face, made from.

G. ADJUSTABLE MASONRY-VENEER ANCHORS: Two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch. Fabricate anchor section from rib-stiffened, 0.0677-inch thick sheet metal plate galvanized after fabrication with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.. Fabricate wire-tie section from triangular- shaped 0.1875-inch- diameter hot-dip galvanized steel wire tie sized to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, the following:

1. D/A 213; Dur-O-Wal, Inc.
2. D/A 210 with D/A 700-708; Dur-O-Wal, Inc.
3. 315-D with 316; Heckman Building Products, Inc.
4. Pos-I-Tie; Heckman Building Products, Inc.
5. DW-10; Hohmann & Barnard, Inc.
6. DW-10HS; Hohmann & Barnard, Inc.
7. 1004, Type III; Masonry Reinforcing Corporation of America.
8. RJ-711; Masonry Reinforcing Corporation of America.

H. STEEL DRILL SCREWS FOR STEEL STUDS: No 10 diameter minimum ASTM C 954 except manufactured with hex washer head and with neoprene washer, length required to penetrate steel stud flange by not less than 3 exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.

1. Dril-Flex; Elco Industries, Inc.
2. Hohmann & Barnard, Inc.
3. Traxx; ITW-Buildex.

I. ANCHOR BOLTS: Headed type steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated.

J. THRU-WALL MASONRY FLASHING SYSTEM: Provide an fully integrated thru-wall masonry flashing system throughout the project as manufactured by “Illinois Products Corporation” (IPCO), phone: 800-383-8183, website: www.illinoisproducts.com or equivalent system as manufactured by “Polyguard Products Inc, phone: 800-541-4994, website: www.polyguardproducts.com, including the following components:

1. Solvent based rubber flashing primer,
2. 30-mil self-adhesive rubberized asphalt flashing composite
3. Pre-formed flashing corners and end-dams
4. 3/8” (exposed) x 0.015 x 1-5/8-inch deep sheet metal drip-edge
5. Stainless steel at light colored masonry, or
6. Copper sheet metal at dark colored masonry units
7. Pre-formed inside and outside drip-edge corners
8. 15 mil (28 gage) Type 304 stainless steel cavity bridges, and
9. Rubberized asphalt flashing mastic, to seal edges of flashing

K. COMPRESSIBLE FILLER: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 50 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.

L. PREFORMED CONTROL-JOINT GASKETS: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. STYRENE-BUTADIENE-RUBBER COMPOUND: ASTM D 2000, Designation M2AA-805.
2. PVC: ASTM D 2287, Type PVC-65406.

M. BOND-BREAKER STRIPS: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

N. RECTANGULAR PLASTIC WEEP/VENTS: Clear butyrate or PVC , 3/8 by 1-1/2 by 3-1/2:

1. Cell Vent; Dur-O-Wal, Inc., or Hohmann & Barnard # 343 louvered Weep Vent or equal

O. CAVITY DRAINAGE MATERIAL: 1-inch- thick, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings.

1. Mortar Break; by Advanced Building Products, Inc.
2. Polytite MortarStop, by Dayton Superior Corporation, Dur-O-Wal Division
3. Mortar Net; Mortar Net USA, Ltd.

P. REINFORCING BAR POSITIONERS: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

1. D/A 811; Dur-O-Wal, Inc.
2. D/A 816; Dur-O-Wal, Inc.
3. No. 376 Rebar Positioner; Heckman Building Products, Inc.
4. #RB Rebar Positioner; Hohmann & Barnard, Inc.
5. #RB-Twin Rebar Positioner; Hohmann & Barnard, Inc.
6. Double O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.
7. O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.

Q. MASONRY CLEANER: Provide standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by manufacturer of masonry units being cleaned.

2.08 MORTAR AND GROUT MIXES

A. DO NOT USE admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride in mortar or grout.

B. ADD COLD-WEATHER ADMIXTURE (IF USED) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

C. PREBLENDED, DRY MORTAR MIX: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

D. MORTAR FOR UNIT MASONRY: Comply with ASTM C 270, Property Specification, and as follows:

1. Typical Unit masonry or masonry veneer: Type N.
2. For masonry below grade, in contact with earth, and where indicated, use Type M.
3. For reinforced masonry and where specifically indicated, use Type S.

E. GROUT FOR UNIT MASONRY: Comply with ASTM C 476, and provide material with 2,000 PSI compressive strength when tested at 28 days, unless noted otherwise. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

F. EPOXY POINTING MORTAR: Mix epoxy pointing mortar to comply with mortar manufacturer's directions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.

1. Verify that foundations are within tolerances specified.
2. Verify that reinforcing dowels are properly placed.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.02 INSTALLATION, GENERAL

A. THICKNESS: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

B. BUILD CHASES AND RECESSES to accommodate items specified in this Section and in other Sections of the Specifications.

C. LEAVE OPENINGS FOR EQUIPMENT TO BE INSTALLED before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.

D. CUT MASONRY UNITS with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. SELECT AND ARRANGE UNITS for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. WETTING OF BRICK: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

3.03 CONSTRUCTION TOLERANCES

A. COMPLY WITH ACI 530.1/ASCE 6/TMS 602 and the following:
   1. FOR CONSPICUOUS VERTICAL LINES, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
   2. FOR VERTICAL ALIGNMENT OF EXPOSED HEAD JOINTS, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.
   3. FOR CONSPICUOUS HORIZONTAL LINES, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
   4. FOR EXPOSED BED JOINTS, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
   5. FOR EXPOSED HEAD JOINTS, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.04 LAYING MASONRY WALLS

A. LAY OUT WALLS IN ADVANCE for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Lay exposed masonry in “running bond” or as otherwise indicated in the Drawings. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
B. STOPPING AND RESUMING WORK: In each course, rake back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
C. BUILT-IN WORK: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
D. FILL SPACE BETWEEN HOLLOW-METAL FRAMES and masonry solidly with grout, unless otherwise indicated.
E. WHERE BUILT-IN ITEMS ARE TO BE EMBEDDED in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
F. FILL CORES IN HOLLOW CMU’s with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
G. BUILD NON-LOAD-BEARING INTERIOR PARTITIONS full height of story to underside of solid floor or roof structure above, unless otherwise indicated. Install compressible filler in joint between top of partition and underside of structure above. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Division 7 Section "Firestopping."

3.05 MORTAR BEDDING

A. LAY HOLLOW MASONRY UNITS with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
B. LAY SOLID BRICK-SIZE MASONRY UNITS with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
C. SET CAST-STONE TRIM UNITS in full bed of mortar with full vertical joints (except as required for sealant joints noted below). Fill all dowel, anchor, and similar holes. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water. Wet joint surfaces thoroughly before applying mortar.

3.06 JOINTING

A. TOOL EXPOSED MORTAR JOINTS SLIGHTLY CONCAVE when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
B. CUT JOINTS FLUSH FOR MASONRY WALLS to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.
C. SEALANT JOINTS: Rake-back mortar 3/4 inch deep minimum, sponge clean, and provide sealant joints in accordance with Division-7 Section “Joint Sealers” at the following locations:
   1. Head joints of all horizontal surfaces on solid masonry copings
   2. Between all brick and CMU or cast-stone masonry units
   3. At horizontal surfaces of all projecting masonry units, including sills or running trims
   4. At all horizontal relieving angles
   5. At all masonry control-joints or building expansion joints

3.07 MASONRY JOINT REINFORCEMENT

A. PROVIDE CONTINUOUS MASONRY JOINT REINFORCEMENT by installing entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches. Space reinforcement not more than 16 inches o.c. typically, and at not more than 8 inches o.c. in foundation walls, free-standing enclosure walls, and parapet walls. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings, in addition to continuous reinforcement.
B. CUT OR INTERRUPT JOINT REINFORCEMENT at control and expansion joints, unless otherwise indicated. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend

reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

C. ANCHOR MASONRY TO STRUCTURAL MEMBERS where masonry abuts or faces structural members by providing an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials. Install anchors embedded in masonry joints and attached to structure. Space anchors not more than 24 inches o.c. vertically and 36 inches o.c. horizontally or more as indicated on the Drawings.

D. ANCHOR MASONRY VENEERS to wall framing with masonry-veneer anchors by fastening screw-attached anchors through sheathing to wall framing with a minimum of two (2) metal fasteners unless anchor design only uses one fastener. Apply sealant at all penetrations of anchors through sheathing material – either before or after anchor installation to maintain the air-moisture barrier at the sheathing face. Embed tie sections in masonry joints. Locate anchor sections to allow maximum vertical differential movement of ties up and down. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches around perimeter.

3.08 CONTROL AND EXPANSION JOINTS

A. PROVIDE MASONRY CONTROL JOINTS where indicated on the Drawings, and as follows:

1. Install control joints at spacing not to exceed 24 feet horizontally if not indicated on the drawings.
2. Install control joints above both sides of lintels or shelf-angles when the open span exceeds six (6) feet in width.

B. EXPANSION JOINTS: Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

C. FORM CMU CONTROL JOINTS by (1) fitting bond-breaker strips into hollow contour at ends of units on one side of control joint, filling resultant core with grout, and raking joints in the exposed faces., or (2) by using control-joint gaskets designed to fit standard sash block, or (3) by installing special shaped interlocking units designed specifically for control joints. Install bond-breaker strips at all control joints. Keep head joints free and clear of mortar or rake out joint for application of sealant. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete.

D. FORM CONTROL JOINTS IN BRICK by forming open joint of not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Keep joint free and clear of mortar.

E. CONSTRUCT HORIZONTAL, PRESSURE-RELIEVING JOINTS by inserting a compressible filler of 3/8-inch high minimum for installing sealant and backer rod specified in Division 7 Section "Joint Sealants." Locate horizontal, pressure-relieving joints beneath all shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.09 FLASHING, WEEPS AND CAVITY DRAINAGE

A. INSTALL EMBEDDED FLASHING AND WEEP HOLES in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. PREPARE MASONRY SURFACES so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

C. AT MASONRY-VENEER WALLS, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, or behind exterior sheathing board when building paper does not exist, lapping flashings at least 4 inches.

D. INSTALL SELF-ADHERING FLASHING SYSTEM in strict accordance with flashing system manufacturer's installation instructions and recommendations. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge. Install cavity-bridge units to span any openings that would not support the flashing material. Place metal drip-edge in a bead of urethane sealant, and apply flashing material to top of drip-edge starting 1 inch from outside edge of masonry. Apply flashing material to the face of glass-mat gypsum sheathing panels with the flashing manufacturer's primer, and extend up face of sheathing at least 8 inches. Seal top edge with manufacturer's flashing mastic per manufacturer's recommendations.

E. INSTALL WEEP UNITS in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing, spaced at 24 inches o.c. Place cavity drainage material immediately above flashing in cavities at each weep.

F. INSTALL CAVITY VENTS in the highest available head joint (excluding rowlocks) at the top of ALL cavity spaces at same spacing as weep vents.This includes below all through wall flashing and/or lintels with brick below and above. *NOTICE: INTENT IS TO HAVE AIR FLOW BEHIND THE MASONRY*

G. INSTALL REGLETS AND NAILERS for flashing and other related construction where they are shown to be built into masonry.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. TEMPORARY FORMWORK AND SHORES: Construct formwork and shores to support reinforced masonry elements during construction. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. PLACING REINFORCEMENT: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.

C. GROUTING: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.11 FIELD QUALITY CONTROL

A. ENGAGE A TESTING AGENCY to perform field quality-control testing of installed Work.
B. FREQUENCY: Each 5000 SF of wall area or portion thereof maximum.
C. MORTAR PROPERTIES: ASTM C 780.
D. GROUT COMPRESSIVE STRENGTH: ASTM C 1019.
E. BRICK of each type and grade used: ASTM C 67.
F. CMU's of each type used: ASTM C 140.
G. MASONRY PRISMS: For each type of wall construction indicated to be "Prism-Tested", prepare prisms per ASTM C-1314 standards, 1 set for testing at 7 days, and a second set for testing at 28 days.

3.12 REPAIRING, POINTING, AND CLEANING

A. REMOVE AND REPLACE masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
B. POINTING: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
C. IN-PROGRESS CLEANING: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

3.13 FINAL CLEANING:

A. AFTER MORTAR IS THOROUGHLY SET AND CURED, clean all exposed masonry. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Protect adjacent surfaces from contact with cleaner by covering with liquid strippable masking agent, polyethylene film, or waterproof masking tape. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
B. CLEAN brick by the bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20, using job-mixed detergent solution. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions that is approved for use by the manufacturer of the masonry. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.
C. REMOVE ALL EXCESS MASONRY from Project site.

END OF SECTION 04 20 00

Division 05 – Metals

SECTION 05 12 00 – STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide structural steel where indicated on the Drawings, as specified herein, and as necessary for complete installation.

1.02 ENGINEERING DESIGN SERVICE: If needed, provide services of a Structural Engineer licensed in the state in which the Project is located to design connections required, and to supervise preparation of structural steel shop-drawings.

1.03 INCLUDE SHOP CERTIFICATION TESTING AND INSPECTION as a part of the Work of this Section.

1.04 RELATED SECTIONS include the following:

A. DIVISION-01 SECTION "Quality Requirements" for testing agency procedures and administrative requirements.
B. DIVISION-05 SECTION "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
C. DIVISION-09 SECTION “Painting” for surface preparation and priming requirements.

1.05 DEFINITION - STRUCTURAL STEEL: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.06 REFERENCE STANDARDS: Comply with applicable provisions of the following:

A. AISC's "Code of Standard Practice for Steel Buildings and Bridges" except that Paragraph 4.2.2 is hereby modified by the deletion of the following sentence: "This approval constitutes the Owner's acceptance of all responsibility for the design by the fabricator as a part of his preparation of these shop drawings."
B. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
C. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
D. AISC's "Specification for the Design of Steel Hollow Structural Sections."
E. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
F. AWS "Structural Welding Code."
G. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
H. AISC Steel Design Guide Series “Erection Bracing of Low Rise Structural Steel Buildings.”

1.07 PERFORMANCE REQUIREMENTS FOR CONNECTIONS: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.

1.08 SUBMITTALS

A. PRODUCT DATA: For each type of product indicated.
B. SHOP DRAWINGS: Show fabrication of structural-steel components. Include details of cuts, connections, splices, camber, holes, and other pertinent data. Include embedment drawings. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
C. WELDING CERTIFICATES to verify that welders to be employed in the Work have satisfactorily passed AWS qualification tests.
D. QUALIFICATION DATA: For Installer, fabricator and for professional engineer.

1.09 QUALITY ASSURANCE

A. PROFESSIONAL ENGINEER QUALIFICATIONS: A professional, registered/licensed “structural” engineer legally qualified to practice in the state in which the Project is located, experienced in providing engineering services of the kind required herein. Engineering services are defined as those performed for installations of structural work similar to Work specified in this Section in material, design, and extent. Provide certificate indicating compliance with Division-1 requirements for Professional Liability Insurance before submitting shop drawings for review.
B. INSTALLER QUALIFICATIONS: An experienced and qualified entity who has completed structural steel work similar in material, design, and extent to that indicated for this Project, with a record of successful in-service performance, and who participates in the AISC Quality Certification Program and is currently designated:
C. AISC-Certified Erector, Category CSE.
D. FABRICATOR QUALIFICATIONS: An qualified entity experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work. Fabricator shall be registered with and approved by authorities having jurisdiction, and who participates in the AISC Quality Certification Program and is designated:
E. AISC-Certified Plant, Category SBD.
F. SHOP-PAINTING APPLICATORS: Qualified according to AISC's Sophisticated Paint Endorsement P3 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
G. WELDING: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
H. A TESTING LABORATORY will be retained to qualify welding processes. Materials and installed work may require testing and retesting, as directed by Architect, at anytime during progress of Work. Allow free access to shop fabrication facilities. Remove and replace work found to be defective and provide new acceptable work.

1.10 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 erosion and deterioration.
B. STORE FASTENERS in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
C. 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.

1.11 COORDINATION - FURNISH 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.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. RECYCLED CONTENT OF STEEL PRODUCTS: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
B. W-SHAPES: High-Strength, Low-Alloy Columbium-Vanadium Steel: ASTM A 992, Grade 50.
C. CHANNELS, ANGLES, PLATE, BARS AND SHAPES: ASTM A 36
D. RECTANGULAR STEEL TUBING: ASTM A 500, Grade B, structural tubing.
E. ROUND STEEL TUBING: ASTM A 500, Grade B or Grade C, structural tubing.
F. THREADED ROD, NUTS & WASHERS: ASTM A 36 carbon steel, plain finish.
G. WELDING ELECTRODES:E70XX, unless indicated otherwise on structural drawings, per AWS requirements.
H. HIGH-STRENGTH BOLTS, NUTS, AND WASHERS: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain finish.
I. DIRECT-TENSION INDICATORS: ASTM F 959, Type 490, compressible-washer type, plain.
J. TENSION-CONTROL, HIGH-STRENGTH BOLT-NUT-WASHER ASSEMBLIES: ASTM F 1852, Type 1, heavy hex or round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain finish.
K. UNHEADED ANCHOR RODS: ASTM F 1554, Grade 36 or ASTM F 1554, Grade 55, cut threads only, weldable as indicated, straight configuration unless otherwise indicated.
L. CLEVISES AND TURNBUCKLES: ASTM A 108, Grade 1035, cold-finished carbon steel.
M. EYE BOLTS AND NUTS: ASTM A 108, Grade 1030, cold-finished carbon steel.
N. PRIMER: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
O. NONMETALLIC, SHRINKAGE-RESISTANT GROUT: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.02 FABRICATION

A. FABRICATE AND ASSEMBLE structural steel in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design." Camber structural-steel members where indicated. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected. Mark and match-mark materials for field assembly. 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. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
C. FINISHING: Accurately finish ends of columns and other members transmitting bearing loads.
D. CLEAN AND PREPARE STEEL SURFACES that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."
E. HOLES: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members. Cut, drill, or punch holes perpendicular to steel surfaces. Cut, drill, mechanically thermal cut, or punch base-plate holes perpendicular to steel surfaces. Weld threaded nuts to framing and other specialty items indicated to receive other work.
F. FABRICATIONS:
    1. STEEL WALL-OPENING FRAMING: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
    2. WELDED DOOR FRAMES: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) o.c., unless otherwise indicated.

2.03 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: Snug tightened.
B. WELD CONNECTIONS: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
C. ASSEMBLE AND WELD BUILT-UP SECTIONS by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

D. VERIFY THAT WELD SIZES, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces. Grind butt welds flush. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.04 SHOP PRIMING:

A. SHOP PRIME STEEL SURFACES typically, except at the following:

1. Surfaces embedded in concrete or mortar beyond 2” depth
2. Surfaces to be field welded.

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:

C. SSPC-SP 2, "Hand Tool Cleaning."

D. PRIMING: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces. Stripe paint corners, crevices, bolts, welds, and sharp edges. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

E. PAINTING: Apply a 1-coat, nonasphaltic 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.

2.05 FIELD APPLIED COATINGS

A. Apply coatings as specified on Structural drawings for all steel set below finished grade or encased in concrete. Typically, at all columns. Coating should only be applied to steel from finished grade/top of slab and below.

2.06 SOURCE QUALITY CONTROL

A. ENGAGE an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. CORRECT DEFICIENCIES in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. TESTS INCLUDE, but are not limited to:

1. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
3. Liquid Penetrant Inspection: ASTM E 165.
4. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
5. Ultrasonic Inspection: ASTM E 164.
6. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.01 PREPARATION: 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. Procedure for installation of temporary bracing should follow AISC Steel Design Guide Series #10 “Erection Bracing of Lowe Rise Structural Steel Buildings.” Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.02 ERECTION

A. SET STRUCTURAL STEEL ACCURATELY in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design.”

B. BASE AND BEARING PLATES: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required. 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 base or bearing plate before packing with grout. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. MAINTAIN ERECTION TOLERANCES of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. ALIGN AND ADJUST VARIOUS MEMBERS forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure. 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. REMOVE ERECTION BOLTS on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. DO NOT USE THERMAL CUTTING during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.03 FIELD 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. Provide “snug tightened” joint type, unless otherwise indicated.

B. WELD CONNECTIONS:

1. Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design for bearing, adequacy of temporary connections, alignment, 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 will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
5. Grind butt welds flush.
6. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.04 FIELD QUALITY CONTROL

A. A QUALIFIED INDEPENDENT TESTING AND INSPECTING AGENCY will be retained to inspect field welds and high-strength bolted connections. The testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

D. In addition to visual inspection, field welds will be tested according to AWS D1.1 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 will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

E. CORRECT DEFICIENCIES IN WORK that test reports and inspections indicate does not comply with the Contract Documents.

3.05 REPAIRS AND PROTECTION

A. REPAIR DAMAGED GALVANIZED COATINGS on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. TOUCHUP PAINTING: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION 05 12 00

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide miscellaneous metal fabrications where indicated on the Drawings, as specified herein, and as necessary for complete installation. The Work of this Section Includes, but is not limied to:

A. Steel framing and supports for trash enclosure doors
B. Steel framing and supports for mechanical and electrical equipment.
C. Steel framing and supports for applications where framing and supports are not specified in other Sections.
D. Shelf angles.
E. Metal ladders.
F. Metal bollards.

1.02 PRODUCTS FURNISHED, but not installed, under this Section include the following:

A. Loose steel lintels.
B. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
C. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.03 SUBMITTALS

A. SHOP DRAWINGS - TYPICAL: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
B. SUBMIT STRUCTURAL ANALYSIS DATA indicating compliance with design loads and provide shop drawings signed and sealed by the qualified Professional Engineer responsible for their preparation.

1.04 QUALITY ASSURANCE

A. FABRICATOR QUALIFICATIONS: A firm experienced in producing metal fabrications 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. PROFESSIONAL ENGINEER QUALIFICATIONS: Legally qualified to practice in jurisdiction where Project is located, experienced in providing engineering services of the kind indicated, with Professional Liability Insurance as required in Supplementary Conditions.
C. QUALIFY WELDING PROCEDURES AND PERSONNEL according to the following:
    1. AWS D1.1, "Structural Welding Code--Steel."
    2. AWS D1.3, "Structural Welding Code--Sheet Steel."
    3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.05 PROJECT CONDITIONS

A. FIELD MEASUREMENTS: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
B. ESTABLISHED DIMENSIONS: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to
C. ENSURE that actual dimensions correspond to established dimensions. Allow for trimming and fitting.
D. COORDINATE INSTALLATION OF ANCHORAGES for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.01 EXPOSED METAL SURFACES: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.02 RECYCLED CONTENT OF STEEL PRODUCTS: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.03 FERROUS METAL MATERIALS:

A. Steel Plates, Shapes, and Bars: ASTM A 36.
B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
D. Rolled-Steel floor Plate: ASTM A 786, rolled from plate complying with ASTM A 36 or ASTM A 283, Grade C or D.
E. Steel Bars for Gratings: ASTM A 36.
F. Wire Rod for Grating Crossbars: ASTM A 510.
G. Uncoated, Cold-Rolled Steel Sheet: Commercial quality, complying with ASTM A 366; or structural quality, complying with ASTM A 611, Grade A, unless another grade is required by design loads.
H. Uncoated, Hot-Rolled Steel Sheet: Commercial quality, complying with ASTM A 569; or structural quality, complying with ASTM A 570, Grade 30, unless another grade is required by design loads.
I. Galvanized Steel Sheet: ASTM A 653, G90 coating, either commercial quality or structural quality, Grade 33, unless another grade is required for design loads.

2.04 WELDING RODS AND BARE ELECTRODES: Select according to AWS specifications for metal alloy welded.

2.05 ROUGH HARDWARE: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing, supporting or anchoring.

2.06 FASTENERS: zinc-coated fasteners for interior use, or galvanized for exterior use or when built into exterior walls:

A. Bolts and Nuts: Regular hexagon head type, ASTM A-307, Grade A.
B. Lag Bolts: Square Heat type, FS FF-B-561.
C. Machine Screws: Cadmium plated steel, FS FF-S-92.
D. Plain Washers: Round Carbon Steel FS FF-W-92.
E. Toggle Bolts: Tumble wing type, FS FF-B-588, Type, class and style as required.
F. Lock Washers: Helical spring type carbon Steel, FS FF--W-84.

2.07 CAST-IN-PLACE (CIP) ANCHORS: Anchors 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 independent testing agency. Provide threaded or wedge type; galvanized ferrous castings, of either ASTM A 47 malleable iron or ASTM A 27 cast steel, with bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153.

2.08 EXPANSION ANCHORS: Drilled-in anchor bolt and sleeve assembly complying with FS FF-S-325, Group VIII (anchors, expansion, nondrilling), Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5) with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

A. INTERIOR LOCATIONS: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
B. AT LOCATIONS EXPOSED TO WEATHER: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594 at locations exposed to weather.

2.09 MANUFACTURERED METAL PRODUCTS:

A. DOWNSPOUT BOOT: “Zurn” # Z191-CA (cleanout-access) cast-iron unit with 5” x 4” inlet, 4” round outlet (verify size and type of connection required with storm-drainage system), 24” high unit with 2” NPT cleanout access with plug, in black colored “Dura-Coat” finish.
B. CONCEALED-IN-WALL COUNTERTOP SUPPORTS: Pre-fabricated steel countertop support bracket of minimum 2 inch wide steel angle in a “T-shape” assembly, with an angle support arm extending from one (1) to four (4) inch maximum from the outside edge of a countertop:
    1. Basis-of-Design: “Upper Extension (EC) Series concealed bracket by A&M Hardware, Inc., P: 888-647-0200, www.aandmhardware.com) in black color, and in support arm length as required for depth of countertop.
C. CONCEALED-IN-WALL SHELF SUPPORTS: Pre-fabricated steel shelf support bracket of minimum 2 inch wide steel angle in a “T-shape” assembly, with an angle support arm extending from to 1-1/2 from the outside edge of a shelf, or as otherwise indicated in the Drawings:
    1. Basis-of-Design: “Upper Extension (EC) Series 12” deep concealed shelf support by A&M Hardware, Inc., P: 888-647-0200, www.aandmhardware.com) in black color, and in support arm length as indicated on the Drawings and as required for depth of shelf.
D. CONCEALED COUNTERTOP SUPPORTS: 2.5 inch wide by 1/2 inch thick units fabricated from ASTM A36 hot rolled steel with four (4) pre-drilled mounting holes, in length as required to securely anchor to support framing and to extend to within one (1) inch of edge of countertop overhang, with 35 degree “safe edge” on front of bracket, in black electrostatic powder-coat finish:
    1. BASIS-OF-DESIGN: “CenterlineBrackets Standard Granite Bracket” Series CSP as manufacturered by Centerline Steel LLC., P: 888-960-3854, www.countertopbracket.com
E. CONCEALED SHELF SUPPORTS: 2.5 inch wide by 1/2 inch thick steel unit fabricated from ASTM A36 hot rolled steel with six (6) pre-drilled mounting holes to anchor to support framing and to extend to within one (1) inch of edge of countertop, with 35 degree “safe edge” on front of bracket (for silicone mounting on flat surface), in black electrostatic powder-coat finish:
    1. BASIS-OF-DESIGN: “CenterlineBrackets Floating Wall Mount Bracket” by Centerline Steel LLC., P: 888-960-3854, www.centerlinebrackets.com
F. CHANNEL-SUSPENSION SYSTEM: Pre-engineered assemblies of 0.093 inch thick (12 gage) minimum pre-punched channels and shapes, with accessory hanger-rods (1/2 inch diameter min), beam-clamps, washers, nuts, inserts, fittings and other components in electro- or hot-dipped-galvanized finish typically.
    1. APPROVED MANUFACTURERS / SYSTEMS: Cooper B-Line, Kindorf by Thomas & Betts, Hohmann & Barnard, Unistrut, Versabar or equivalent system in compliance with requirements herein.
G. HANGER RODS: Mild low carbon steel, fully threaded or threaded each end, with nuts as required to position and lock rod in place, in manufacturer’s standard electro- or hot-dipped galvanized finish.
    1. INTERIOR, DRY AREA FINISH: Any manufacturer’s standard phosephate and baked enamel/epoxy, electro-galvanized, or 15 mil minimum thickness polyvinyl chloride (PVC) finish
    2. EXTERIOR OR DAMP AREA FINISH: Hot-dipped galvanized (other finishes not permitted)
H. PRE-FABRICATED TRASH ENCLOSURE GATES: Furnish pre-fabricated, pre-finished steel gates.
    1. Basis of Design: Ametco: 4326 Hamann Parkway P.O. Box 1210, Willoughby, OH 44096 Phone: 1-800-321-7042
    2. Type: Large Swing Gates; Shadow 100 Design

3. Hinges: Steel, Heavy Duty
4. Finish: Galvanized and powder coated. Color selected by Architect from manufacturer's standard colors.

2.10 FABRICATION OF MISCELLANEOUS METALWORK - 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. SHEAR AND PUNCH METALS cleanly and accurately. Remove burrs.
C. 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.
D. WELD CORNERS AND SEAMS CONTINUOUSLY to comply with 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. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
E. PROVIDE FOR ANCHORAGE of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
F. CUT, REINFORCE, DRILL, AND TAP METAL FABRICATIONS to receive finish hardware, screws, and similar items.
G. FABRICATE JOINTS that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
H. ALLOW FOR THERMAL MOVEMENT resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
I. FORM EXPOSED WORK TRUE TO LINE AND LEVEL with accurate angles and surfaces and straight sharp edges.
J. REMOVE SHARP OR ROUGH AREAS on exposed traffic surfaces.
K. FORM EXPOSED CONNECTIONS WITH HAIRLINE JOINTS, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.11 MISCELLANEOUS STEEL FRAMING AND SUPPORTS: Provide steel framing and supports that are not a part of structural-steel framing as necessary to complete the Work. Fabricate from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

A. GALVANIZE exterior miscellaneous framing and supports and when installed in exterior walls, and where indicated.
B. CAST-IN-PLACE (CIP) UNITS: When units will be cast into concrete or built into masonry, fabricate with integrally welded steel strap anchors 1-1/4 inches wide by 1/4 inch thick by 8 inches long at 24 inches o.c., unless otherwise indicated. Furnish inserts if units must be installed after concrete is placed.
C. LOOSE BEARING AND LEVELING PLATES: Provide at steel items bearing on masonry or concrete Work. Drill plates to receive anchor bolts and for to facilitate grouting. Galvanize after fabrication.
D. LOOSE STEEL MASONRY LINTELS: Fabricate from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches, unless otherwise indicated.
E. SHELF ANGLES: Fabricate from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete. Align expansion joints in angles with indicated control and expansion joints in cavity-wall exterior wythe. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.
F. ROOFTOP UNIT SUPPORT-FRAMES: Provide continuous steel-angle frame supports under all rooftop HVAC units, roof scuttles, roof smoke vents, skylights, exhaust fans and similar rooftop mounted equipment.
   1. Minimum angle size shall be 4" x 4" x 3/8" unless otherwise indicated.
   2. Field weld angle frames to the adjacent bar joists with horizontal leg flush with top of joists.
G. ANGLE-FRAME AT ROOFTOP OPENINGS: Provide continuous, four (4) sided steel-angle frame at all openings in the roof deck larger than 9" round or square, field welded to the adjacent bar joists.
   1. Provide 3" x 3" x 3/8" minimum angle size unless otherwise indicated.
H. EMBEDDED PIT-ANGLES /CHANNEL FRAMES: Provide galvanized perimeter steel angles and channel assemblies with welded studs for concrete embedment at dock leveler pits, edge of docks, and similar elements. Galvanize after fabrication at both interior and exterior conditions.

2.12 MISCELLANEOUS STEEL FABRICATIONS & TRIM: Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more

than 6 inches from each end, 6 inches from corners, and 24 inches OC, unless otherwise indicated. Galvanize exterior miscellaneous steel trim and in exterior walls, and where indicated.

A. PIPE BOLLARDS: Fabricate from Schedule 80 steel pipe. Anchor bollards in place with concrete footings. Support and brace bollards in position in footing excavations until concrete has been placed and cured
B. PIPE GUARDS: Fabricate from 3/8-inch-thick by 12-inch-wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2-inch clearance between pipe and pipe guard unit minimum. Drill each end for two 3/4-inch anchor bolts.

2.13 STEEL LADDERS: Fabricate for locations shown, with dimensions, fabrication details and anchorages as follows:

A. COMPLY WITH ANSI A14.3, unless otherwise indicated.
B. SIDERAILS: Continuous, 1/4 x 3 - inch steel flat bars, with eased edges, spaced 18 inches apart.
C. SAFETY POST EXTENSION: provide on one side of ladder to extend not less than 42 inches above roof hatch.
D. ABRASIVE BAR RUNGS: 3/4 inch diameter round abrasive surfaced rungs spaced 12 inches OC. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces. Abrasive surface may be provided by coating rung with aluminum-oxide granules set in epoxy-resin adhesive, or by using a manufactured rung filled with aluminum-oxide grout, at fabricators option.
E. SUPPORT EACH LADDER at top and bottom and not more than 60 inches OC with welded or bolted bent-steel or hot-formed angle steel brackets of minimum 1/4" thickness x 3” H x 3” wide (at support) x 5” high, providing a minimum 3” clearance between rungs and supporting substrate. Size brackets to support design loads specified in ANSI A14.3.

2.14 GROUT

A. NONMETALLIC, NONSHRINK GROUT: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement based, shrinkage-compensating agents, and plasticizing and water-reducing agents, with NO gypsum, complying with ASTM C 1107 with fluid consistency and 30-minute working time.

2.15 FINISHES:

A. COMPLY WITH NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.
B. PREPARATION FOR SHOP PRIMING: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
    1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
    2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
C. APPLY SHOP PRIMER to uncoated surfaces of metal fabrications, except those that are shop finished, units with galvanized finishes, at units intended to be embedded in concrete or masonry, or covered with sprayed-on fireproofing, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges.
D. HOT-DIP GALVANIZED FINISH: Apply zinc coating by the hot-dip process to comply with ASTM A 123, for steel and iron products, or ASTM A 153 for steel and iron hardware. Fill vent holes and grind smooth after galvanizing.
    1. Galvanize all exterior steel assemblies, including associated attachments and brackets.

PART 3 - EXECUTION:

3.01 FASTENING TO IN-PLACE CONSTRUCTION: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

3.02 CUTTING, FITTING, AND PLACEMENT: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.03 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.

3.04 FIELD WELDING: Comply with the following requirements:

A. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
B. Obtain fusion without undercut or overlap.
C. Remove welding flux immediately.
D. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.05 SETTING BEARING AND LEVELING PLATES: Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout. Use non-shrink, non-metallic grout unless otherwise indicated. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.06 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts

embedded in grouted masonry or concrete or with bolts through top plates of pipe columns. Where grout space under bearing plates is indicated at girders supported on concrete or masonry, install as specified above for setting and grouting bearing and leveling plates.

3.07 INSTALL PIPE COLUMNS on concrete footings with grouted baseplates. Position and grout column baseplates as specified above for setting and grouting bearing and leveling plates. Do not grout baseplates of columns supporting steel girders until girders are installed and leveled.

3.08 FILL BOLLARDS solidly with concrete, mounding top surface and finishing smooth.

3.09 INSTALLATION OF DOWNSPOUT BOOT: Mount to substrate securely through dual mounting straps. Install with top set 18" above grade unless indicated otherwise. Connect bottom to storm-drainage system piping. Apply sealant in color to match boot finish, all around gap between downspout and boot, sloping top surface away from downspout for water-tight seal.

3.10 FIELD WELDING: Comply with applicable AWS specification for procedures of manual shielded metal arc welding, for appearance and quality of welds, and for methods used in correcting welding work. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent surfaces.

3.11 CLEANING & PROTECTION:

A. TOUCHUP PAINTING: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
B. GALVANIZED SURFACES: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
C. PROTECT finishes of metalwork during construction period by use of temporary protective coverings. Remove protective covering at time of Substantial Completion. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

3.12 ADJUSTING AND CLEANING

A. TOUCHUP PAINTING: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting (but with low VOC in field) to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
B. GALVANIZED SURFACES: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780, using low VOC galvanizing repair finish material.

END OF SECTION 05 50 00

SECTION 05 58 00 – FORMED METAL FABRICATIONS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide formed metal fabrications, where indicated on the Drawings, as specified herein, and as necessary for complete installation. Types of applications include but are not limited to the following:

A. Stainless Steel countertops
Stainless Steel wall base

1.02 REFERENCED STANDARDS:

A. American Institute of Steel Construction (AISC)'s "Code of Standard Practice", as follows:

1. AISC Section 10.2.1: Tolerances – one-half of standard
2. AISC Section 10.2.3: Weld show through minimized
3. AISC Section 10.2.4: Joint Gap Tolerances Minimized
4. AISC Section 10.2.5: Welds Ground Smooth
5. AISC Section 10.2.6: Piece Marks Hidden
6. AISC Section 10.2.7: Mill Marks Removed
7. AISC Section 10.2.8: Surface Defects Minimized
8. AISC Section 10.4.1: Special Care in Processing AESS
9. AISC Section 10.4.2: Tolerances – one-half of standard

B. NATIONAL SANITATION FOUNDATION (NSF)

1. NSF # 2

1.03 SUBMITTALS

A. PRODUCT DATA: For each type of product indicated, including finishing materials.
B. SHOP DRAWINGS: Include plans, elevations, component details, and attachments to other work of formed metal. Indicate materials and profiles of each formed metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

1. Indicate weld size, length and type – and identify special grinding, finish and profile of welds required.
2. Indicate special tolerances and erection requirements for formed metalwork.

1.04 QUALITY ASSURANCE

A. FABRICATOR QUALIFICATIONS: A firm experienced in producing formed metal fabrications 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.

1.05 DELIVERY, STORAGE, AND HANDLING

A. STORE FORMED METAL INSIDE a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.
B. DELIVER AND STORE CAST-METAL PRODUCTS in wooden crates surrounded by sufficient packing material to ensure that products will not be cracked or otherwise damaged.

1.06 PROJECT CONDITIONS

A. FIELD MEASUREMENTS: Verify actual locations of walls and other construction contiguous with formed metal by field measurements before fabrication and indicate measurements on Shop Drawings.
B. ESTABLISHED DIMENSIONS: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions. If practical, provide allowance for trimming and fitting at site.

1.07 COORDINATION - COORDINATE INSTALLATION OF ANCHORAGES for formed metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.08 PRE-INSTALLATION CONFERENCE: Schedule and conduct a conference at the project site per requirements of Division-01 requirements. Include representatives of the Contractor, fabricator, erector, and the finish applicator. Review and coordinate requirements for shipping, special handling, attachment of safety cables and temporary erection bracing, touch-up finishing and other requirements of formed metalwork.

PART 2 - PRODUCTS

2.01 PROVIDE MATERIALS with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

2.02 STAINLESS STEEL

A. Stainless-Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled
B. Stainless-Steel Tube: ASTM A 554, Grade MT-304
C. Sound Dampening: NSF-certified, nonabsorbent, hard-drying, sound-deadening coating, compounded for permanent adhesion to metal in 1/8-inch (3-mm) thickness that does not chip, flake, or blister.

2.03 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

B. Uncoated Steel Items: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed, Type 304 stainless-steel fasteners where exposed.
C. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.
D. Provide concealed fasteners for interconnecting components and for attaching formed metal items to other work, unless otherwise indicated.
E. Anchors: Provide anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed.

2.04 FABRICATION OF FORMED METAL – GENERAL:

A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
B. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
C. Form metalwork elements to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces.
D. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
E. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
F. Cut, drill, and punch metals cleanly and accurately.
G. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
H. Mill joints to a tight, hairline fit. Cope or miter corner joints.
I. Fabricate connections that will be exposed to weather in a manner to exclude water.
J. Provide weep holes where water may accumulate.
K. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items, unless otherwise indicated.
L. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.

2.05 FABRICATION OF STAINLESS STEEL COUNTERTOPS: Fabricate according to NSF 2 requirements, factory assembled to the greatest extent feasible, providing closed butt and contact joints that do not require a filler typically, and as follows:

A. Welding: Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.
B. Provide full-penetration welds for full-joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.
C. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces. Where fasteners are welded to underside, finish reverse side of weld smooth and undepressed.
D. Coat unexposed stainless-steel welded joints with suitable metallic-based paint to prevent corrosion.
E. Joints: Fabricate field-assembled countertops prepared for field-joining methods. For metal butt joints, comply with SMACNA standards. Where stainless steel is joined to a dissimilar metal, use stainless-steel welding material or fastening devices.
F. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.
G. Finish sheared metal edges free of burrs, fins, and irregular projections. Provide surfaces free from exposed fasteners. Cap exposed fastener threads, including those inside cabinets, with stainless-steel lock washers and stainless-steel cap (acorn) nuts.
H. Countertop metal thickness: Minimum 0.0781-inch-thick stainless steel
I. Wall base metal thickness: Minimum 0.0625-inch thick stainless steel
J. Reinforcement of countertops: Minimum 0.0781-inch-thick, stainless-steel reinforcing angles or channel shapes

2.06 STAINLESS STEEL FINISHES:

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes. Remove or blend tool and die marks and stretch lines into finish. Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece, and as follows:
B. Concealed Surfaces: No. 2B finish (bright, cold-rolled, unpolished finish).
C. Exposed Surfaces: No. 4 finish (bright, directional polish), typical.
D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

PART 3 - EXECUTION

3.01 EXAMINATION

A. EXAMINE SUBSTRATES AND CONDITIONS, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of formed metal.
B. PROCEED WITH INSTALLATION only after unsatisfactory conditions have been corrected.
C. EXAMINATION OF MATERIALS: Check formed metal members upon delivery for twist, kinks, gouges or other imperfections which might result in rejection of the appearance of the member. Coordinate remedial actions with fabricator prior to erection.

3.02 HANDLE, LIFT AND ALIGN PIECES using protection required to maintain the appearance of the formed metal through the process of installation.

3.03 SET UNITS accurately in locations and to elevations indicated, and according to AISC specifications referenced herein. In addition to the special care used to handle and erect formed metalwork, employ the following erection techniques:

3.04 INSTALLATION, GENERAL

A. PROVIDE ANCHORAGE DEVICES and fasteners where needed to secure formed metal to in-place construction.
B. PERFORM CUTTING, DRILLING, AND FITTING REQUIRED to install formed metal. Set products accurately in location, alignment, and elevation; measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.
C. FIT EXPOSED CONNECTIONS ACCURATELY TOGETHER to form tight, hairline joints or, where indicated, with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of formed metal, restore finishes to eliminate evidence of such corrective work.
D. DO NOT CUT OR ABRADE FINISHES that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
E. Install concealed gaskets, joint fillers, insulation, and flashings as work progresses.
F. RESTORE PROTECTIVE COVERINGS that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.
G. CORROSION PROTECTION: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
H. GRIND FIELD WELDS SMOOTH in the connections of formed metal members.

3.05 STAINLESS STEEL COUNTERTOP INSTALLATION: Install level and plumb, according to manufacturer's written instructions, original design, and referenced NSF standards. Securely anchor and attach units to walls, floors, or bases with stainless-steel fasteners, unless otherwise indicated. Install sealant in joints between equipment and abutting surfaces with continuous joint backing, in accordance with requirements of Division-07 “Joint Sealants” Section. Provide airtight, watertight, vermin-proof, sanitary joints.

3.06 ADJUSTING AND CLEANING: Clean and touchup paint or finish field welds, bolted connections, and abraded areas of shop paint to blend with adjacent surfaces of formed metalwork. Clean field welds, bolted connections and abraded areas of galvanized surfaces to comply with ASTM A780. Perform touch-up work in accordance with applicable Division-09 requirements

3.07 PROTECTION

A. PROTECT FINISHES OF FORMED METAL from damage during construction period with temporary protective coverings approved by metal fabricator. Remove protective covering at time of Substantial Completion.
B. RESTORE FINISHES DAMAGED DURING INSTALLATION and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 58 00

END OF DIVISION 05

Division 06 – Wood Plastics & Composites

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.01 PROVIDE nailers, blocking, backing, and plywood which is generally not exposed to view, as required for completion of the Work, where noted on the Drawings, and as specified herein.

A. All rough carpentry inside the existing building must be fire-retardant treated (FRT)

1.02 LUMBER STANDARD: American. Softwood Lumber Std. PS 20 (U.S. Dept. Comm.), S4S, 19% moisture at time of dressing, except as otherwise indicated.

PART 2 - PRODUCTS

2.01 WOOD BLOCKING for support or attachment of other construction, including rooftop equipment bases and support curbs, blocking, cants, nailers, furring and grounds: provide dimension lumber of Construction, Stud, or No. 2 grade with 19 percent maximum moisture content and of any of the following species:

A. Mixed southern pine; SPIB.
B. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
C. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
D. Eastern softwoods; NELMA.
E. Northern species; NLGA.
F. Western woods; WCLIB or WWPA.

2.02 WOOD FURRING: Provide strips for installing plywood or paneling, select boards with no knots capable of producing bent-over nails and damage to panels.

2.03 ENGINEERED WOOD PRODUCTS

A. WOOD BLOCKING OR BACKING PANELS: For concealed wall backing in drywall partitions (including but not limited to application at grab-bars, wall-mounted cabinets, and wall-mounted door stops), provide APA C-D PLUGGED INT plywood with fire-retardant treatment, 3/4" thick minimum, or 2 x 6 fire-retardant treated lumber.
B. ELECTRICAL / PHONE PANELS: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4 inch thick.

2.04 COMPOSITE WOOD BLOCKING (alternative to below grade treated)

A. For below slab nailers at walk-in cooler to fasten cooler walls down.
B. Plastic Lumber or equal
   1. Structural Grade

2.05 WOOD-PRESERVATIVE-TREATED MATERIALS

A. PRESERVATIVE TREATMENT BY PRESSURE PROCESS: Comply with AWPA U1, and as follows:
   1. For interior construction not in contact with the ground: Use Category UC2
   2. For exterior construction not in contact with the ground: Use Category UC3b
   3. For items in contact with the ground: Use Category UC4a
   4. For items in contact with the ground in sever climates or where termites exist: Use Category UC4b
   5. For items in contact with the ground in climates with high potential for deterioration: Use Category UC4c
   6. For items in continuous contact with water: Use Category UC5 Marine
B. PRESERVATIVE CHEMICALS: Provide materials acceptable to authorities having jurisdiction and containing no arsenic or chromium.
C. FOR EXPOSED ITEMS PRESERVATIVE ITEMS that are noted to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
D. TREAT ITEMS INDICATED on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
   3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
   4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
   5. Wood floor plates that are installed over concrete slabs-on-grade.

2.06 FIRE RETARDANT TREATED (FRT) WOOD MATERIALS (typical interior wood blocking except where preservative treated): Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

A. FIRE-RETARDANT-TREATED LUMBER AND PLYWOOD BY PRESSURE PROCESS: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test. Use treatment that does not promote corrosion of metal fasteners.

1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

B. IDENTIFY FIRE-RETARDANT TREATED WOOD with appropriate classification marking of qualified testing agency.

2.07 KILN-DRY WOOD MATERIALS AFTER TREATMENT to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

2.08 PROVIDE FASTENERS of size and type indicated and that comply with requirements for material and manufacture.

A. Nails, Brads, and Staples: ASTM F 1667.
B. Power-Driven Fasteners: CABO NER-272.
C. Wood Screws: ASME B18.6.1.
D. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
E. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
F. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153.

PART 3 - EXECUTION

3.01 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION:

A. INSTALL WHERE INDICATED and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
B. ATTACH ITEMS TO SUBSTRATES to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.
C. PROVIDE PERMANENT GROUNDS of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.02 INSTALL PLYWOOD BACKING PANELS by fastening to studs. Coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

3.03 INSTALLATION OF WOOD BLOCKING AT ROOF AREAS: Typically, provide not less than 2 x 6 inch nominal preservative treated wood blocking members at roof and roof edges – spaced when necessary with solid shims or plywood, as appropriate. Connect blocking members in accordance with FM Global's Property Loss Prevention Data Sheet # 1-49 – "Perimeter flashing", and as follows:

A. BLOCKING TO CMU'S: Provide 12 inch long x 3/8 inch diameter (minimum – or as otherwise noted) galvanized steel anchor bolts spaced at 32 inch centers typically, and at 16 inch centers when within eight (8) feet (or 10% of total wall length - whichever is greater) of intersection with other walls. Embed bolt with a galvanized steel nut and washer at bottom into solid-filled cores of the CMU. Stagger bolts to either side of blocking members wider than 6 inches.
B. BLOCKING TO ROOF DECKING: Provide two (2) rows staggered of minimum # 10 galvanized sheet metal screws, with spacing in each row not to exceed 24 inches typically, and at 12 inch centers when within eight (8) feet (or 10% of total wall length – whichever is greater) of intersection with other walls. Penetrate screws into decking with not less than 3 full screw-threads clear, and provide a 5/8 inch diameter galvanized steel washer at top of blocking penetration.
C. BLOCKING TO OTHER BLOCKING: Provide galvanized wood screws with minimum 100 pound withdrawal resistance or lag screws of equivalent strength, in length to penetrate into secured member not less than 1-1/4 inch. Install fasteners in two (2) rows staggered, with spacing in each row not to exceed 24 inches typically, and at 12 inch centers when within eight (8) feet (or 10% of total wall length - whichever is greater) of intersection with other walls.

3.04 PROTECTION

A. PROTECT WOOD THAT HAS BEEN TREATED with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
B. PROTECT ROUGH CARPENTRY from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00

SECTION 06 11 00 – WOOD FRAMING

PART 1 - GENERAL

1.01 PROVIDE wood framing, nailers, and plywood which is generally not exposed to view, as required for completion of the Work, where noted on the Drawings, and as specified herein.

1.02 RELATED SECTIONS: The following include requirements for the Work of this Section:

A. Refer to Division-06 “Rough Carpentry” Section for general wood material and installation requirements

1.03 DEFINITIONS

A. EXPOSED FRAMING: Framing not concealed by other construction.
B. DIMENSION LUMBER: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
C. TIMBER: Lumber of 5 inches nominal or greater in least dimension.

1.04 LUMBER GRADING AGENCIES, and the abbreviations used to reference them, include the following:

A. NeLMA: Northeastern Lumber Manufacturers' Association.
B. NLGA: National Lumber Grades Authority.
C. RIS: Redwood Inspection Service.
D. SPIB: The Southern Pine Inspection Bureau.
E. WCLIB: West Coast Lumber Inspection Bureau.
F. WWPA: Western Wood Products Association.

1.05 ACTION SUBMITTALS:

A. SUBMIT PRODUCT DATA for each type of process and factory-fabricated product, as follows:
   1. Indicate component materials and dimensions and include construction and application details.
   2. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
   3. Indicate type of preservative used and net amount of preservative retained.
   4. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
   5. Include physical properties of treated materials based on testing by a qualified independent testing agency.
   6. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
   7. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   8. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. FASTENER PATTERNS: Full-size templates for fasteners in exposed framing.

1.06 INFORMATION SUBMITTALS

A. MATERIAL CERTIFICATES: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
B. EVALUATION REPORTS: For the following, from ICC-ES:
   1. Wood-preservative-treated wood.
   2. Fire-retardant-treated wood.
   3. Engineered wood products.
   4. Shear panels.
   5. Power-driven fasteners.
   6. Powder-actuated fasteners.

1.07 QUALITY ASSURANCE - TESTING AGENCY QUALIFICATIONS: For testing agency providing classification marking for fireretardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.08 DELIVERY, STORAGE, AND HANDLING: Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 LUMBER STANDARD: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any ruleswriting agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

A. Factory mark each piece of lumber with grade stamp of grading agency.
B. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
C. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.02 WOOD FURRING: Provide strips for installing plywood or paneling, select boards with no knots capable of producing bent-over nails and damage to panels.

2.03 DIMENSION LUMBER FRAMING

A. NON-LOAD-BEARING INTERIOR PARTITIONS: Stud grade, of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB, or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Northern species; NLGA.
7. Eastern softwoods; NeLMA.
8. Western woods; WCLIB or WWPA.

2.04 LOAD-BEARING / STRUCTURAL WOOD FRAMING, WALLS OR PARTITIONS (exterior walls or interior load bearing partitions): Any species with the following minimum design values, unless greater values are indicated in the Structural Drawings:

A. STUD GRADE: Modulus of elasticity = 1,200,000psi, Allowable Fiber Stress in Compression = 850psi
B. NO. 2 GRADE: Modulus of elasticity = 1,400,000psi, Allowable Fiber Stress in Compression = 1,200psi
C. NO. 1 GRADE: Modulus of elasticity = 1,600,000psi, Allowable Fiber Stress in Compression = 1,500psi
D. JOISTS, RAFTERS, AND OTHER FRAMING Not Listed Above: Any species and grade with a modulus of elasticity of at least 1,600,000 psi and an allowable fiber stress in bending of 900psi.

2.05 MAXIMUM WOOD-STUD LATERALLY-UNSUPPORTED HEIGHT LIMITS (shall comply with 2018 IBC Table 2308.5.1): Comply with the most restrictive requirements of the structural Drawing limits (if indicated) or the following:

NOMINAL WD STUD SIZE (in inches):	MAXIMUM SPACING (in inches):	BEARING WALLS Supporting roof and Ceiling only:	BEARING WALLS Supporting one (1) floor, Roof and ceiling:	BEARING WALLS Supporting two (2) floors, roof and ceiling	NON-BEARING PARTITIONS
2 x 3	16	(NP)	(NP)	(NP)	10 feet
2 x 4	16	10 feet	10 feet	10 feet	14 feet
2 x 4	24	10 feet	10 feet	(NP)	14 feet
2 x 6	16	10 feet	10 feet	10 feet	20 feet
2 x 6	24	10 feet	10 feet	(NP)	20 feet

2.01 MAXIMUM WOOD FRAMED UNSUPPORTED SPAN LIMITS FOR CEILINGS (shall comply with 2018 IBC Table 2308.7.1): Comply with the most restrictive requirements of the structural Drawing limits (if indicated) or the following:

JOIST SPACING (inches)	SPECIES AND GRADE	2X4	2X6	2X8	2X10
12	DOUG FIR #2	9'-10"	14'-10"	18'-9"	22'-11"
16	DOUG FIR #2	8'-9"	12'-10"	16'-3"	19'-10"
19.2	DOUG FIR #2	8'-0"	11'-9"	14'-10"	18'-2"
24	DOUG FIR #2	7'-2"	10'-6"	13'-3"	16'-3"

2.02 OSB SUBFLOORING / UNDERLAYMENTS:

A. GRADE: Exposure 1 – Single-floor panels
B. SPAN RATING: Not less than 24 oc.
C. THICKNESS: Not less than 5/8 inch
D. EDGE DETAIL: Tongue and groove.

2.03 SHEAR WALL PANELS: Provide wood-framed units consisting of a prefabricated assembly of wood perimeter framing, tie downs, and Structural I plywood or OSB sheathing.

2.04 PRESERVATIVE TREATMENT

A. Pressure treat boards and dimension lumber with waterborne preservative according to AWPA U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground or embedded in slab at grade (below walk-in refrigerator / freezer).
B. Preservative Chemicals: Acceptable to authorities having jurisdiction.
   1. Do not use chemicals containing arsenic or chromium.
C. Use process that includes water-repellent treatment.
D. After treatment, re-dry to 19 percent maximum moisture content.
E. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
F. Application: Treat items indicated on Drawings and the following:
   1. Sills and ledgers.
   2. Members in contact with masonry or concrete.
   3. Embedded in slab or below finished floor blocking.

2.05 FASTENERS

A. PROVIDE FASTENERS OF SIZE AND TYPE INDICATED that comply with requirements specified in this Article for material and manufacture. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

1. Nails, Brads, and Staples: ASTM F 1667.
2. Power-Driven Fasteners: CABO NER-272.
3. Wood Screws: ASME B18.6.1.
4. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
5. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
6. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

B. 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.

2.06 METAL FRAMING ANCHORS:

A. GENERAL: Provide units made from metal indicated, of structural capacity, type, and size indicated, and as follows:
B. PROVIDE PRODUCTS ACCEPTABLE TO AHJ representatives and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
C. ALLOWABLE DESIGN LOADS: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values must be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
D. MANUFACTURERS: The Construction Documents are based on the use of products manufactured by “Simpson Strong Tie Co.” Pending compliance with requirements herein, the following manufacturers are also acceptable:

1. Cleveland Steel Specialty Co.
2. Mitek USP Structural Connectors

E. METAL FRAMING ANCHOR FINISHES:

1. For interior locations: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (Z180) coating designation.
2. At wood-preservative-treated (TRT) lumber and where indicated: Heavy-galvanized steel sheet complying with ASTM A 653 - structural steel (SS), high-strength, low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch thick.

F. JOIST HANGERS: U-shaped joist hangers with 2-inch-long seat and 1-1/4-inch-wide nailing flanges at least 85 percent of joist depth - Thickness: 0.062 inch.
G. I-JOIST HANGERS: U-shaped joist hangers with 2-inch-long seat and 1-1/4-inch-wide nailing flanges full depth of joist, with nailing flanges to provide lateral support at joist top chord - Thickness: 0.062 inch
H. TOP FLANGE HANGERS: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member - Strap Width: 2 inches; Thickness: 0.062 inch
I. BRIDGING: Rigid, V-section, nailless type, 0.050 inch (1.3 mm) thick, length to suit joist size and spacing.
J. POST BASES: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch-minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.
K. JOIST TIES: Flat straps, with holes for fasteners, for tying joists together over supports - Width: 1-1/4 inches; Thickness: 0.062 inch; Length: 16 inches
L. RAFTER TIE-DOWNS: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick.
M. RAFTER TIE-DOWNS (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
N. FLOOR-TO-FLOOR TIES: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.
O. WALL BRACING: Either T-shaped bracing made for letting into studs in saw kerf - 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges, or angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

2.07 FRAMING ACCESSORY MATERIALS

A. SILL SEALER: Glass fiber resilient insulation fabricated in strip form, one (1) inch nominal thickness compressible to 1/32 inch thick, or closed-cell neoprene foam of 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
B. ADHESIVES FOR GLUING FURRING AND SLEEPERS TO CONCRETE OR MASONRY: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
C. WATER-REPELLENT PRESERVATIVE: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION OF WOOD FRAMING

A. PROVIDE FRAMING MEMBERS of sizes and on spaces shown, and frame openings as shown, or if not shown, comply with recommendations of American Forest and Paper Association, American Wood Council, WCD-1 "Details

for Conventional Wood Frame Construction". Do not splice structural members between supports. All load bearing lumber must be grade marked.

B. PROVIDE SPECIAL FRAMING as shown for eaves, overhangs, dormers and similar conditions, if any.
C. INSTALLATION STANDARDS: ANSI/AF&PA NDS-2005, "National Design Specification for Wood Construction", including nailing, firestopping, anchorage, framing and bracing.
D. SECURELY ATTACH ROUGH CARPENTRY WORK to substrate by anchoring and fastening as indicated, complying with the following:
    1. NES NER-272 for power-driven fasteners.
    2. Published requirements of metal framing anchor manufacturer – installing fasteners through each hole
    3. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
E. USE COMMON WIRE NAILS, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.
F. USE FINISHING NAILS FOR EXPOSED WORK, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
G. FIELD-TREATMENT OF PRESERVATIVE TREATED LUMBER: Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber. Use inorganic boron for items that are continuously protected from liquid water, or use copper naphthenate for items not continuously protected from liquid water.

3.02 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION: Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.03 WALL AND PARTITION FRAMING INSTALLATION:

A. GENERAL: Provide stud framing of size and spacing indicated or, if not otherwise indicated, of the following sizes and spacings. Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using 2" thick members with widths equaling that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction.
B. INSTALL SILL SEALER to form continuous seal between sill plates and foundation walls.
C. PROVIDE CONTINUOUS HORIZONTAL BLOCKING at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.
D. 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. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches OC.
E. 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.
F. FOR NON BEARING WALLS or 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.
G. FOR LOAD BEARING WALLS or partitions, provide double-jamb studs for openings 6' 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".
H. PROVIDE FIRE BLOCKING of not less than 2" nominal thickness and no less in width than the enclosed spaces within partitions. Provide continuous and closely fitted rows of bridging to form a complete and effective separation throughout the width of partitions, placed so that there will be no concealed air spaces greater than eight (8) feet in vertical dimension. Intermediate stops may be in line with opening headers. Provide furred spaces between stud walls and partitions with continuous fire stops at the same elevation as those in the enclosing walls which must be installed horizontally, thus forming a solid stop from outside to outside of studs. Fire stop all partitions at all suspended ceiling system locations.
I. FIRE BLOCK CONCEALED SPACES BETWEEN FLOOR SLEEPERS with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
J. FIRE BLOCK CONCEALED SPACES behind combustible cornices and exterior trim at not more than 20 feet OC.

3.04 FLOOR JOIST FRAMING INSTALLATION: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry.

A. ATTACH FLOOR JOISTS as follows:
    1. Where supported on wood members, by using metal framing anchors.
    2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.
B. FIRE CUTS: At joists built into masonry, bevel cut ends 3 inches and do not embed more than 4 inches.
C. FRAME OPENINGS with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.
D. DO NOT NOTCH in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches from top or bottom.

E. PROVIDE SOLID BLOCKING of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.
F. LAP MEMBERS FRAMING from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2- inch nominal thickness by depth of joist over supports.
G. ANCHOR MEMBERS PARALLELING MASONRY with 1/4-by-1-1/4-inch metal strap anchors spaced not more than 96 inches OC, extending over and fastening to three joists. Embed anchors at least 4 inches into grouted masonry with ends bent at right angles and extending 4 inches beyond bend.
H. PROVIDE SOLID BLOCKING between joists under jamb studs for openings.
I. 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. Provide bridging of type indicated below, at intervals of 96 inches OC, between joists.
    1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal size lumber, double-crossed and nailed at both ends to joists.
    2. Steel bridging installed to comply with bridging manufacturer's written instructions.

3.05 CEILING JOIST AND RAFTER FRAMING INSTALLATION:

A. PROVIDE FRAMING of sizes and spacing shown. Install with crown edge up and support ends of each member with not less than 1-1/2 inch of bearing on wood. Attach to wood bearing members by toe nailing or metal connectors; frame to masonry with wood ledgers bolted to masonry.
B. FRAME OPENINGS with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds four (4) feet. 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 inches from top or bottom. Provide solid blocking (2 inch thick by depth of joist) at ends of joists unless nailed to header or bearing member.
C. LAP MEMBERS FRAMING from opposite sides of supporting members not less than four (4) inch or securely tie opposing members together. Provide solid blocking (2 inch thick by depth of joist) over supports.

3.06 STAIR FRAMING INSTALLATION: Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:

A. Size: 2-by-12-inch nominal size, minimum.
B. Material: parallel-strand lumber (PSL) OR laminated veneer lumber (LVL) only. Do NOT use solid lumber.
C. Notching: Notch rough carriages to receive treads, risers, and supports; leave at least 3-1/2 inches of effective depth. DO NOT overcut material at notches.
D. Spacing: At least three framing members for each 36-inch clear width of stair.
E. Install stair framing with no more than 3/16-inch variation between adjacent treads and risers and no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

3.07 INSTALLATION OF PLYWOOD STRUCTURAL PANELS: Comply with applicable recommendations contained in Form No. E 30T APA “Engineered Wood Construction Guide", for types of construction panels and applications indicated, with fastening methods as follows:

A. Sheathing and Decking: nail to framing
B. Plywood Backing Panels: nail to supports

END OF SECTION 06 11 00

SECTION 06 16 00 – SHEATHING

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide sheathing materials, including joint and penetration treatment, where indicated on the Drawings, as specified herein, and as necessary for complete installation. This Section includes:

A. Wall Sheathing
B. Roof Sheathing
C. Underlayment
D. Sheathing joint and penetration treatments

1.02 RELATED SECTIONS: The following include requirements for the Work of this Section:

A. REFER TO DIVISION-06 “Rough Carpentry” Section and “Wood Framing” Section for general wood material and installation requirements, including preservative and fire-retardant treatments, as applicable.

1.03 ACTION SUBMITTALS

A. SUBMIT PRODUCT DATA for each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
B. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
C. Indicate type of preservative used and net amount of preservative retained.
D. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
E. Include physical properties of treated materials.
F. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
G. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
H. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.04 INFORMATIONAL SUBMITTALS

A. EVALUATION REPORTS: For following products, from ICC-ES:

1. Preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.05 QUALITY ASSURANCE

A. TESTING AGENCY QUALIFICATIONS: For testing agency providing classification marking for fireretardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.06 DELIVERY, STORAGE, AND HANDLING: Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. FIRE-TEST-RESPONSE CHARACTERISTICS: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction. Provide fire-resistance ratings as indicated by design designations from UL's "Fire Resistance Directory."

2.02 WOOD PANEL SHEATHING:

A. ACCEPTABLE WOOD SHEATHING TYPES: Except as otherwise indicated on the Structural Drawings, wood sheathing panels may be either plywood or oriented strand board, as long as they meet requirements for span, structural designation and exposure category.
B. EMISSIONS: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
C. OSB SHEATHING WITH INTEGRAL WRB: square-edged oriented-strand-board (OSB) panels, with factory-applied water-resistive barrier (WRB) facer.

1. TYPICAL PANEL THICKNESS: 7/16 inch, unless otherwise indicated on the Drawings
2. STRUCTURAL PERFORMANCE CHARACTERISTICS: Exposure 1 rated, DOC PS 2, span rated 32/16, Structural 1 Performance Category
3. INTEGRAL AIR AND WATER-RESISTIVE BARRIER (WRB) FACER: Medium-density, phenolic-impregnated sheet material qualifying as a Grade D weather-resistive barrier per ICC-ES AC38, tested with less than 0.04 CFM/SF at 1.57 LBS/SF per ASTM E 2375 air-leakage, and with no more than 12 perms water vapor permenance per ASTM E96
4. BASIS-OF-DESIGN: Zip System Sheathing, by Huber Engineered Woods, P: 800-933-9220, www.ZIPSystem.com

D. JOINT AND PENETRATION TREATMENT MATERIALS: Provide the following components as part of a tested, integrated water-resistant assembly to permanently flash and seal sheathing panel seams, building penetrations,

window and door frame joints, transitions to other building materials, and to lap over and seal off edges of metal flashings from the sheathing surface, to permanently flash and seal all building penetrations and panel seams, for a complete, water-resistant barrier assembly shedding moisture to the exterior of the wall assembly:

E. MEMBRANE FLASHING TAPE: 0.012 inch thick pressure-sensitive, self-adhering, cold-applied, joint and seam tape consisting of polyolefin film with acrylic adhesive,

1. Basis-of-Design Product: ZIP System Tape, by Huber Engineered Woods;

F. FLEXIBLE MEMBRANE FLASHING TAPE: 0.042 inch thick pressure-sensitive, self-adhering, cold-applied flexible flashing tape consisting of a polyolefin film with an acrylic adhesive, to be used in lieu of typical membrane flashing tape at irregular and difficult to seal areas.

1. Basis-of-Design: ZIP System Stretch Tape, by Huber Engineered Woods.

G. LIQUID-APPLIED FLASHING MEMBRANE: Gun-grade, cold-applied, silyl-terminated polyether (STPE) liquid flashing membrane material, tested to be compatible with the sheathing WRB surface, and with the self-adhering seam and flashing tape, and tested as part of an integrated, water-resistant assembly. The liquid-applied membrane material is intended to supplement and/or replace the membrane flashing material:

1. Basis-of-Design: Zip System Liquid-Flash, by Huber Engineered Woods.

2.03 PLYWOOD ROOF & WALL SHEATHING PANELS: Comply with either DOC PS 1 or DOC PS 2 or APA PRP-108 performance standards unless otherwise indicated, with panels in thickness as needed to comply with requirements specified, but not less than that as indicated on the Drawings. Factory mark panels to indicate compliance with applicable standard. Plywood sheathing on the exterior side of a wall must be rated exposure 1 with a span rating to suit support spacing indicated and must be compatible with the Architectural finish requirements, and as follows:

A. Grade: Exterior, Structural I rated exterior sheathing
B. CDX-Plugged
C. Span Rating: Not less than 24/0.
D. Nominal Thickness: Not less than 1/2-inch - and as indicated on the Drawings.
E. When bottom surface of roof sheathing is exposed to view, provide APA A-D EXT grade, with "A" surface on the exposed face.

2.04 ORIENTED-STRAND-BOARD (OSB) SHEATHING: DOC PS 2, Exposure 1, Structural I rated, 32/16 span- rating - 1/2 inch thick minimum or as otherwise indicated on the Drawings, complete with sheathing clips midspan between all supports. Factory mark panels to indicate compliance with applicable standard.

A. PLYWOOD COMBINATION SUBFLOOR-UNDERLAYMENT: DOC PS 1, Exposure 1, underlayment single-floor panels, as follows:

1. Span Rating: Not less than 24 o.c.
2. Nominal Thickness: Not less than 23/32 inch
3. Edge Detail: Square.
4. Edge Detail: Tongue and groove.
5. Surface Finish: Fully sanded face.

B. PLYWOOD UNDERLAYMENT: Provide in nominal thickness indicated on the Drawings, or if not indicated, not less than 1/4 inch over smooth subfloors, and not less than 3/8 inch over board or uneven subfloors.

2.05 GYPSUM BOARD SHEATHING

A. GYPSUM SHEATHING & SOFFIT BOARD WITH INTEGRAL WRB (Base-Bid exterior sheathing and soffits below Podium level): Glass-mat Type-X fire-resistant gypsum board in compliance with ASTM C 1177 with glass mat facing both sides and on long edges, with a water-resistant treated gypsum core without organic materials (paper or wood fiber), and with a factory-applied water-resistant barrier (WRB) surface facing. Provide in 48 inch wide panels x maximum length feasible (up to 120 inches) to minimize joints, and in thickness indicated on Drawings, or as follows:

1. Typical wall and soffit panel thickness: 5/8 inch (except as otherwise indicated)

B. BASIS-OF-DESIGN: "DensElement Barrier System" by Georgia-Pacific (GP) Gypsum Corporation.
C. JOINT AND PENETRATION TREATMENT MATERIALS: Provide the following components as part of a tested, integrated water-resistant assembly to permanently flash and seal sheathing panel seams, building penetrations, window and door frame joints, transitions to other building materials, and to lap over and seal off edges of metal flashings from the sheathing surface, to permanently flash and seal all building penetrations and panel seams, for a complete, water-resistant barrier assembly sheding moisture to the exterior of the wall assembly:
D. LIQUID-APPLIED FLASHING MEMBRANE: Gun-grade, cold-applied, silyl-terminated polymer (STPE) liquid flashing membrane, tested to be compatible with the sheathing WRB surface, and with the associated flashing membrane material:

1. Basis-of-Design: R-Guard FastFlash by Prosoco, or sheathing mfgr approved equal.

E. MEMBRANE FLASHING Extruded, elastomeric, pre-cured silicone sheet, to be bonded to substrates on both sides of joints with liquid-flashing material.

1. Basis-of-Design Product: R-Guard SureSpan EX, by Prosoco, Inc.

2.06 FASTENERS:

A. PROVIDE FASTENERS in size and type that comply with requirements specified in this Article for material and manufacture, with hot-dip zinc coating complying with ASTM A 153 typically, and as follows:

1. Nails, Brads, and Staples: ASTM F 1667.
2. Power-Driven Fasteners: NES NER-272.

3. Wood Screws: ASME B18.6.1.

2.07 SCREWS FOR FASTENING WOOD SHEATHING: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened. Provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

2.08 SCREWS FOR FASTENING GYPSUM SHEATHING TO METAL FRAMING: Type S-12 bugle head self-tapping steel drill screws with fine thread for heavy-steel gage, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117. For steel framing less than 0.0329 inch thick (20 gage), use screws that comply with ASTM C 1002.For steel framing from 0.033 to 0.112 inch thick (20 to 10 gage), attach sheathing to comply with ASTM C 954.

2.09 ADHESIVES FOR FIELD GLUING PANELS TO FRAMING: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels. Adhesives must have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES AND CONDITIONS for compliance with requirements for installation affecting performance of the Work. Verify that metal wall studs, opening framing, bridging, bracing and other framing support members and anchorage have been installed within necessary alignment tolerances and requirements. Verify that items required to penetrate the sheathing system are either installed or marked for future installation. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of installation constitutes acceptance of existing conditions and acceptance of responsibility for satisfactory performance.

3.02 DO NOT USE MATERIALS WITH DEFECTS that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

3.03 CUT SHEATHING MATERIALS AT ALL PENETRATIONS, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

3.04 SECURELY ATTACH to substrate by fastening as indicated, complying with sheathing manufacturer's recommendations and with the following, as applicable:

A. NES NER-272 for power-driven fasteners.
B. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

3.05 COORDINATE SHEATHING INSTALLATION with flashing and joint-sealant installation requirements so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.06 WOOD STRUCTURAL PANEL INSTALLATION: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated. Fasten panels as indicated below:

A. COMBINATION SUBFLOOR-UNDERLAYMENT: Screw to framing. Space panels 1/8 inch apart at edges and ends.
B. SUBFLOORING: Screw to cold-formed metal framing. Space panels 1/8 inch apart at edges and ends.
C. WALL AND ROOF SHEATHING: Screw to cold-formed metal framing. Space panels 1/8 inch apart at edges and ends. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
D. UNDERLAYMENT: Nail to subflooring. Space panels 1/32 inch (0.8 mm) apart at edges and ends. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

3.07 GYPSUM SHEATHING & SOFFIT INSTALLATION: Comply with GA-253 and with manufacturer's written instructions. Fasten gypsum sheathing to wood framing with nails unless otherwise indicated on the Drawings. Fasten gypsum sheathing to metal framing with screws. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

A. HORIZONTAL INSTALLATION: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
B. VERTICAL INSTALLATION: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards. For sheathing under stucco cladding with metal lath, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
C. SEAL SHEATHING JOINTS according to sheathing manufacturer's written instructions. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

D. FINISH GLASS-MAT GYPSUM SOFFITS by applying joint tape over all joints and embed tape within setting-type joint compound as recommended by the manufacturer. Skim-coat the full exposed soffit area with setting-type joint compound for a smooth, flat, finish, ready for finishing.

3.08 INSTALLATION OF WRB MEMBRANE FLASHINGS (on sheathing materials with an integral WRB):

A. WINDOW, DOOR & STOREFRONT / CURTAINWALL COORDINATION: Install WRB joint and perimeter treatments before window, door, storefront or curtainwall members are installed.

B. SEAL JOINTS 1/4 inch and less with joint sealant material, between sheathing panels at fluid/liquid applied WRB, and at sheathing panels with integral WRB. Fill joints with approved sealant ensuring contact with all substrate edge, and strike flush excess sealant to form a continuous water-sealed surface over the joint.

C. SEAL GAPS AND VOIDS or irregular joints greater than 1/4 inch between sheathing panels, and cracks over 1/16 inch in masonry or concrete substrates with a strip of WRB membrane flashing lapped a minimum of 1-1/2 inch on both sides of the joint. Prime surfaces per WRB membrane flashing manufacturers' instructions and allow to dry. Align and position the WRB flashing membrane, remove any protective films, and press firmly into place for a water-tight joint seal. Ensure a minimum two (2) inch overlap at end and side laps of the WRB membrane flashing. Roll the WRB membrane flashing and laps to ensure a water-tight seal.

D. SEAL INSIDE AND OUTSIDE CORNERS of substrate materials or sheathing boards with a strip of WRB membrane flashing extending a minimum of three (3) inches on both sides of the corner. Prime surfaces per manufacturers' instructions and allow to dry. Align and position the WRB membrane flashing, remove any protective films, and press firmly into place. Ensure a minimum two (2) inch overlap at end and side laps of the WRB membrane flashing. Roll the WRB membrane flashing and laps to ensure a weather-tight seal.

E. TRANSITION AREAS: At sheathing material changes, and at tie-in's of sheathing to structural beams, columns, floor slabs or intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials, provide the seal method as indicated above for corners.

F. AT WALL OPENINGS OR EDGES, cut WRB membrane flashing to cover the full depth of the wall substrate (including sheathing and framing) plus four (4) inches minimum coverage onto the exterior side WRB surface.

1. AT DOOR OR WINDOW SILLS, cut WRB membrane flashing a minimum of twelve (12) inches longer than opening width and apply primer to substrate per primer manufacturer's requirements. Cover horizontal sill opening by aligning inside edge of flexible-flashing with inside edge of exterior wall assembly and adhere to the rough opening across the sill and up both jambs a minimum of six (6) inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs. Fan flexible-flashing at bottom corners onto face of wall, and press firmly in place – and mechanically fasten all fanned edges.
2. AT THROUGH-WALL SHEET-METAL FLASHINGS of shelf-angles, lintels, and at door or window sills, apply an eight (8) inch width of the WRB membrane flashing over and above the sheet-metal flashing, spaced equally onto the WRB sheathing and over the sheet metal flashing, extending not less than six (6) minimum past shelf-angles, or into an end-dam, as applicable.
3. AT JAMBS AND WALL EDGES, and after installation of sill flashing treatment, cut WRB membrane flashing to the same height as the rough-openings, apply flashing primer to substrate, and apply the WRB membrane flashing by aligning the inside edge with inside surface of the wall assembly - starting at opening head and lapping over the sill-flashing (as applicable), extending down to the sill or base of opening.
4. AT WINDOW OR DOOR HEADS with a lintel or shelf-angle above, cut the WRB membrane flashing six (6) inches longer than the width of the opening. Apply flashing primer and WRB membrane flashing onto the lintel or shelf-angle and inside into the head-surface substrate, overlapping the jamb side WRB membrane flashings a minimum of three (3) inches on both sides. When a lintel or shelf-angle does not exist, install a "head-flap" of WRB membrane flashing across the head of the opening, and cut and trim into the inside corners. Apply a four (4) inch width of WRB membrane flashing lapping over the 45-degree angled cut surfaces inside the jambs and head conditions, and apply an additional four (4) inch width of WRB membrane flashing lapping over both on a 45-degree angle, per WRB membrane flashing manufacturer's recommendations.
5. AT FASTENERS, MASONRY TIES, DUCTWORK MECHANICAL OR ELECTRICAL PENETRATIONS, and all other penetrations through the exterior WRB membrane, apply the WRB membrane flashing system to fully seal the building enclosure from water penetration, per requirements of the WRB membrane flashing manufacturer.
6. AT SUBSEQUENT BUILDING MATERIAL ATTACHMENTS, provide WRB membrane flashing material extending a minimum of three (3) inches beyond sides of planned anchor locations of subsequent building finishes or anchorage systems (including rain-screen assemblies and siding). Coordinate with installer(s) of subsequent systems for accurate location of supplemental WRB membrane flashing application. Prime substrate surfaces and apply WRB membrane flashing per manufacturers' instructions. Ensure a minimum two (2) inch overlap at all end and side laps of WRB membrane flashing.
7. ROLL AND PRESS the WRB membrane flashing material after installation with a hard rubber or metal roller to ensure full adhesion and sealing to all substrate surfaces.
8. WINDOW & DOOR FRAME SEALING: Install backer-rod within the shim space joint between window, door or storefront framing and the WRB membrane flashed rough openings. Apply backer and sealant all around the exterior joints, with "weeped" seals on the exterior sides of shelf-angles or sill surfaces. At interior side of opening joints, install backer rod and seal all around to create a complete air-seal from the inside. Comply with requirements of Division-07 "Joint Sealants" Section, as applicable.

END OF SECTION 06 16 00

SECTION 06 41 00 – ARCHITECTURAL WOOD CASEWORK

PART 1 - GENERAL

1.01 PROVIDE CUSTOM-FABRICATED ARCHITECTURAL WOOD CASEWORK requiring quality craftsmanship and joinery, where indicated in the Drawings and as specified herein.

1.02 QUALITY ASSURANCE: Except as otherwise indicated by the Drawings or these Specifications, provide Architectural Woodwork in compliance with The Architectural Woodwork Institute's "Quality Standards" Section 400 – Custom Grade.

1.03 SUBMITTALS

A. SUBMIT PRODUCT DATA for each type of product indicated. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. SUBMIT SHOP DRAWINGS showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections. Show locations and sizes of holes and cutouts installed in architectural woodwork.

C. SUBMIT SAMPLES FOR INITIAL SELECTION, to include 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 indicated.

1. Shop-applied transparent finishes.
2. Plastic laminates.
3. Countertop materials

1.04 DO NOT DELIVER WOODWORK until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.05 PROJECT CONDITIONS

A. ENVIRONMENTAL LIMITATIONS: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. FIELD MEASUREMENTS: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements.
2. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 PROVIDE MATERIALS THAT COMPLY with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

2.02 TYPICAL PLYWOOD: Exterior grade C D/EXT APA x 3/4 inch thickness min.

2.03 TYPICAL SUBSTRATE MATERIAL: WATERPROOF MDF: For countertop substrate and at door, drawer end and other exposed components of opaque painted cabinets, provide water-proof formaldehyde-free medium density fiberboard (MDF) as follows:

A. APPROVED MANUFACTURER: “Medex” by Roseburg, P: 800-245-1115, www.roseburg.com

2.04 THERMOSET DECORATIVE OVERLAY PANELS (typical finish of cabinet interiors): Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1. Provide material with no added urea formaldehyde (NAUF).

A. Provide material / color as indicated on the Drawings – if not indicated - provide color as selected by Architect from Manufacturer’s full range of available color options.

2.05 TYP. PLASTIC LAMINATE (PLAM): NEMA # GP-50 - standard or post-forming grade

2.06 TYPICAL PANEL EDGING @ PLAM SURFACES: 3 mm thick solid PVC - heat welded to panel edge & routed BS - color to match adjacent PLAM

2.07 THERMOSET DECORATIVE OVERLAY PANELS: Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1. Provide material with no added urea formaldehyde (NAUF). Provide panels prefinished in color indicated on the Drawings – if not indicated, provide color as selected by Architect from Manufacturer’s full range of available color options.

2.08 MISCELLANEOUS WOOD MATERIALS:

A. Hardboard: AHA A135.4.
B. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade MD.
C. Particleboard (PBD): ANSI A208.1, Grade M-2
D. Softwood Plywood: DOC PS 1, Medium Density Overlay.

E. Hardwood Plywood And Face Veneers: HPVA HP-1.

2.09 ADHESIVE

A. for Bonding Plastic Laminate: contact cement.
B. for Bonding Edges: Hot-melt adhesive.

2.10 INSTALLATION MATERIALS

A. FURRING, BLOCKING, SHIMS, AND HANGING STRIPS: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
B. ANCHORS: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.11 MISCELLANEOUS WOOD PRODUCTS:

A. Hardboard AHA A135.4.
B. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade MD.
C. Particleboard (PBD): ANSI A208.1, Grade M-2
D. Softwood Plywood: DOC PS 1, Medium Density Overlay.
E. Hardwood Plywood And Face Veneers: HPVA HP-1.

2.12 TYPICAL CASEWORK HARDWARE:

A. BACK-MOUNTED PULLS: Provide typical pulls as indicated on the Drawings
B. CONCEALLED HINGES: BHMA A156.9, B01602, 170 degrees (minimum) of opening, self-closing fully concealed, 3-way adjustable, screw mounted unit – two (2) per door minimum - Basis-of-Design: "Blum" # 71.6500 (full overlay)
C. DRAWER SLIDES: Side-mounted, bottom applied full-extension – soft-closing zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated 100 pounds for box drawers, and 200 pounds for file drawers minimum.
D. ADJUSTABLE SHELF STANDARDS AND CLIP-TYPE SUPPORTS (for mounting at ends of shelves): BHMA A156.9, B04071; with shelf rests, B04081
E. ADJUSTABLE SHELF STANDARDS AND BRACKETS (for mounting at rear of shelves): BHMA A156.9, B04102; with shelf brackets, B04112.
F. SHELF RESTS for drilled holes: BHMA A156.9, B04013.
G. DOOR & DRAWER LOCKS Disk tumbler cylinder cam locks for doors and drawers with lipped/overlay construction (straignt cam) or flush construction (formed cam) as required. Provide units with cam size and type as required by cabinet construction:
    1. BASIS-OF-DESIGN: “CompX National” # C8053-19 series (black finished unless indicated otherwise)
    2. Keying: 2 keys/door – all units keyed alike unless otherwise indicated.

PART 3 - FABRICATION:

3.01 TYPICAL FABRICATION OF WOOD CABINETS FOR OPAQUE FINISH

A. Quality Standard: Comply with AWI Section 400, Custom Grade requirements for wood cabinets, and as follows:
    1. AWI Type of Cabinet Construction: Frameless (face frame) with flush overlay or as otherwise indicated.
    2. WOOD PANELS for doors, drawers, cabinet sides and other exposed surfaces: Waterproof MDF

3.02 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWI Section 400 – Custom Grade requirements for laminate cabinets.
B. AWI Type of Cabinet Construction: frameless with flush overlay
C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following:
    1. Horizontal Surfaces Other Than Tops: HGL.
    2. Post formed Surfaces: HGP.
    3. Vertical Surfaces: VGS.
    4. Edges: Self-edged with PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
D. Materials for Semi-exposed Surfaces: Provide surface materials indicated below:
    1. Surfaces Other Than Drawer Bodies: Thermoset decorative overlay.
    2. Drawer Sides and Backs: Thermoset decorative overlay.
    3. Drawer Bottoms: Hardwood plywood – or decorative pre-finished panels .
E. Colors, Patterns, and Finishes: Provide materials and products as indicated on the Drawings. Other manufacturers must be submitted as a substitution per of Division-01 requirements. If color is not indicated, provide from Architect approved plastic laminate manufacturer, in manufacturer’s full range of colors and finishes in the both solid colors, and solid colors with the core the same color as the surface.
F. PLASTIC-LAMINATE (PLAM) COUNTERTOPS
    1. Quality Standard: Comply with AWI Section 400 – Custom Grade
    2. Core material: MDF, or waterproof MDF at countertops with sinks.
    3. High-Pressure Decorative Laminate Grade: HGS (HGP at post-formed countertops).
    4. Colors, Patterns, and Finishes: Provide materials and products as indicated on the Drawings. Other manufacturers must be submitted as a substitution per of Division-01 requirements. If color is not indicated, provide from Architect approved plastic laminate manufacturer, in manufacturer’s full range of colors and finishes in both solid colors, and in solid colors with the core the same color as the surface.

5. Edge Treatment: Self-edged in same material as horizontal laminate cladding

3.03 FABRICATION, GENERAL

A. WOOD MOISTURE CONTENT: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
B. FABRICATE WOODWORK to dimensions, profiles, and details indicated. Ease edges to 1/16 inch radius at corners of cabinets and edges of solid-wood (lumber) members and rails.
C. COMPLETE FABRICATION, including assembly, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
D. SHOP CUT OPENINGS, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
E. SHOP FABRICATE casework to dimensions, profiles, and details indicated on Shop Drawings. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting. Complete fabrication, finishing, hardware application and other Work before shipment to project site to maximum extent possible.
F. SHOP ASSEMBLY OF CASEWORK: Completely assemble casework in shop prior to shipment to project site. Mark individual items in sequence with removable materials to facilitate field assembly. Shop fit glass in casework, remove and package to protect from breakage, clearly marked to facilitate field installation.
G. COUNTERTOP CUTOUTS: To the greatest extent possible, make countertop cutouts in the factory, with all exposed edges completely sealed against potential water penetration between finish surface and substrate, and substrate and web frame, as applicable.

PART 4 - INSTALLATION:

4.01 DELIVER inserts and other anchoring devices to be built into substrates, well in advance of time substrates are to be built. Condition wood materials to average prevailing humidity conditions in installation areas prior to installation.

4.02 DISCARD units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes or patterns.

4.03 INSTALL the Work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8 inch in 8'-0" for plumb and level, and with 1/16" maximum offset in flush adjoining surfaces and 1/8" maximum offsets in revealed adjoining surfaces.

4.04 SCRIBE AND CUT to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

4.05 ANCHOR 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. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

4.06 INSTALL CABINETS without distortion so that cabinet doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors in openings and to provide free operation. Complete installation of hardware and accessory items indicated.

4.07 COUNTERTOPS: Anchor securely to base units and other support systems.

4.08 REPAIR DAMAGED and defective casework to eliminate defects functionally and visually, or where not possible, replace casework. Adjust joinery for uniform appearance. Clean, lubricate and adjust hardware for smooth operation. Rehang or replace doors which do not swing or operate freely, as directed by Owner. Clean casework on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.

4.09 TOUCH-UP FINISHING as required by installation. Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing of concealed surfaces and similar items.

4.10 PROTECTION: Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

END OF SECTION 06 41 00

SECTION 06 64 13 – FIBERGLASS REINFORCED PLASTIC (FRP) PANELING

PART 1 - GENERAL

1.01 WORK INCLUDES surface preparation of wall surfaces and installation of Fiberglass Reinforced Plastic (FRP) paneling, as specified herein and as needed for a complete and proper installation.

1.02 PROVIDE FRP paneling on all wall surfaces adjacent to or within two (2) feet of a service (mop) sink, up to 48 inches above finished floor (FFE), unless another wall finish is indicated to be provided on the Drawings.

PART 2 - PRODUCTS

2.01 (STANDARD) FRP PANELS: .090 inch thick x 4 feet wide 4 x 8, 10 or 12 ft high USDA accepted panels of semi-rigid fiberglass reinforced plastic panels, with color-matched one-piece trim and panel moldings at all joints between panels, and at top and bottom edges of panels:

A. Basis-of-Design Product / Manufacturer: “Marlite FRP", # P-100 White - Class III/C per ASTM E-84, embossed surfaced units, or equal

PART 3 - INSTALLATION

3.01 EXAMINE AREAS and conditions in which FRP will be installed. Complete all finishing operations, including prime coat of paint, before beginning installation of wall surface protection materials.

3.02 PREPARATION: Acclimate panels in temperature and humidity conditions approximating those at the project site for not less than 24 hours before application. Lay panels flat. Do not stack on fresh conc. floors or other surfaces that emit moisture. Walls must be dry and free from dirt, dust and grease. Remove switchplates, wall plates, and surface- mounted fixtures in areas where panels are to be applied.

3.03 PANEL FITTING: Position panels with 1/4" gap at ceiling and floor, and 1/8' gap between each panel and division bar of moldings to allow for normal expansion and contraction. Allow not less than 1/8" gap around pipes, electrical fittings, and other projections. Use carbide-tipped power saws to cut panels. Prefit each panel before installing.

3.04 INSTALL PANELS by using manufacturer’s recommended adhesive applied to back of panels for 100% coverage, with a notched trowel. Before adhesive skins over, set panels in position and press against wall. Pull entire panel back away from wall 8" to 10" to flash off any solvents, if applicable. Press back in place. Apply adequate pressure to make full contact between panel and wall.

3.05 PANEL MOLDINGS: Install one-piece matching trim and panel moldings at all joints between panels, and at top and bottom edges of panels. Install moldings with continuous bead of silicone sealant during installation of panels. Seal joints between moldings and between molding and adjacent finish material. Remove excess sealant immediately.

3.06 CLEAN-UP: Remove excess adhesive and sealant while it is still wet. Replace removed plates and fixtures. Remove surplus materials and debris resulting from panel installation upon completion of Work, and leave areas of installation in clean condition.

END OF SECTION 06 64 13

Division-07 – Thermal & Moisture Protection

SECTION 07 11 00 – DAMPROOFING AND WATERPROOFING

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide bituminous dampproofing, in accordance with requirements contained herein, applied to the following surfaces:

A. Exterior concrete “slab-edge” surfaces, extending to footing below
B. Foundation walls at basements and crawlspaces.

1.02 RELATED SECTIONS

A. Division 03: Concrete
B. Division 07: Insulation

1.03 DAMPPROOFING: Provide cold-applied, emulsified-asphalt meeting one of the following:

A. ASTM D 1227, Type II, Class 1, for troweled coats: or
B. ASTM D 1227 Type II, Class 1 for fibered brush and spray coats, or
C. ASTM D 1227, Type III, Class 1for brush and spray coats.

1.04 WATERPROOFING: Provide self-adhering waterproofing membrane meeting the following:

A. Flexible, bituminous, roll-type waterproofing membrane.
B. Composed of a nominally 56 mil thick layer of polymeric waterproofing membrane on a heavy duty, four-mil thick, cross-laminated polyethylene carrier film.

1.05 SUBMITTALS

A. Product Data

1.06 QUALITY CONTROL

A. Obtain all products from one manufacturer as a “system”.
B. Store and Install according to manufacturers specifications.

PART 2 - PRODUCTS

2.01 DAMPPROOFING:

A. EMULSIFIED-ASPHALT PRIMER: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.
B. ASPHALT-COATED GLASS FABRIC: ASTM D 1668, Type I.

2.02 WATERPROOFING MEMBRANE

A. Basis of Design: W.R. Meadows; Mel-Rol.
B. Testing Criteria
    1. ASTM D412:
        a. Tensile Strength Film: 5900 psi min
        b. Tensile Strength Membrane: 460 psi min
        c. Elongation: 971.3% min
    2. ASTM C836: Low Temp Crack Bridging 100 Cycle @ -25dF: Pass
    3. ASTM D903: Peel Adhesion: 11.8 lb/in min
    4. ASTM D1876: Lap Adhesion: 8.62 lbf/in. min
    5. ASTM E-96,B: Water Vapor Permeability: 0.1 Perms max
    6. ASTM D 570: Water Absorption: 0.1%, 72 hrs. max
    7. ASTM D5385: Hydrostatic Resistance: Equiv. to 200 ft of water. Min.
    8. ASTM E 154: Puncture Resistance: 50 lbf min
    9. ASTM D1970: Flexibility @ -20dF: Pass
C. Accessories: Install above membrane as part of a system with associated:
    1. Primer adhesive
    2. Detail Strips
    3. Termination bar
    4. Mastic beads
    5. Catalytic Bonding Asphalt
    6. Protection Course
    7. Drainage Board. System shall include dimpled drainage mat over waterproofing system if backfill is native soil. Drainage board may be excluded only if backfill is clean gravel with silt barrier between backfill and soil.
        a. Basis of Design: W.R. Meadows; Mel-Drain.

PART 3 - EXECUTION

3.01 DAMPPROOFING:

A. MASK OR OTHERWISE PROTECT ADJOINING EXPOSED SURFACES from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. CLEAN SUBSTRATES OF PROJECTIONS and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.
C. COMPLY WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
D. AT INTERNAL AND EXTERNAL CORNERS, changes in plane, construction joints, and cracks, install embed an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat required for embedding fabric is in addition to other coats required.
E. APPLY TWO (2) BRUSH OR SPRAY COATS at a rate of 1.5 to 2.5 gal./100 sq. ft per coat depending on substrate texture, to produce a uniform, dry-film thickness of not less than 15 mils. Apply in two (2) coats to obtain required thickness, allowing time for complete drying between coats.
F. REMOVE DAMPPROOFING MATERIALS from surfaces not intended to receive dampproofing.

3.02 WATERPROOFING MEMBRANE:

A. Temperature … Apply in dry, fair weather when the air and surface temperatures are above 40° F (4° C). Do not apply to frozen concrete.
B. MEL-ROL LOW TEMP can be used when air and surface temperatures are between 20° F (-7° C) and 60° F (16° C).
C. Surface Conditioning … Apply MEL-PRIME adhesive to surfaces that will be covered within one working day. If left exposed overnight, additional adhesive must be applied. Follow all instructions and precautions on containers.
D. REMOVE release paper from MEL-ROL from the top edge of the roll and firmly press exposed area to the wall. Remove the release paper from the rolls in a downward direction, pressing MEL-ROL into place on the wall.
E. Footing Details … Use DETAIL STRIP for impaction sheet coverage. First, fold strips lengthwise and then cut at the fold. Material is then ready to install as 4 ½" (114.3 mm) strips on either side of the rebar. Any excess can be turned down on the face of the footing. Next, fill the voids around rebars in the keyway with CATALYTIC BONDING ASPHALT. Pour the walls. Install DETAIL STRIP horizontally along the wall where it meets the footing, placing half the material up the wall and the other half onto the footing. Extend the material 4 ½" (114.3 mm) beyond outside corners. Slit extended portion of DETAIL STRIP lengthwise. Place the horizontal flap out onto the footing and bend the vertical flap around the wall. Repeat this procedure in the opposite direction.
F. MEL-ROL can be applied to concrete, masonry surfaces, wood, insulated wall systems, and metal. All substrates must be clean, dry, and free of all surface irregularities.
G. Horizontal Application … Remove release paper on edge, then position the MEL-ROL membrane. Pull balance of release paper off, running the roll from low to high points so that all laps will shed water. Stagger end laps and overlap all seams at least 2 ½" (63.5 mm). Apply a double-thickness of the MEL-ROL membrane over construction, control, and all expansion joints and cracks greater than 1/16″ (1.59 mm) wide.
H. Vertical Wall Application … Masonry walls may require the application of a cementitious parge-coat. Allow the parge-coat to dry before priming and applying MEL-ROL. When applied, the parge-coat will produce a smooth, uniform, and well-bonded surface. Remove release paper, then apply vertically in lengths approximately 8′ (2.44 m) long over the top of the horizontal DETAIL STRIP at the footing. Overlap seams at least 2 ½" (63.5 mm). Tightly butt edges of membrane and apply POINTING MASTIC in corner applications.
I. To the top terminations, apply POINTING MASTIC at least 1/8″ (3.18 mm) thick and 1″ (25.4 mm) wide. As an option, TERMINATION BAR may be used to fasten the membrane mechanically.
J. Hand-Rub and Roll Press … Once positioned, immediately hand-rub the MEL-ROL membrane firmly to the surface, removing any bubbles or wrinkles, then pressure roll the complete surface to assure positive adhesion.
K. Inside Corners … Before MEL-ROL is applied, place a vertical DETAIL STRIP on inside corners extending the material 4 ½" (114.3 mm) beyond each side of the corner. Terminate at the footing and finish the corner with POINTING MASTIC.
L. Outside Corners … Bend DETAIL STRIP vertically over the outside corner and extend 4 ½" (114.3 mm) beyond each side of the corner. Terminate the material at the footing. Finish the corner with POINTING MASTIC. (See Diagram C.)
M. Drains and Protrusions … All protrusions should be sealed with two layers of membrane applied at least 6″ (152.4 mm) in all directions. Seal all terminations with POINTING MASTIC. Around drains, apply two layers of MEL-ROL and put a bead of POINTING MASTIC between the membrane and clamping rings and at all terminations, drains, and protrusions. See ASTM D 5898
N. Inspect and Repair … A thorough inspection should be made before covering and all necessary repairs made immediately. Tears and inadequate overlaps should be covered with MEL-ROL … slit fish mouths and patch. Seal edges of all patches with POINTING MASTIC. Where applicable, horizontal applications can be flood-tested for 24 hours. All leaks should be marked and repaired when membrane dries.
O. Protect the Membrane … on all vertical and horizontal installations with the immediate application of PROTECTION COURSE if no drainage system is used, or MEL-DRAIN. To secure PROTECTION COURSE, use POINTING MASTIC as an adhesive, and/or physically attach at the top edge using TERMINATION BAR. Backfilling should be done immediately, using care and caution to avoid damaging the waterproofing application.
P. PRECAUTIONS: Avoid the use of products that contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with MEL-ROL. The use of MEL-ROL does not negate the need for relief of hydrostatic heads. A complete drain tile system should be placed around the exterior of footing and under slabs, as required.
Q. Dispose of all debris off site. Do NOT leave debris to be covered by backfill.

END OF SECTION 07 11 00

SECTION 07 21 00 – THERMAL INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide insulation work, as shown on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents. Applications of insulation specified in this section include the following: blanket-type building insulation and rigid-type building insulation at wall furring

1.02 RELATED SECTIONS:

A. Section 018113 Certification Requirements.

1.03 THERMAL CONDUCTIVITY: Thicknesses indicated are for thermal conductivity (k-value at 75 degrees F or 24 degrees C) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide thickness required to achieve indicated value.

1.04 FIRE AND INSURANCE RATINGS: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with regulations as interpreted by governing authorities.

1.05 SUBMITTALS

A. SUBMIT PRODUCT DATA including manufacturer's product specifications and installation instructions for each type of insulation and moisture protection material required.

1.06 QUALITY ASSURANCE

A. FIRE-TEST-RESPONSE CHARACTERISTICS: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to AHJ representatives. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

1.07 DELIVERY, STORAGE, AND HANDLING

A. PROTECT INSULATION MATERIALS from physical damage and from deterioration by 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 PLASTIC INSULATION as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.01 PROVIDE PREFORMED UNITS, sized to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths, as appropriate for conditions of use indicated.

2.02 UNDER-SLAB INSULATION
HIGH-DENSITY (HD) EXTRUDED-POLYSTYRENE (XPS) INSULATION FILL: ASTM C 578 – Type VII (2.20 PCF- 60 PSI minimum compressive strength), with insulation value of R-5 per inch, maximum flame-spread and smoke-developed indexes of 75 and 450, respectively.

A. Acceptable Manufacturers include: DiversiFoam Products, Dow Chemical Company, Owens Corning, or Pactiv Building Products Division.

2.03 EXTERIOR CONTINUOUS INSULATION:
HIGH-DENSITY (HD) EXTRUDED-POLYSTYRENE (XPS) INSULATION FILL: ASTM C 578 – Type VII (2.20 PCF- 40 PSI minimum compressive strength), with insulation value of R-5 per inch, maximum flame-spread and smoke-developed indexes of 75 and 450, respectively.

A. Acceptable Manufacturers include: DiversiFoam Products, Dow Chemical Company, Owens Corning, or Pactiv Building Products Division.

2.04 UN-FACED BATT or BLANKET INSULATION: Provide formaldehyde free, un-faced batts or blankets (without kraft-paper facings) consisting of fiberglass, or rock-wool meeting ASTM C 665, Type I (blankets without membrane facing) with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Subject to compliance with requirements, available manufacturers include but are not limited to:

A. GLASS-FIBER INSULATION:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville Corporation.
4. Knauf Fiber Glass.
5. Owens Corning.

B. ROCK-WOOL FIBER INSULATION:

1. Owens Corning / Thermafiber.
2. Roxul.

2.05 ROCK-WOOL INSULATION: Formaldehyde free, unfaced, rock-wool-fiber boards of 2.0 PCF minimum, with R-value of 4.2 per inch thickness, meeting ASTM C 665, Type I (blankets without membrane facing); consisting of mineral fibers with a maximum flame-spread and smoke-developed indexes of 0 and 0 respectively; and rated as non-combustible per ASTM E 136 / NFPA Standard 220. Approved Products / Manufacturers include:

A. Owens Corning / Thermafiber RainBarrier HD
B. Roxul CavityROCK DD

2.06 HIGH-DENSITY ROCK-WOOL INSULATION BOARD: Formaldehyde free, unfaced, rock-wool-fiber boards of 6.0 PCF minimum, with R-value of 4.2 per inch thickness, meeting ASTM C 665, Type I (blankets without membrane facing); consisting of mineral fibers with a maximum flame-spread and smoke-developed indexes of 0 and 0 respectively; and rated as non-combustible per ASTM E 136 / NFPA Standard 220. Approved Products / Manufacturers include:

A. Owens Corning / Thermafiber RainBarrier HD
B. Roxul CavityROCK DD

2.07 SILL SEALER (install below all bottom track or sill plates on concrete substrate): Glass fiber insulation in strip form, 1/4" nominal thickness compressible to 1/32"; selected from standard widths to suit width of sill members indicated.

2.08 PROTECTION BOARD: Premolded, semirigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, of standard sizes.

2.09 AUXILIARY INSULATING MATERIALS

A. ADHESIVE FOR BONDING INSULATION: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
B. MISCELLANEOUS INSULATION ANCHORS: Provide adhesively attached, spindle-type anchors (angle-shaped when required), insulation-retaining washers and insulation standoffs with suitable anchor adhesive with demonstrated capability to bond insulation anchors securely to substrates indicated where insulation is required in areas where metal framing or other insulation retention system is not indicated.

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES AND CONDITIONS, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. CLEAN SUBSTRATES OF SUBSTANCES harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.
B. COMPLY WITH INSULATION MANUFACTURER'S WRITTEN INSTRUCTIONS applicable to products and application indicated. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
C. EXTEND INSULATION IN THICKNESS INDICATED to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
D. WATER-PIPING COORDINATION: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
E. APPLY SINGLE LAYER OF INSULATION to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.03 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

A. ON VERTICAL SURFACES, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer. If not indicated, extend insulation a minimum of 36 inches below exterior grade line.
B. PROTECT BELOW-GRADE INSULATION on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to insulation manufacturer's written instructions.
C. PROTECT TOP SURFACE OF HORIZONTAL INSULATION from damage during concrete work by applying protection board.

3.04 INSTALLATION OF GENERAL BUILDING INSULATION

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. SEAL JOINTS BETWEEN CLOSED-CELL (NONBREATHING) INSULATION units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
C. INSTALL MINERAL-FIBER BLANKETS IN CAVITIES formed by framing members according to the following requirements:
    1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
    2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
    3. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

3.05 INSTALL BOARD INSULATION ON CONCRETE OR CMU SUBSTRATES by adhesively attached, spindle-type insulation anchors as follows:

A. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
B. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
C. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
D. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.06 PLACE LOOSE-FILL INSULATION into spaces indicated, either by pouring or by machine blowing, to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively

3.07 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 07 21 00

SECTION 07 25 00 – FLUID-APPLIED, VAPOR IMPERMEABLE, WATER RESISTIVE BARRIER (WRB)

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide a fluid-applied, vapor-impermeable, air, moisture and weather-resistive barrier (WRB) system where indicated on the Drawings, as specified herein, and as necessary for a complete installation. The Work of this Section includes the primary membrane, through-wall flashing membranes, related accessories and joint treatments to bridge and seal the following air leakage pathways and gaps throughout the Project:

A. Joints and gaps in substrate material(s), and between dissimilar building envelope materials
B. Connections of the walls to the roof air barrier.
C. Connections of the walls to the foundations.
D. Seismic, expansion and control joints in the substrate material
E. Openings and penetrations at window and door frames, store front and curtain wall
F. Piping, conduit, duct and similar penetrations through the substrate
G. Ties, screws, bolts, anchorages and similar penetrations for subsequent insulation and finishes
H. Other air-leakage pathways into the building envelope.

1.02 BARRIER PERFORMANCE REQUIREMENTS:

A. Provide a system capable of performing as a continuous vapor-permeable weather barrier, and as a liquid-water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. The system must be capable of accommodating substrate movement and sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration or leakage, and as follows:

1. AIR PERMEABILITY: 0.0016 CFM/SF at 1.6 PSF per ASTM E2178 and ASTM E283 with no increased air leakage when subjected to a sustained wind load of 10.5 PSF for 1 hour and gust wind load pressure of 62.8 PSF for 10 seconds when tested at 1.6 PSF per ASTM E331
2. WATER VAPOR PERMEANCE: Less than 10.0 perms per ASTM E96 Method B when tested at 58 mils dry film thickness.
3. NO FUNGAL GROWTH when tested per ASTM D 5590
4. SURFACE BURNING: NFPA Class A, UBC Class 1, flame Spread 25, Smoke Developed 85 per ASTM E84
5. UV RESISTANCE: Passes 73 Cycles to ASTM D4799 Cycle B (Q-UV)
6. LOW TEMPERATURE FLEXIBILITY and crack bridging: Pass -4 degrees F per ASTM C836
7. LONG TERM FLEXIBILITY: Pass to CGSB 71-GP-24M
8. PASSING WATERTIGHTNESS test CGSB 37-GP-56M

1.03 REFERENCES

A. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
B. ASTM E2178: Standard Test Method for Air Permeance of Building Materials.
C. ASTM E283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
D. ASTM E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.
E. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
F. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
G. ASTM E96: Water Vapor Transmission of Materials.
H. CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.
I. AMMA 2400: Standard Practice for Installation of Windows with a Mounting flange in Stud Frame Construction.
J. ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
K. ASTM D 5590: Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

1.04 SUBMITTALS

A. SUBMIT PRODUCT DATA for each component of the barrier system.
B. LABORATORY TEST DATA from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178. Include test reports on porous substrate and include sustained wind load and gust load air leakage results.
C. SUBMIT INSTALLER QUALIFICATIONS indicating training, qualifications, competencies and written approval by the primary system manufacturer for execution of the Work of this Section.

1.05 QUALITY ASSURANCES:

A. PERFORM WORK in accordance with manufacturer's written instructions and this specification. Maintain one copy of manufacturer's written instructions on site. Allow access to Work site by the air barrier membrane manufacturer's representative. Ensure continuity of the weather barrier throughout the Project.
B. PROVIDE MATERIALS from a single manufacturer regularly engaged in the manufacturing of such weather resistant membrane systems, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
C. COMPLY with all federal, state and local regulations controlling the use of volatile organic compounds (VOCs).

D. MOCK-UP: Construct mock approximately 6 foot high x 6 foot wide, incorporating typical substrate(s) with attachment of subsequent materials to demonstrate barrier membrane application details that will be used. Allow seven (7) calendar days for inspection and approval of mock up by Owner and/or Architect before proceeding with air barrier work. Pending approval, the mock-up may remain as part of the Work.
E. PRE-INSTALLATION CONFERENCE: Organize and administer not less than one (1) week prior to commencement of the Work of this Section, in accordance with requirements of Division-01 Sections. Ensure that all entities responsible for creating and maintaining a continuous plane of weather tightness are present at the conference.

1.06 DELIVERY, STORAGE, AND HANDLING

A. DELIVER MATERIALS in original, unopened packages with manufacturers' labels intact and clearly identifying products.
B. STORE MATERIALS inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes. Complete installation as rapidly as possible in each area of construction.
C. WASTE MANAGEMENT AND DISPOSAL: Separate and recycle waste materials in accordance with requirements of Division-01 Sections and per the Construction Manager's Waste Reduction Work Plan. Verify compliance with VOC regulations and requirements herein for all products, and document to the Construction Manager.

1.07 PROJECT CONDITIONS - WEATHER LIMITATIONS: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after coatings are applied. Do not apply air-moisture barrier coating during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air and substrate temperatures permit materials to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1.08 COORDINATE INSTALLATION of barrier components with other trades to provide a continuous air-tight membrane.

PART 2 - PRODUCTS

2.01 FLUID-APPLIED WEATHER RESISTANT BARRIER (WRB):
BASIS-OF-DESIGN PRODUCT / MANUFACTURER: Air-Bloc 16MR as manufactured by Henry Company – or equal

2.02 PROVIDE AUXILIARY MATERIALS recommended by the prime barrier manufacturer for the intended use and compatible with the barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of AHJ representatives.

2.03 PRIMER: Liquid waterborne or solvent-borne primer recommended for substrate by manufacturer of barrier material.

2.04 WRB MEMBRANE FLASHING: For use at perimeter of window or storefront framing (head jamb or sills), transitions and joint treatments in substrates, inside or outside substrate corners, and at anchorage locations for subsequent framing or cladding materials, provide a self-adhering UV-resistant SBS modified-bitumen sheet membrane with a metallic aluminum film with the following physical properties:

A. Peel Adhesion to Primed Steel 15.0 per ASTM D 1000
B. Vapor permeance: less than 0.05 perms per ASTM E 96
C. Membrane Thickness: 0.0443 inch (40 mils)
D. Low temperature flexibility: -15 degrees F per ASTM D146 min
E. Elongation: 40% per ASTM D412-modifed min
F. Basis-of-Design Product / Manufacturer: Blueskin® WB® Self-Adhered water resistive air barrier by Henry Company – or equal

2.05 ADHESIVE WITH LOW VOC CONTENT: For self-adhering membranes at all temperatures, provide a synthetic rubber based adhesive, quick setting, having the following physical properties:

A. VOC: less than 240 g per L,
B. Solids by weight: 40%,
C. Drying time (initial set): 30 minutes.
D. Basis-of-Design Product / Manufacturer: Blueskin LVC Adhesive, as manufactured by Henry

2.06 PENETRATION & TERMINATION SEALANT: moisture cured, medium modulus polymer modified sealing compound having the following physical properties:

A. Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,
B. Complies with Fed. Spec. TT-S-00230C, Type II, Class A
C. Complies with ASTM C 920, Type S, Grade NS, Class 25
D. Elongation: 450 – 550%
E. Remains flexible with aging and seals construction joints up to 1 inch wide
F. Basis-of-Design Product / Manufacturer: HE925 BES Sealant as manufactured by Henry

PART 3 - EXECUTION:

3.01 EXAMINE SUBSTRATES and conditions under which the Work of this Section is to be performed and notify the Construction Manager in writing of unsatisfactory conditions. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints flush.

A. EXAMINE ROOF EDGES, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where materials will be installed.
B. VERIFY that concrete or masonry has cured and aged for minimum time period recommended by the barrier manufacturer. Verify that concrete or masonry surfaces are visibly dry and free of moisture.
C. VERIFY that masonry joints are flush and completely filled with mortar.
D. PROCEED WITH INSTALLATION only after unsatisfactory conditions have been corrected.

3.02 PROTECT CONTIGUOUS WORK from moisture deterioration and soiling caused by application of air-moisture barrier. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

3.03 PROTECT SUBSTRATES AND WALL CONSTRUCTION behind them from inclement weather during installation. Prevent penetration of moisture behind sheathing and deterioration of substrates.

3.04 INSTALLTION OF BARRIER SYSTEM

A. JOINT TREATMENT

1. SEAL JOINTS 1/4 inch and less between panels of sheathing boards with joint treatment sealant. Fill joints with approved joint treatment sealant ensuring contact with all edges of substrate material. Strike flush any excess sealant over joint layer to form a continuous layer over the joint.
2. SEAL GAPS AND VOIDS or irregular joints greater than 1/4 inch between sheathing panels, and cracks over 1/16 inch in masonry or concrete with a strip of membrane flashing lapped a minimum of 1-1/2 inch on both sides of the joint. Prime surfaces per manufacturers' instructions and allow to dry. Align and position the flashing material, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of the flashing membrane joints. Roll all laps and membrane with a counter top roller to ensure a weather-tight seal.
3. SEAL INSIDE AND OUTSIDE CORNERS of substrate materials or sheathing boards with a strip of membrane flashing extending a minimum of three (3) inches on either side of the corner. Prime surfaces per manufacturers' instructions and allow to dry. Align and position membrane flashing, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane flashing. Roll all laps and membrane with a counter top roller to ensure a weather-tight seal.
4. TRANSITON AREAS: At tie-in's to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials, provide the seal method as indicated above for corners.

B. ATTACHMENTS OF SUBSEQUENT BUILIDING MATERIALS: Provide membrane flashing material extending a minimum of three (3) inches on all sides of planned anchor locations of subsequent building systems or finishes (including rain-screen assemblies and siding). Coordinate with installer(s) of subsequent systems for accurate anchorage locations. Prime surfaces per manufacturers' instructions and allow to dry. Align and position membrane flashing, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane flashing. Roll all laps and membrane with a counter top roller to ensure a weather-tight seal.

C. WINDOWS AND ROUGH OPENINGS: Wrap head and jamb of rough openings with membrane flashing. Place membrane flashing across sheet-metal flashings and end dam terminations. Prime surfaces as per manufacturers' instructions and allow to dry. Align and position membrane flashing, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of flashing membrane, and roll all laps and he membrane with a counter top roller to ensure a weather-tight seal. Extend barrier to connect to the vapor retarder barrier, if exists.

D. APPLICATION OF PRIMARY WEATHER BARRIER: Apply by spray or flat trowel a complete and continuous unbroken film of liquid barrier membrane. For temperatures above 40 degrees F and rising, apply one component water based elastomeric emulsion air barrier membrane at a rate of 16.7 SF / gallon to a uniform wet film thickness of 100 mils to achieve an average dry film thickness of 58 mils. Spray apply or trowel around all projections and penetrations ensuring a complete and continuous barrier membrane. Lap liquid applied membrane 1 inch over self-adhering membranes to seal their leading edges. Allow barrier membrane to dry per manufacturers recommendations prior to placement of exterior wall finish materials.

E. APPLICATION OF TERMINATION SEALANT: Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with penetration and termination sealant.

3.05 FIELD QUALITY CONTROL: Make notification to manufacturer's representative and Construction Manager when sections of Work are complete, to allow review prior to covering the barrier system.

3.06 PROTECTION: Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Drying time varies depending on temperature and relative humidity. Protect air barrier Work against wet weather conditions for a minimum of 24 hours.

END OF SECTION 07 25 00

SECTION 07 42 13 – METAL CEILING PANELS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide factory-formed and field-assembled, lap-seam type metal-panels where indicated on the Drawings, as specified herein, and as necessary for complete installation.

1.02 RELATED SECTIONS include the following:

A. Division-07 Section "Sheet Metal Flashing and Trim" for associated sheet metal Work.
B. Division-07 Section "Joint Sealants" for field-applied wall panel sealants not specified in this Section.

1.03 SUBMIT PRODUCT DATA, including manufacturer's product specifications, standard details, and installation instructions.

1.04 SUBMIT SHOP DRAWINGS indicating fabrication and installation layouts, details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled Work.

1.05 QUALITY ASSURANCES

A. MOCK-UP: Provide panels for a ceiling system mockup. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mock-up at location as directed by Architect. Retain accepted mock-up as quality standard for acceptance of completed metal facade. If accepted, mock-up may be incorporated as part of metal panel work.

1. Provide mock-up of sufficient size to show typical pattern of joints, panel width, edge construction, and finish color.
2. Obtain Architect's approval of material mock-up prior to proceeding with installation.

1.06 PRE-INSTALLATION CONFERENCE: Prior to commencement of work, convene an installation conference to include the Architect, General Contractor and Installer and establish procedures to maintain optimum working conditions and to coordinate this Work with related and adjacent work.

A. Review methods and procedures for installation including, but not limited to: substrates, sub framing, penetrations, and other preparatory work.
B. Review drawings, specifications, submittals and other contract documents.
C. Review construction schedule verifying availability of all materials, personnel and equipment needed to proceed and avoid delays.
D. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including cold temperatures.

1.07 DELIVER COMPONENTS, sheets, metal-panels, and other manufactured items so as not to be damaged or deformed. Package metal-panels for protection during transportation and handling.

1.08 COORDINATE METAL-PANEL ASSEMBLIES with rain drainage work, flashing, trim, and construction of girts, and or studs and other adjoining work to provide a secure, and non-corrosive installation.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS: Fabricate and install the metal wall panel system, including the size and spacing of attachment devices to meet the following loads:

A. WIND LOAD: Per local code requirements – but not less than 25 pounds per SF pressure inwards and outwards
B. THERMAL MOVEMENT: Provide systems and detail connections, which allow for thermal movement resulting from ambient temperature range of -4 degrees F to 176 degrees F.

2.02 ALUMINUM SHEET METAL:,

A. Metal Thickness: 0.032 inch - 24 gage
B. Color / Finish: pigmented and pre-weathered finish as indicated on the Drawings, or if not indicated, as selected by Architect from manufacturer's full range of available finish panel options.
C. Panel Unit Face Height (as installed - overall): 12 inch,
D. Panel Thickness: 1-1/2 inch (0.5 inch)
E. Texture: Smooth, NO striations or grooves.

2.03 BASIS-OF-DESIGN MANUFACTURER:

A. Berridge FW-1025 & FW-12 Panels

2.04 ACCESSORIES

A. PROVIDE ALL COMPONENTS NECESSARY for a complete, functional, rainscreen assembly including, but not limited to, trims, fascias, sills, flashing, counter flashing, door frame trim, corner units, clips, wall caps, closures and fillers, to match panels.
B. CLIPS & FASTENERS: provide concealed clips and stainless steel fasteners; supplied in accordance with manufacturer's recommendations and to meet the load requirements as indicated and as confirmed by engineering calculations. Attachment clips must permit expansion and contraction of the panel system throughout the specified temperature range. When permeable air barrier sheets are used and as required by the architect to resist liquid water penetration at the fastener penetration, provide fasteners with watertight washer gaskets.
C. CONCEALED SLIDING CLIP ATTACHMENT: to reduce oil canning, provide a separate clip to indirectly fasten the panel to the substrate, per panel manufacturer's recommendations.

2.05 MISCELLANEOUS MATERIALS

A. FASTENERS: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
B. PROVIDE CONCEALED FASTENERS per manufacturer's recommendations at typical vertical wall panels.
C. PROVIDE EXPOSED FASTENERS of stainless steel, tamper-resistant heads at corrugated metal panels, with epoxy-coated heads to match color of panel

2.06 PANEL ACCESSORIES: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-panels, unless otherwise indicated.

2.07 SEAM SEALING TAPE: Pressure-sensitive 100 per cent solid polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, non-sag, non-toxic non-staining tape.

2.08 SEALED JOINTS: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

2.09 PANEL JOINT SEALANT: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal-panels and remain weathertight; and as recommended in writing by metal-panel manufacturer.

2.10 FABRICATION:

A. FABRICATE PANELS to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" and manufacturer's recommendations that apply to the design, dimensions (pan width and depth), geometry, metal thickness, and other characteristics of the installation indicated. Shop fabricate to the greatest extent possible.
B. FABRICATE TO ALLOW FOR EXPANSION in running work sufficient to prevent leakage, damage, and deterioration of the Work. Form exposed sheet metal work to fit over substructure without excessive oil canning, buckling, and tool marks, true to line and levels indicated. Limit panel length to not more than 50 feet.
    1. Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of splice or backer plates with one side being attached to the profile and the other side sealed with non-acidic sealant. (Fins and channels may also be substituted for expansion measures).
C. APPLY BITUMINOUS COATING or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials that are non compatible or could result in corrosion or deterioration of either material or finishes.
D. 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.

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal-panel supports, and other conditions affecting performance of work.

A. Examine primary and secondary wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-panel manufacturer.
B. Verify that sheathing surfaces are sound, dry, properly secured and that provision has been made for flashings, anchorage, and all other interface items attaching to or penetrating through the Work of this Section.
C. Examine roughing-in for components and systems penetrating metal-panels to verify actual locations of penetrations relative to joint locations of metal-panels before installation.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 CLEAN SUBSTRATES of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

3.03 INSTALL METAL-PANELS in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor metal-panels and other components of the Work securely in place, with provisions for thermal and structural movement.

3.04 FIELD CUTTING OF METAL-PANELS by torch is not permitted.

3.05 REMOVE PROTECTIVE FILM (if any) from exposed surfaces of metal panels promptly upon installation (or prior if film covers any concealed seam areas) with care to avoid damage to finish.

3.06 SHIM OR OTHERWISE PLUMB substrates receiving metal-panels. Rigidly fasten base end of metal-panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.

3.07 LOCATE PANEL SPLICES over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

3.08 APPLY ELASTOMERIC SEALANT continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing.

3.09 ALIGN BOTTOM OF METAL-PANELS and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

3.10 METAL PROTECTION: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal-panel manufacturer.

3.11 JOINT SEALERS: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal-panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal-panel manufacturer. Seal metal-panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal-panel manufacturer.

3.12 INSTALL ACCESSORIES with positive anchorage to building and provide for thermal expansion. Coordinate installation with flashings and other components.

3.13 REPLACE METAL-PANELS that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 54 23

SECTION 07 42 43 – METAL COMPOSITE PANEL SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide a metal-faced composite panel system where indicated on the Drawings, as specified herein, and as necessary for complete installation.

1.02 SUBMIT PRODUCT DATA: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of composite wall panel and accessory.

1.03 SHOP DRAWINGS: Show fabrication and installation layouts of composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

1.04 DO NOT STORE metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F.

1.05 PROTECT STRIPPABLE PROTECTIVE COVERING from exposure to sunlight and high humidity, except to extent necessary for period of installation.

1.06 COORDINATE COMPOSITE WALL PANEL ASSEMBLIES with rain drainage work, flashing, trim, and construction of girts, and or studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.07

PART 2 - PRODUCTS

2.01 METAL-FACED COMPOSITE WALL PANELS: Provide field-fabricated metal-faced composite wall panel system fabricated from two metal facings bonded to a kraft-paper honeycomb core. Include attachment system components and accessories required 58 for a weather-tight system.

2.02 BASIS-OF-DESIGN MFGR / PRODUCT: Laminators Inc., Phone 800-523-2347 - website: www.laminatorsinc.com: "Omega-Lite" panels with "Clip & Caulk" installation system, Or approved equivalent panel and installation system

2.03 PANEL FINISH: Full range of manufacturer's options, including "Kynar 500" series, "Metalic Paint", "Natural Series" or "Designer Series" exposed-surface aluminum panels. Apply pretreatment and manufacturer's backer finish.

2.04 ATTACHMENT SYSTEM COMPONENTS: Formed from extruded aluminum or other approved materials compatible with panel facing. Include manufacturer's standard panel clips and anchor channels, drip edge, closed-cell PVC foam tape, panel adhesive, and other miscellaneous installation materials as appropriate.

2.05 PANEL JOINT SEALANT: ASTM C 920; elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in composite wall panels and remain weathertight; and as recommended in writing by composite wall panel manufacturer.

2.06 MISCELLANEOUS MATERIALS

A. FASTENERS: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
B. ALL PANEL ACCESSORIES: Provide components required for a complete wall panel assembly including trim, copings, fascia, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of composite wall panels, unless otherwise indicated.

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, composite wall panel supports, and other conditions affecting performance of work.

3.02 EXAMINE PRIMARY AND SECONDARY WALL FRAMING to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by composite wall panel manufacturer.

3.03 EXAMINE ROUGHING-IN for components and systems penetrating composite wall panels to verify actual locations of penetrations relative to seam locations of composite wall panels before composite wall panel installation.

3.04 PROCEED WITH INSTALLATION only after unsatisfactory conditions have been corrected.

3.05 INSTALL FLASHINGS and other sheet metal to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

3.06 MISCELLANEOUS FRAMING: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members 38 and anchorage according to ASTM C 754 and composite wall panel manufacturer's written recommendations.

3.07 FABRICATE COMPOSITE WALL PANELS and accessories, by manufacturer's standard procedures and processes as recommended by Manufacturer. Comply with indicated profiles and with dimensional requirements.

3.08 FORM PANEL LINES, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.

3.09 SHEET METAL ACCESSORIES: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet 46 Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with 48 exposed edges folded back to form hems.

3.10 INSTALLATION OF COMPOSITE WALL PANELS

A. DO NOT BEGIN INSTALLATION until weather barrier and flashings that will be concealed by composite wall panels are installed.
B. SHIM OR OTHERWISE PLUMB substrates receiving composite wall panels. Rigidly fasten lower or base-end of composite wall panels and allow other end free movement for thermal expansion and contraction.
C. INSTALL ATTACHMENT SYSTEM required to support wall panels, including subgirts, perimeter trims, tracks, drainage channels, panel clips, and anchor channels. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material 60 joinery, and panel-system joint seals. ÜLIP INSTALLATION: Attach panel clips to supports at each wall panel joint at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of wall panels to panel clips with manufacturer's standard fasteners.
D. INSTALL COMPOSITE WALL PANELS in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor composite wall panels and other components of the Work securely in 68 place, with provisions for thermal and structural movement. ÚLIGN BOTTOM OF COMPOSITE WALL PANELS and fasten with adhesive or mechanical fasteners as recommended by Manufacturer. Fasten flashings and trim around openings and similar elements with self-tapping screws. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
E. INSTALL FLASHING AND TRIM as composite wall panel work proceeds.

3.11 LOCATE PANEL SPLICES over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

3.12 APPLY ELASTOMERIC SEALANT continuously between metal base channel (sill angle) and concrete, and elsewhere as 10 indicated or, if not indicated, as necessary for waterproofing.

3.13 METAL PROTECTION: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by composite wall panel manufacturer.

3.14 SEAL HORIZONTAL AND VERTICAL JOINTS between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Division-07 Section "Joint Sealants."

3.15 JOINT SEALERS: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of composite wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by composite wall panel manufacturer. Seal composite wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by composite wall panel manufacturer.

3.16 ACCESSORY INSTALLATION

A. INSTALL ACCESSORIES with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components. Install components required for a complete composite wall panel 28 assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
B. FLASHING AND TRIM: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

3.17 EXPANSION PROVISIONS: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum 38 of 10 feet with no joints allowed within 24 inches corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints). ÜLEANING AND PROTECTION

3.18 REMOVE TEMPORARY PROTECTIVE COVERINGS and strippable films, if any, as composite wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of composite wall panel installation, clean 46 finished surfaces as recommended by composite wall panel manufacturer. Maintain in a clean condition during construction.

3.19 AFTER COMPOSITE WALL PANEL INSTALLATION, clear weep holes and drainage channels of obstructions, dirt, and sealant.

3.20 REPLACE COMPOSITE WALL PANELS that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 43

SECTION 07 50 00 – MEMBRANE ROOFING SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide an integrated, membrane roofing system to include roof insulation and a single-ply roofing membrane, where indicated on the Drawings, as specified herein, and as necessary for complete installation. Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist uplift pressures, thermally induced movement, and exposure to weather without failure. The membrane roofing system includes the following:

A. Air-barrier sheet over roofing substrate
B. Tapered insulation to achieve positive slope to roof drains, scuppers or gutters, as applicable
C. Mechanically attached roof deck board
D. Mechanically attached thermoplastic roof membrane,
E. Installation of roofing system terminations and penetrations in accordance with manufacturer's recommendations
F. Roof protection pads around HVAC equipment, and at roof-mounted piping supports.

1.02 REFERENCED STANDARDS: In addition to compliance with Manufacturer's standards and recommended installation details, comply with the following unless more stringent details are indicated in the Drawings:

A. National Roofing Contractors Association (NRCA) Roofing Manual: Membrane Roof Systems – most recent edition.

1.03 PERFORMANCE REQUIREMENTS

A. PROVIDE INSTALLED ROOFING MEMBRANE AND BASE FLASHINGS that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
B. MATERIAL COMPATIBILITY: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

1.04 FM/GLOBAL LISTING: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings, and as follows:

A. Fire/Windstorm Classification: Class 1A-90
B. Hail Resistance: SH (Sever Hazard).

1.05 ENERGY PERFORMANCE REQUIREMENTS:

A. SOLAR REFLECTIVITY: Provide roofing system with initial Solar Reflectance Index not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency. Provide roofing system that is listed on the DOE's Energy Star "Roof Products Qualified Product List" for low-slope roof products. Provide roofing system with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRRC-1.
B. LONG-TERM THERMAL RESISTANCE (LTTR): Comply with ASTM C 1289-11A for "aged" thermal-resistane values of roof insulation, equivalent to a time-weighted thermal design R-value for not less than 15 years.

1.06 INSTALLER QUALIFICATIONS: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1.07 EXTERIOR FIRE-TEST CHARACTERISTICS: "Class B" per ASTM E-108 by testing identical products to the approval of AHJ representatives.

1.08 SUBMITTALS

A. SUBMIT PRODUCT DATA for each type of product indicated.
B. SHOP DRAWINGS: For roofing system. Include plans, elevations, sections, details, and attachments to other Work:
    1. Base flashings and membrane terminations.
    2. Tapered insulation, including slopes.
    3. Insulation fastening patterns.
    4. Membrane seaming plan (indicating additional perimeter and corner attachments)
C. INSTALLER CERTIFICATES: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
D. MANUFACTURER CERTIFICATES: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article. Submit evidence of meeting performance requirements.
E. QUALIFICATION DATA: For Installer and manufacturer.
F. MAINTENANCE DATA: For roofing system to include in maintenance manuals.
G. WARRANTIES: Special warranties specified in this Section.
H. INSPECTION REPORT: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.09 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
B. MANUFACTURER QUALIFICATIONS: A qualified manufacturer that has FMG approval for membrane roofing system identical to that used for this Project.

C. SOURCE LIMITATIONS: Obtain components for membrane roofing system either from or approved by the roofing membrane manufacturer.
D. FIRE-TEST-RESPONSE CHARACTERISTICS: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to AHJ representatives. Materials must be identified with appropriate markings of applicable testing and inspecting agency.
E. EXTERIOR FIRE-TEST EXPOSURE: Class B; ASTM E 108, for application and roof slopes indicated.
F. SURFACE-BURNING CHARACTERISTICS OF FOAM PLASTIC INSULATION: Provide materials that meet requirements of FM/Global 4450 or UL 1256 (provide written confirmation to AHJ representatives upon request).

1.10 PRE-INSTALLATION CONFERENCE: Conduct at the Project site. Comply with requirements in Division-01. Review methods and procedures related to roofing system including, but not limited to, the following:

A. Meet with Architect, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
B. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
C. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
D. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
E. Review structural loading limitations of roof deck during and after roofing.
F. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
G. Review governing regulations and requirements for insurance and certificates if applicable.
H. Review temporary protection requirements for roofing system during and after installation.
I. Review roof observation and repair procedures after roofing installation.

1.11 DELIVERY, STORAGE, AND HANDLING

A. DELIVER ROOFING MATERIALS to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
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. Protect stored liquid material from direct sunlight. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
C. PROTECT ROOF INSULATION MATERIALS from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. 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.

1.12 WARRANTY

A. SPECIAL ROOF SYSTEM AND FLASHING WARRANTY: Manufacturer's warranty to include labor and material payment without monetary limitation (NDL), in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, metal edge and associated sheet metal flashings, and other components of the membrane roofing system, and as follows:

1. Non-prorated, and fully transferable (not limited to original Owner)
2. Warranty limit up to 90 MPH wind speed (calculated at ground level)
3. No Owner’s signature required for execution of warranty, and
4. Dispute settlement to be held in the state where the project is located

B. WARRANTY PERIOD: TWENTY (20) years from date of Substantial Completion.

PART 2 - PRODUCTS:

2.01 AIR BARRIER: ASTM D 4397 polyethylene sheet, 6 mils thick minimum, with maximum permeance rating of 0.13 perm, applied over entire deck surface before insulation application.

2.02 TPO ROOF MEMBRANE: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Provide membrane as manufactured by Carlisle, Genflex, Firestone, GAF, or Sarnafil, and as follows:

A. Nominal roof sheet thickness: 60 mils minimum
B. Roof Membrane surface color: White
C. Roof Membrane parapet wall flashing color: White

2.03 PROVIDE AUXILIARY MEMBRANE MATERIALS recommended by roofing system manufacturer for intended use and compatible with membrane roofing. Liquid-type auxiliary materials must meet VOC limits of AHJ representatives.

2.04 TYPICAL SHEET FLASHING: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as primary roofing sheet membrane.

2.05 METAL TERMINATION BARS: Manufacturer's standard predrilled stainless-steel, aluminum or polymer bars, approximately 1 by 1/8 inch thick; with anchors.

2.06 ROOF PROTECTION PADS: Provide non-porous protection pads consisting of a minimum 60 mil membrane matching primary roofing material and color, approved for use by membrane roofing system manufacturer, intended either for heat-welded or self-sticking application to the roof membrane, and as approved for use by membrane roofing system manufacturer, with factory-formed or field-cut with corners trimmed to a 2” radius minimum,

A. WALKWAYS: 24” x 24” minimum or as otherwise indicated on the Drawings.
B. PIPING SUPPORT REINFORCEMENT: size to extend 6” outside of all piping supports.

2.07 FASTENERS: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

2.08 MISCELLANEOUS ACCESSORIES: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories as recommended by the Manufacturer.

2.09 ROOF INSULATION:

A. PROVIDE PREFORMED ROOF INSULATION BOARDS that comply with primary roofing membrane manufacturer’s requirements and referenced standards, selected from manufacturer's standard sizes.
B. MINIMUM ROOF SLOPE (of field-areas): 1/4 inch per foot per AHJ requirements (with positive slope at vallies)

2.10 ROOF DECK COVER BOARD: Provide minimum 1/2 inch thick “Dens-Deck Prime” roof board above all insulation boards as a membrane substrate, installed per manufacturer’s recommendations with joints staggered, above the double-layers of insulation, and secure to substrate decking.

2.11 INSULATION ACCESSORIES

A. PROVIDE ACCESSORIES recommended by insulation manufacturer for intended use and compatible with membrane roofing.
B. MECHANICAL 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 acceptable to roofing system manufacturer.
C. COLD FLUID-APPLIED ADHESIVE: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

2.12 SNOW GUARDS

A. Sno Gem TPO coated rail system.
   1. Single Rail: 1 inch round system
   2. Material: Aluminum
   3. Finish: TPO Coated

PART 3 - EXECUTION

3.01 EXAMINATION

A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
B. VERIFY THAT ROOF OPENINGS AND PENETRATIONS are in place and set and braced and that roof drains are securely clamped in place.
C. VERIFY THAT WOOD BLOCKING, CURBS, AND NAILERS are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
D. VERIFY THAT SURFACE PLANE FLATNESS and fastening of steel roof deck comply with requirements in Division 5 Section "Steel Deck."

3.02 PREPARATION

A. CLEAN SUBSTRATE of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
B. PREVENT MATERIALS FROM ENTERING AND CLOGGING roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
C. COMPLETE TERMINATIONS AND BASE FLASHINGS and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 INSULATION INSTALLATION

A. COORDINATE INSTALLING MEMBRANE ROOFING system components, so insulation 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 insulation.
C. TRIM SURFACE OF INSULATION where necessary at roof drains so completed surface is flush and does not restrict flow of water.
D. INSTALL INSULATION WITH LONG JOINTS of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
E. FASTEN INSULATION PER FMG's "Approval Guide" for specified Windstorm Resistance Classification, including additional anchors at perimeters and building corners.

3.04 AIR BARRIER INSTALLATION: Loosely lay in a single layer, with sides and ends lapping a minimum of 6 inches.

3.05 FULLY-ADHERED ROOFING MEMBRANE INSTALLATION

A. LAYOUT MEMBRANE SHEETS with primary seams perpendicular to ribs of metal decking, with side laps and seams shingled with slope of roof deck when possible.

B. INSTALL ROOFING MEMBRANE over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
C. APPLY BONDING-ADHESIVE TO SUBSTRATE and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
D. SEAMS: Clean entire seam area, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation. Probe all seams after welds have cooled to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane. Verify field strength of seams a minimum of twice daily and repair seam sample areas. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
E. APPLY ADHESIVE AND MECHANICALLY FASTEN roofing membrane securely at terminations, penetrations, and perimeter of roofing, and seal all edges. Space fasteners for “Grade-C” metal deck unless otherwise indicated. Spread sealant or mastic bed over drain-flanges at deck-drains and securely seal membrane in place with clamping ring.

3.06 BASE FLASHING INSTALLATION

A. INSTALL SHEET FLASHINGS AND PREFORMED FLASHING ACCESSORIES and adhere to substrates according to membrane roofing system manufacturer's written instructions.
B. APPLY SOLVENT-BASED BONDING ADHESIVE to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
C. FLASH PENETRATIONS and field-formed inside and outside corners with sheet flashing.
D. CLEAN SEAM AREAS AND OVERLAP and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
E. TERMINATE AND SEAL TOP OF SHEET FLASHINGS and mechanically anchor to substrate through termination bars.

3.07 INSTALL PROTECTION PADS by cleaning roofing of dirt and debris prior to installation. Apply pads securely to surface of roofing membrane, by heat welding to substrate or adhere with roofing system Manufacturer’s approved compatible adhesive per their written instructions:

A. WALKWAY PADS: Provide at all traffic concentration points and where indicated on the Drawings. Place individual units with 6” minimum space between each pad. Install at the following locations:
    1. Around all sides of HVAC equipment mounted on roof
    2. Around all sides of skylights, roof hatches or access doors.
    3. Provide path from roof hatch / access ladder to all HVAC equipment requiring periodic service.
B. PIPING SUPPORTS: Install below piping support units provided by others for rooftop mounted electrical conduits, gas piping, or for condensate piping, if provided. Coordinate with other trades for locations required.

3.08 FIELD QUALITY CONTROL

A. ROOF SYSTEM TESTING: Engage a qualified testing agency to inspect the substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to the Architect. The testing agency must survey the entire roof area for potential leaks using electric field vector mapping (EFVM).
B. OWNER’S TESTING: Owner reserves the right to engage a separate, qualified independent testing and roof inspecting entity to review test reports and to perform separate, roof tests and inspections.
C. MANUFACTURER’S FINAL ROOF INSPECTION: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
D. REPAIR OR REMOVE AND REPLACE components of membrane roofing system that do not comply with specified requirements. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
E. PROTECT MEMBRANE ROOFING SYSTEM from damage and wear during remainder of construction period. Repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

3.09 PROTECTING AND CLEANING

A. PROTECT MEMBRANE ROOFING SYSTEM from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
B. CORRECT DEFICIENCIES in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07 50 00

SECTION 07 46 23 – COMPOSITE WOOD SOFFITS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide wood soffits where indicated on the Drawings, as specified herein, and as necessary for complete installation. Work of this Section includes:

A. Wood Soffit Boards

1.02 RELATED SECTIONS: Comply with the following Sections for requirements of associated material and installation:

A. Division-06 “Architectural Woodwork” Section for general finished wood materials and fabrication requirements
B. Division-07 “Fluid-Applied Weather Resistive Barrier (WRB) for WRB behind wood siding
C. Division-07 “Sheet Metal Flashing and Trim” Section, for flashings associated with wood siding
D. Division-07 “Joint Sealants” Section for sealants associated with wood siding
E. Division-09 “Painting” for finishing Wood

1.03 SUBMIT PRODUCT DATA for all types of materials and accessories components.

1.04 DELIVER materials so they will not be damaged. Package for protection against transportation damage. Exercise care in unloading, storing, and erecting materials to prevent bending, warping, twisting, and surface damage.

1.05 STORE materials at site to prevent warping and weather damage, elevating above ground on level blocking and covering to prevent water damage and to permit adequate ventilation within bundles.

1.06 PROCEED with Work only after substrate construction and penetrating items have been completed. Proceed with Work only when substrate is completely dry.

1.07 SPECIFIED PRODUCT WARRANTY: Provide manufacturer's standard 10 year Limited Transferable Product Warranty on installed work, agreeing to replace defective siding (material only – no labor cost included) which cracks, rots, delaminates, or fails to resist damage caused by hail or termite attacks due to manufacturing defects.

PART 2 - PRODUCTS

2.01 WOOD SOFFIT PANELS: 1 inch thick panels, with rectangular, square edge profile, routered as required per drawings to achieve finished pattern and as follows:

A. BASIS OF DESIGN: MiraTec Exteria Panels
B. SIZE: 2 ft x 16 ft with field routered edge

2.02 FASTENERS: Hot-dipped galvanized self-drilling trim-head steel siding screws of sufficient length to penetrate into wood by one (1) inch minimum, or into metal framing with three screw threads minimum. Countersink and fill as required to provide concealed, smooth finished surface; paint ready.

2.03 WOOD GLUE: Waterproof resorcinol glue as recommended by manufacturer for exterior carpentry use.

2.04 FABRICATION: Router edge as required to achieve pattern shown on drawings.

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION: Clean substrates of projections and substances detrimental to application of the Work of this Section.

3.03 WOOD SOFFIT INSTALLATION

A. NOT USE MATERIALS that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements. Do not use manufactured units with defective surfaces, sizes, or patterns. Install units level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment. Scribe and cut to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
B. INSTALL TO TOLERANCE of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior Work with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation. Coordinate siding Work with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate wood siding.
C. COMPLY WITH manufacturers' instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor units and other components of the Work securely in place, with provisions for thermal and structural movement.
D. UNDERLAYMENT: Apply one layer felt horizontally over entire surface, lapping succeeding courses 2" minimum and
E. INSTALL METAL FLASHINGS as indicated on Drawings and as recommended by siding manufacturer.
F. INSTALL SOFFITS with minimum number of joints practical, using full-length pieces from maximum lengths available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related units. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Adjust joinery for uniform appearance throughout the Work, and as follows:

1. Leave 1/8-inch gap at trim and corners, unless otherwise recommended by manufacturer, and apply sealant.
2. Butt joints only over framing or blocking, nailing top and bottom on each side and staggering joints in subsequent courses.
3. When applicable, install prefabricated outside corners as recommended by manufacturer of siding materials.

3.04 REPAIR AND / OR REFINISH WOOD SIDING only if it complies with requirements and shows no evidence of repair or refinishing.

3.05 REPLACE damaged units and other components of the Work that have deteriorated beyond successful repair by means of finish touchup or similar minor repair procedures.

3.06 CLEANING: Upon completion of installation, clean finished surfaces as recommended by manufacturer, and maintain in a clean condition during construction.

3.07 CLEAN at exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas, and blend with adjacent areas to not be evident.

3.08 PROTECT WOOD SOFFITS from damage from adverse weather and other detrimental causes during construction. Remove and replace wood materials that are moisture or mold damaged. Indications that materials are moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surfaces, contamination and discoloration of the materials.

END OF SECTION 0746 23

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 PROVIDE SHEET METAL FLASHING and sheet metal trim, where indicated on the Drawings, as specified herein, and as required for the prevention of water penetration into the building.

A. This Section includes requirements for sheet metal work associated with roofing and siding Work of other Sections.

1.02 RELATED SECTIONS include the following:

A. Division-06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
B. Applicable Division-07 Sections for roofing Work
C. Division-07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
D. Division-07 Section "Joint Sealants" for field-applied sealants to sheet metal flashing and trims.

1.03 PERFORMANCE REQUIREMENTS

A. INSTALL SHEET METAL FLASHING AND TRIM TO WITHSTAND wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
B. FABRICATE AND INSTALL ROOF EDGE FLASHING and copings capable of resisting forces according to recommendations in FMG Loss Prevention Data Sheet 1-49, for the following windstorm classification. Identify materials with nameof fabricator and design approved by FM Approvals.
   1. Windstorm Classification: Class 1-90
C. THERMAL MOVEMENTS: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
   2. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.04 SUBMITTALS

A. SUBMIT PRODUCT DATA including manufacturer's installation instructions and general recommendations for each specified sheet material and fabricated product.
B. SUBMIT SHOP DRAWINGS showing layout, joining, profiles, and anchorages of fabricated work, including major counter-flashings, trim/fascia units, expansion joint systems, etc., with plan & elevation layout at 1/4" scale, details at 3" scale. Show 3-dimensional details in shop drawings where different joint conditions connect so that tradespersons can clearly understand the intent and relationship of different materials and conditions.
C. SAMPLES FOR VERIFICATION: For each type of exposed finish required, prepare Samples of size indicated below:
   1. Sheet Metal Flashing: 12 inches long for each color used.
   2. Metal Roofing: 12 x 12 inch panel of each panel and finish

1.05 QUALITY ASSURANCES:

A. REFERENCED QUALITY STANDARD: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.06 MOCKUP:

A. PROVIDE MATERIALS for construction of a field mockup of each different color/finish and exposed application of sheet metal Work indicated, showing the full range of exposed color and finish textures to be expected in the completed construction.
B. BEFORE INSTALLING THE WORK OF THIS SECTION, build mockup to verify selections made under sample Submittals and to demonstrate aesthetic effects. Refer to Division-01 Section Quality Requirements for general requirements of Mockup.

1.07 DELIVERY, STORAGE, AND HANDLING

A. DELIVER SHEET METAL FLASHING MATERIALS and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
B. STACK MATERIALS on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
C. COORDINATE INSTALLATION of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.01 TYPICAL PRE-FINISHED ALUMINUM SHEET: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:

A. Fluoropolymer 2-Coat System: Manufacturer's standard 2-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.

B. Color: As indicated on Drawings, in up to three (3) different colors throughout the project as selected by the Architect from the manufacturer's full range

2.02 PREFINISHED STEEL SHEET: Zinc-coated (galvanized) structural quality steel sheet per ASTM A 653 G90 coating, and pre-painted by the coil-coating process to comply with ASTM A 755, in minimum 0.024 inch thickness (24 gage), or 0.032 inch thick where indicated herein, and in finish as follows:

A. Fluoropolymer 2-Coat System: Manufacturer's standard 2-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.
B. Color: As indicated on Drawings, or if not indicated, provide up to three (3) different material colors as selected by the Architect from the Manufacturer's full range of available options, including metallic surfaced finishes.

2.03 UNDERLAYMENT MATERIALS

A. SELF-ADHERING, HIGH-TEMPERATURE SHEET: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    1. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
    2. Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT
    3. Metal-Fab Manufacturing, LLC; MetShield.
    4. Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
    5. Polyguard Products, Inc.; Deck Guard HT.
    6. SDP Advanced Polymer Products Inc; Palisade SA-HT.

2.04 MISCELLANEOUS MATERIALS

A. PROVIDE MATERIALS AND TYPES OF FASTENERS, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
B. FASTENERS: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads. At exposed fasteners, provide heads matching color of sheet metal by means of plastic caps or factory-applied coating. At flashing and trim, provide blind fasteners of high-strength aluminum or stainless-steel, or self-drilling screws, gasketed, with hex washer head.
C. SEALING TAPE: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
D. ELASTOMERIC SEALANT: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
E. BUTYL SEALANT: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
F. BITUMINOUS COATING: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
G. REGLETS: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.
    1. Material: Stainless steel, 0.019 inch thick – mill finished
    2. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
    3. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
    4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
    5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
    6. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
    7. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
    8. Available 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. Cheney Flashing Company.
        b. Fry Reglet Corporation.
        c. National Sheet Metal Systems, Inc.
        d. Sandell Manufacturing.

2.05 GENERAL FABRICATION

A. CUSTOM FABRICATE SHEET METAL flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
B. FABRICATE SHEET METAL flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal. Fabricate sheet metal flashing and trim

without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

C. TYPICAL SEALED JOINTS: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

D. EXPANSION PROVISIONS: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

E. CONCEAL FASTENERS AND EXPANSION PROVISIONS where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

F. FABRICATE CLEATS AND ATTACHMENT DEVICES from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate in thickness as recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

G. PROTECT MECHANICAL AND PAINTED FINISHES on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.06 FABRICATED ITEMS:

A. THROUGH-WALL SHEET METAL (SM) FLASHINGS: Fabricate in sections not exceeding 12-foot- long (minimum 8-feet long at continuous units) at shelf angles in masonry construction, at head and sill openings in either masonry or frame construction, and at all locations where indicated on the Drawings. Fabricate discontinuous lintel, sill, and similar flashings to extend a minimum of four (4) inches beyond each side of wall openings. Form with 2-inch-high end dams where flashing is discontinuous. Fabricate with drip edge, by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees. Fabricate with preformed corners, end dams, other special shapes, and seaming materials at splices as applicable. Fabricate through-wall flashings from one of the following materials:

1. Stainless Steel: 0.016 inch thick.
2. Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.

B. WALL-PANEL FLASHINGS: Provide "Z"-shaped units at exterior horizontal panel joints and other wall panel trims where indicated on the Drawings to match color of wall panels to greatest extent feasible:

1. Metal: 0.032 inch thick minimum “typical prefinished” aluminum

C. SHEET METAL FASCIA: Provide flush faced finish of typical prefinished 0.040 inch thick sheet metal in lengths not to exceed ten (10) feet maximum, with flush sealed, butted 3/8 inch thick joints over six (6) inch wide plates. Install with continuous cleats for concealed anchorages as applicable.

D. BRAKE-METAL WINDOW & DOOR OPENING TRIMS: At window and door openings, provide anodized finished, flush fabricated metal brake-metal formed trims as indicated on the Drawings and as required herein:

1. Fabricate in one-piece units up to ten (10) feet maximum, with flush sealed, butted joints of 3/8 inch space over 6 inch wide joint plates of equal thickness, when required.
2. Provide continuous metal cleats of 0.040 inch thick aluminum sheet, attached through WRB typically @ 12 inch centers, and anchor to masonry when necessary at outside edges.
3. At sills, break-form outside edge to fit over continuous cleat and extend down to cover top edge of masonry or wall panel minimum of one (1) inch high. Fold-up (end dam) both sides to extend up behind wall trim not less than four (4) inches. Anchor and seal sill unit to substrate – lapping wall unit over end dam to drain
4. Install so that sealant between units will be concealed behind exposed opening trims to the greatest extent feasible.
5. At head and jamb trims, align outside edge to be flush with exterior wall finish typically.
6. At head trims, fold-down sides behind jamb trims not less than two (2) inches.
7. Apply jamb trims after installation of head and sill trims, over end dams of sills and turned-down edges of head trims.

E. THROUGH-WALL SHEET METAL (SM) FLASHINGS (typical at openings in masonry or frame construction): Fabricate in sections not exceeding 12-foot- long (minimum 8-feet long at continuous units) at shelf angles in masonry construction, at head and sill openings in either masonry or frame construction, and at all locations where indicated on the Drawings. Fabricate discontinuous lintel, sill, and similar flashings to extend a minimum of four (4) inches beyond each side of wall openings. Form with 2-inch-high end dams where flashing is discontinuous. Fabricate with drip edge, by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees. Fabricate with preformed corners, end dams, other special shapes, and seaming materials at splices as applicable. Fabricate from 0.016 inch thick (25 gage) minimum stainless-steel sheet meeting ASTM A 240 or ASTM A 666, Type 304, dead soft, fully annealed, in 2D (dull, cold-rolled) finish, unless otherwise noted.

F. FABRICATE SCUPPERS of dimensions indicated with a closure flange trim at exterior side extending one (1) beyond face of wall, and with a fully welded (not seamed) wall flange returning on the roof side of the wall four (4) inches minimum, and a base flange on the interior extending 4 inches onto the field of the roof inside the exterior wall. Fabricate scupper from 0.024 inch thick (24 gage) stainless steel or TPO coated sheet metal. Fabricate exterior-side scupper trim-ring of minimum 2-1/2 inch width of pre-finished metal to match building standard material.

G. FABRICATE CONDUCTOR HEADS with flanged back and stiffened top edge of dimensions and in conformance with shape or profile as indicated on the Drawings. Provide angled bottom shape to prevent damage from freezing water typically, complete with outlet tube, exterior flange trim, downspout strainer, and built-in overflows of double the area of the downspout (except at open-topped conductor head not exceeding the primary drainage level). Fabricate conductor heads from 0.032 inch minimum thickness (20 gage) prefinished steel metal, unless otherwise indicated.

H. FABRICATE ROOF-EDGE to comply with requirements of SPRI/FM 4435 ES-1 Wind Design Standard, and provide verification of compliance by wind-testing to that standard with the shop-drawing submittal. Fabricate in eight (8) foot

minimum to ten (10) foot maximum length units, with 1/2 inch wide joints between sections. Fabricate joint plates of same thickness as metal roof edge. Provide continuous cleat fastening bottom edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld to be watertight.

1. Fascia Height: Four (4) inch minimum exposed face – or greater if indicated on the Drawings or as otherwise required to comply with referenced wind design standard.
2. Fascia Metal: Typical prefinished “Kynar 500” aluminum sheet metal, in minimum 0.040 inch thicknes in color indicated on the Drawings or as selected by Architect from Manufacturer’s full range of available options, including metallic finishes.
3. Continuous Cleats: 0.050 aluminum sheet metal
4. Joint Style: Butt, with 6-inch- wide back plates

I. PRE-ENGINEERED ROOF-EDGE FASCIA: Provide a two-piece, pre-engineered roof-edge and fascia system meeting SPRI/FM 4435 ES-1 Wind Design Standard, consisting of a snap-on pre-finished sheet metal fascia cover in section lengths not exceeding 10 feet, and a continuous metal anchor bar with integral drip edge cleat to engage fascia cover. Provide matching mitered and welded/sealed corner units as applicable:

1. Fascia Height: Four (4) inch minimum exposed face – or greater if indicated on the Drawings or as otherwise required to comply with referenced wind design standard.
2. Fascia Metal: Typical prefinished “Kynar 500” aluminum sheet metal, in minimum 0.040 inch thickness in color indicated on the Drawings or as selected by Architect from Manufacturer’s full range of available options, including metallic finishes.
3. Continuous Cleats: 0.050 aluminum sheet metal or as otherwise required by system design
4. Fascia Joint Style: Butt type with six (6) inch wide concealed splice plates
5. APPROVED SYSTEMS / MANUFACTURERS:
6. “TerminEdge” by A. W. P. Hickman Company (Ph: 800-892-9173 - website: www.wph.com)
7. “Anchor-Tite Coping” by Metal-Era, Inc., (Ph: 262-549-6900 - website: www.metalera.com)

J. MANUFACTURED COPINGS: Provide pre-engineered coping system meeting SPRI/FM 4435 ES-1 Wind Design Standard, consisting of a continuous metal anchor system with an integrated drip edge cleat on both sides of the parapet wall to engage the coping, in section lengths not exceeding 10 feet. Provide matching mitered and welded corner units, and as follows:

1. Fascia Height: Four (4) inch minimum exposed faces – or greater if indicated on the Drawings or as otherwise required to comply with referenced wind design standard.
2. Fascia Joints: butt type with concealed splice plates.
3. Fascia Metal: Typical prefinished “Kynar 500” sheet metal, in minimum 0.050 sheet aluminum thickness, in color indicated on the Drawings or as selected by Architect from Manufacturer’s full range of available options, including metallic finishes.
4. APPROVED SYSTEMS / MANUFACTURERS:
5. “PermaSnap 2” by A. W. P. Hickman Company (P: 800-892-9173 - web: www.wph.com)
6. “Perma-Tite Gold Coping” by Metal-Era, Inc., (P: 262-549-6900 - web: www.metalera.com)
7. Other manufacturers pre-approved by Architect

K. BASE FLASHINGS, COUNTER-FLASHINGS, & FLASHING RECEIVERS: Fabricate from pre-finished aluminum: 0.040 inch thick.

L. FABRICATE GUTTER UNITS from pre-finished .032 aluminum, to cross-section indicated on the Drawings, complete with end pieces, outlet tubes, and other accessories as required. Stiffen outer edge with hemmed return, and fabricate outer edge 1/2" below back edge. Fabricate in seamless lengths were possible; minimum 96-inch- long sections. Provide 1/4" x 2" aluminum gutter brackets bent to match shape of gutter profile. Furnish flat-stock gutter spacers fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Provide all gutters with screen of 1/4" aluminum hardware cloth in aluminum frame.

M. DOWNSPOUTS: Provide 5 inch wide x 4 inch deep rectangular units typically, or in larger size as indicated on Drawings. Fabricate from minimum 0.032 pre-finished aluminum. Provide fabricated, telescoping elbows as required by building profile. Provide 1-1/4" x .050" thick (20 gage) downspout strap anchors at no more than eight (8) feet centers vertically, matching color of downspout material.

N. ROOF DRAIN LEADER / DOWNSPOUT NOZZLE: Cast bronze nozzle machined to slide over pipe extending past wall surface for set-screw anchorage, to discharge roof drain leader, with “lambs tongue” outfall extending not less than 5-1/2 inches beyond wall surface, in nominal unit size to match pipe leader, and with round cast bronze wall flange and optional bird screen:

1. Basis-of-Design: # 1775 Downspout Cover by J R Smith Mfg Co, or equal

O. ROOF DRAIN: Furnish and install a combination Side Outlet Roof Drain, overflow and flashing area as one unit, complete with expansion couplings on both primary drain and overflow, made of high impact ABS, manufactured by Tech Specialties or approved equal.

1. Basis of Design: #T-0022: 3-inch ABS-Roof Drain Side Outlet
2. Dome Grate
3. With Overflow Drain

2.07 MISCELLANEOUS SHEET METAL FABRICATIONS:

A. ROOF FLASHING TRANSITIONS: At roof and roof-to-wall transitions, roof-to-roof-edge flashings and fascia-cap transitions, shop-fabricate interior and exterior corners from 0.034 inch thick (20 gage) minimum galvanized steel sheet

B. AT ROOF BASE FLASHINGS, shop fabricate interior and exterior corners from 0.028 inch thick (22 gage) minimum galvanized steel sheet
C. AT COUNTERFLASHINGS, shop fabricate interior and exterior corners from 0.022 inch thick (24 gage) minimum galvanized steel sheet
D. FLASHING RECEIVERS: shop fabricate from 0.022 inch thick (24 gage) minimum galvanized steel sheet
E. ROOF-PENETRATION FLASHING: Fabricate from 0.019 inch thick (26 gage) stainless steel sheet minimum
F. METAL SPLASH PANS: Fabricate from 0.019 inch thick (26 gage) stainless steel sheet minimum
G. EQUIPMENT SUPPORT FLASHING: Fabricate from 0.028 inch thick (22 gage) minimum galvanized steel sheet
H. OVERHEAD-PIPING SAFETY PANS: Fabricate from 0.040 inch thick (18 gage) minimum galvanized steel sheet

PART 3 - EXECUTION

3.01 ANCHOR SHEET METAL FLASHING AND TRIM and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system. Torch cutting of sheet metal flashing and trim is not permitted.

3.02 METAL PROTECTION: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals. Coat side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

3.03 UNDERLAYMENT: Install all sheet metal flashing over a course of underlayment, and cover with a slip sheet. Install underlayment wrinkle free in accordance with its manufacturer's instructions, typically using adhesive to minimize mechanical fasteners under the sheet metal flashing and trim. Prime substrate when recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment material. Apply underlayment in a shingle fashion to shed water, with end laps not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Cover underlayment within fourteen (14) days. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trims.

3.04 INSTALL EXPOSED SHEET METAL FLASHING AND TRIM without excessive oil canning, buckling, and tool marks. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of sealant. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3.05 INSTALL CONTINUOUS CLEATS anchored at 12" inch centers minimum at face.

3.06 EXPANSION PROVISIONS: Provide for thermal expansion of exposed flashing and trim, by spacing joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

3.07 FASTENERS: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. With aluminum sheet metal, use aluminum or stainless-steel fasteners.

3.08 SEAL JOINTS WITH ELASTOMERIC SEALANT as required for watertight construction. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants." Rivet or weld joints in uncoated aluminum where necessary for strength.

3.09 ROOF FLASHING INSTALLATION

A. INSTALL SHEET METAL ROOF FLASHING AND TRIM to produce a complete roof drainage system, and to comply with SMACNA's "Architectural Sheet Metal Manual" as applicable. Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight. Coordinate installation of roof perimeter flashing with installation of roof drainage system items.
B. METAL ROOF EDGE FLASHING: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. When face of roof edge exceeds 4 inches in height, interlock exterior bottom edge of with a continuous cleats anchored to substrate at 6-inch centers. Anchor interior leg of coping with screw fasteners and washers at 3-inch OC in staggered rows (6 inch OC each row) or as otherwise required by Manufacturer's tested unit.
C. COPINGS: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch centers. Anchor interior leg of coping with screw fasteners and washers at 24-inch centers.
D. ROOF-PENETRATION FLASHING: Seal units with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.
E. PIPE OR POST COUNTERFLASHING: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
F. COUNTERFLASHING: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.

3.10 HANGING GUTTERS: Join sections with riveted and soldered joints or with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets straps spaced not more

than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts. Fasten gutter spacers to front and back of gutter. Loosely lock straps to front gutter bead and anchor to roof deck. Anchor and loosely lock back edge of gutter to continuous cleat, eave or apron flashing. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart. Anchor gutter with spikes and ferrules spaced not more than 24 inches apart. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps.

A. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.

3.11 INSTALL PARAPET SCUPPERS by continuously supporting unit, set to correct elevation for rainwater flow, and seal flanges to interior wall face, over tapered edge strips, and under roofing membrane. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper. Loosely lock front edge of scupper with conductor head.

3.12 INSTALLATION OF DOWNSPOUTS: Telescope upper sections into lower section 1-1/2" minimum, rivet and seal. Elbow downspouts away from building at building offsets and toward building immediately below gutter connection. Attach to wall strap anchors at downspout top, bottom, horizontal joints and at 10 feet maximum centers. Secure straps to wall at masonry where downspouts are open ended, and extend 3" minimum into storm drain boot or underground drainage system, when indicated.

3.13 INSTALL SPLASH PANS where downspouts discharge on low-slope roofs, even if not so indicated in the Drawings. Set in elastomeric sealant compatible with the roofing substrate.

3.14 WALL FLASHING INSTALLATION

A. INSTALL SHEET METAL WALL FLASHING to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
B. WINDOW AND STOREFRONT OPENINGS: Install sill flashings with end-dams in framed wall systems. Install through-wall flashings to extend 4 inches beyond wall openings in masonry construction.
C. INSTALL EXPANSION JOINT COVERS at locations and of configuration indicated. Lap joints a minimum of four (4) inches in direction of water flow.

3.15 OVERHEAD-PIPING SAFETY PANS: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.16 INSTALLATION TOLERANCES: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.17 CLEANING AND PROTECTION

A. CLEAN EXPOSED METAL SURFACES of substances that interfere with uniform oxidation and weathering.
B. REMOVE TEMPORARY PROTECTIVE COVERINGS and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

3.18 REPLACE SHEET METAL FLASHING AND TRIM that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 54 23

SECTION 07 72 00 – ROOF ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide roof specialties and accessories as shown on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.02 SUBMIT PRODUCT DATA including manufacturer's technical product data, rough-in diagrams, details, installation instructions and general product recommendations.

1.03 SUBMIT SHOP DRAWINGS indicating plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and fieldassembled work.

1.04 QUALITY STANDARDS: Comply with SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap- flashing to coordinate with type of roofing indicated. Comply with "NRCA Roofing and Waterproofing Manual" details for installation of units. Provide manufacturers' standard units, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

PART 2 - PRODUCTS

2.01 ROOF CURBS: Provide internally reinforced roof-curb units with integral spring-type vibration isolators and capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, integral metal cant and integrally formed deck-mounting flange at perimeter bottom. Coordinate curb dimensions with roughing-in information or Shop Drawings of equipment to be supported. Coordinate loading requirements with applicable subcontractor / supplier of equipment to be supported.

A. MINIMUM HEIGHT: sixteen (16) inches unless otherwise indicated
B. MATERIAL: Zinc-coated (galvanized) steel sheet, 0.079 inch thick (14 gage) minimum, in mill phosphatized finish.
C. INSULATION: Factory insulated with 1-1/2-inch thick cellulosic or glass-fiber board insulation, with factory-installed treated wood nailer at top of curb, continuous around unit perimeter.
D. BASE FLANGE: Three (3) inch minimum of same material as curb unit, with roof slope accommodated by sloping the deck-mounting flange. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
E. LINER: Same material as curb, of manufacturer's standard thickness and finish.
F. TOP SURFACE: Level around perimeter
G. AVAILABLE 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. RTU Manufacturer as shown on MEP drawings.
2. AES Industries, Inc.
3. Curbs Plus, Inc.
4. Custom Solution Roof and Metal Products.
5. Greenheck Fan Corporation.
6. LM Curbs.
7. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
8. Roof Products, Inc.
9. Thybar Corporation.
10. Vent Products Co., Inc.

2.02 ROOF HATCHES: Provide metal roof-hatch units with lids and insulated double-walled curbs, with welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, and integrally formed deck-mounting flange at perimeter bottom. Reinforce frame at corners for mounting safety railing.

A. FOR LADDER – UNIT SIZE & TYPE: Single-leaf lid, in 36 by 36 inch nominal, unless otherwise indicated.
B. MINIMUM HEIGHT: fourteen (14) inches unless otherwise indicated.
C. MATERIAL: Zinc-coated (galvanized) steel sheet, 0.079 inch thick (14 gage) minimum, in mill phosphatized finish.
D. LOADS: Minimum 40-lbf/sq. ft external live load and 20-lbf/sq. ft. internal uplift load.
E. HATCH LID MATERIAL: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
F. LID HARDWARE: Galvanized or Stainless-steel spring latch with turn handles inside and outside, butt- or pintle-type hinge system, and padlock hasps inside and outside. Provide two-point latch on lids larger than 84 inches.
G. INSULATION: Factory insulated with 1-1/2-inch thick cellulosic or glass-fiber board insulation, with factory-installed treated wood nailer at top of curb, continuous around unit perimeter.
H. BASE FLANGE: Three (3) inch minimum of same material as curb unit, with roof slope accommodated by sloping the deck-mounting flange. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
I. LINER: Same material as curb, of manufacturer's standard thickness and finish.
J. TOP SURFACE: Level around perimeter
K. AVAILABLE 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. Basis of Design: Type E Roof Hatch by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: www.BILCO.com.

2.03 ROOF-HATCH SAFETY RAILING SYSTEM: Provide integrated system at roof hatch opening sides adjacent to roof edge, including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation;

attached to the roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction, and as follows:

A. HEIGHT: 42 inches minimum above finished roof deck.
B. POSTS AND RAILS: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter.
C. MAXIMUM OPENING SIZE: System constructed to prevent passage of a sphere 21 inches in diameter.
D. POST AND RAIL TOPS AND ENDS: Weather resistant, closed or plugged with prefabricated end fittings. Provide weep holes or another means to drain entrapped water in hollow sections of handrail or railing members. Fabricate joints exposed to weather to be watertight.
E. FASTENERS: Manufacturer's standard, finished to match railing system.
F. FINISH: Manufacturer's standard two-coat polymer, in color as selected by Architect from full range of available options

2.04 LADDER SAFETY-ASSIST POST (at vertical ladder only – not for ships-ladder): Safety railing system Manufacturer's standard ladder safety post that will lock in place on full extension, with release mechanism to return post to closed position: Height: 42 inches minimum above finished roof deck.

A. Material and Finish: 1-5/8" minimum diameter galvanized steel tube or mill finished aluminum.

2.05 PREFORMED EXHAUST VENT FLASHING SLEEVES: Provide double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted metal collar.

A. METAL: 0.063 inch thick aluminum sheet, in mill finish
B. SIZE / diameter: As required for vent size indicated on the Drawings.
C. 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. Custom Solution Roof and Metal Products.
    2. Thaler Metal USA Inc.

2.06 CONDENSER PADS

A. Thermoplastic
B. 2-inch thick, unless 3-inch thick is required by local code.
C. Size to fit condenser.
D. Acceptable manufacturers:
    1. Diversitech
    2. Bramec
    3. OR equal.

2.07 FASTENERS: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match the finish of exposed fasteners with finish of material being fastened. Where removal of exterior exposed fasteners affords access to building, provide nonremovable fastener heads.

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored. Verify dimensions of roof openings for roof accessories. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION: Comply with manufacturer's instructions and recommendations. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks. Coordinate with installation of roof deck and other substrates to receive accessory units, and vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight.

A. Install roof curbs and hatches so that top surface is level
B. Install equipment supports so that top surfaces are level with each other.
C. Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported items.
D. Attach safety railing system to roof-hatch curb and attach ladder-assist post according to manufacturer's instructions.

3.03 ANCHOR UNITS SECURELY to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

3.04 INSTALL ROOF ACCESSORY ITEMS in accordance with construction details of "NRCA Roofing and Waterproofing Manual", and in accordance with requirements of the manufacturer of the prime roofing materials.

3.05 ISOLATION: Where metal surfaces of units are to be installed in contact with noncompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

3.06 OPERATIONAL UNITS: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.07 CLEAN exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings. Clean exposed surfaces according to manufacturer's written instructions. Clean off excess sealants.

3.08 REMOVE AND REPLACE ROOF ACCESSORIES that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 72 00

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.01 PROVIDE sealants complying with requirements included herein, in order to establish and maintain airtight, vermin proof, and waterproof continuous seals on a permanent basis. Failures of installed sealants to comply with this requirement will recognized as failures of materials and workmanship. Types of applications include but are not limited to the following:

1.02 EXTERIOR JOINTS in the following vertical or horizontal surfaces:

A. Pavement joints
B. Construction joints in cast-in-place concrete.
C. Control and expansion joints in unit masonry.
D. Joints in stone cladding and cast stone.
E. Perimeter joints between exterior cladding materials and frames of doors, windows, and louvers.
F. Control and expansion joints in soffits and other overhead surfaces.

1.03 INTERIOR JOINTS in the following vertical surfaces and horizontal nontraffic surfaces:

A. Control and expansion joints on exposed interior surfaces of exterior walls.
B. Perimeter joints of exterior openings where indicated.
C. Vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions.
D. Perimeter joints between interior wall surfaces and frames of interior doors windows.
E. Joints at Tile Work
F. Joints between plumbing fixtures and adjoining walls, floors, and counters.

1.04 SUBMITTALS

A. PRODUCT DATA: For each joint-sealant product indicated.
B. SAMPLES: For each kind and color of joint sealant required, provide samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to the joint sealants.
C. LIST OF MOCKUP MATERIALS: List manufacturer's product/color names, finishes, and other information as required to identify materials used. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.

1.05 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
B. SOURCE LIMITATIONS: Obtain each type of joint sealant through one source from a single manufacturer.
C. MOCKUP: Provide materials for construction of a field mockup of each different color and finish of sealant Work indicated, showing the full range of exposed color and finish textures to be expected in the completed construction. Before installing the work of this section, build mockup to verify selections made under sample Submittals and to demonstrate aesthetic effects. Refer to Division-1 Section Quality Requirements for general requirements of Mockup.

1.06 PROJECT CONDITIONS

A. DO NOT PROCEED WITH INSTALLATION of joint sealants under the following conditions:
    1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
    2. When joint substrates are wet.
    3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
    4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.07 WARRANTY

A. SPECIAL INSTALLER'S WARRANTY: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
    1. Warranty Period: Two years from date of Substantial Completion.
B. SPECIAL MANUFACTURER'S WARRANTY: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
    1. Warranty Period: Two years from date of Substantial Completion.
C. SPECIAL WARRANTIES specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
    1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
    2. Disintegration of joint substrates from natural causes exceeding design specifications.
    3. Mechanical damage caused by individuals, tools, or other outside agents.
    4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.01 AVAILABLE MANUFACTURERS / PRODUCTS: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.02 COMPATIBILITY: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

2.03 SEALANT COLORS: Match adjacent material color typically, as approved by the Architect.

A. The quantity of sealant colors is limited only by the number and color of adjacent materials indicated in the Drawings
B. Provide custom colors to match adjacent materials at no additional cost if manufacturer's "standard" colors do not match adjacent materials, in the professional opinion of the Architect
C. Provide multiple-colors of sealant as required by field-conditions when adjacent materials and their colors change throughout the height or width of a sealant joint

2.04 VOC CONTENT OF INTERIOR SEALANTS: Sealants and sealant primers used inside the weatherproofing system must comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

A. Architectural Sealants: 250 g/L.
B. Sealant Primers for Nonporous Substrates: 250 g/L.
C. Sealant Primers for Porous Substrates: 775 g/L.

2.05 LOW-EMITTING INTERIOR SEALANTS: Sealants and sealant primers used inside the weatherproofing system must comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.06 ELASTOMERIC JOINT SEALANTS

A. ELASTOMERIC SEALANTS: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
B. STAIN-TEST-RESPONSE CHARACTERISTICS: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.07 URETHANE TRAFFIC-JOINT SEALANT: Comply with ASTM C 920 Type S (single component), grade P (pourable), class 25, use T (traffic). Available Products include but are not limited to the following:

A. BASF Building Systems; Sonolastic NP1.
B. May National Associates, Inc.; Bondaflex PUR 40 FC.
C. Pacific Polymers International, Inc.; Elasto-Thane 230 Type II.
D. Sika Corporation, Construction Products Division; Sikaflex - 1a.
E. Tremco Incorporated; Vulkem 116.

2.08 EXTERIOR SILICONE SEALANT: Comply with ASTM C 920 Type S (single component), grade NS (nonsag), class 100/50, Use NT (nontraffic) and use related to joint substrates of M, G, A, and, as applicable to joint substrates indicated, O. Available Products:

A. Dow Corning Corporation; 790.
B. GE Silicones; SilPruf LM SCS2700.
C. Pecora Corporation; 890FTS.
D. Sika Corporation, Construction Products Division; SikaSil-C990.
E. Tremco Incorporated; Spectrem 1.

2.09 BUTYL-RUBBER SEALANT: Comply with ASTM C 1085. Available Products:

A. Bostik Findley; Bostik 300.
B. Fuller, H. B. Company; SC-0296.
C. Fuller, H. B. Company; SC-0288.
D. Pecora Corporation; BC-158.
E. Polymeric Systems Inc.; PSI-301
F. Sonneborn, Division of ChemRex Inc.; Sonneborn Multi-Purpose Sealant.
G. Tremco; Tremco Butyl Sealant.

2.10 LATEX INTERIOR JOINT SEALANTS: Comply with ASTM C 834, Type P, Grade NF. Available Products:

A. BASF Building Systems; Sonolac.
B. Bostik, Inc.; Chem-Calk 600.
C. Pecora Corporation; AC-20+.
D. Schnee-Morehead, Inc.; SM 8200.
E. Tremco Incorporated; Tremflex 834.

2.11 SANITARY SILICONE SEALANT: Comply with ASTM C 920 Type S (single-component) and Grade NS (nonsag), Class 25, white colored (unless otherwise indicated) mildew-resistant, acid-curing silicone sealant. Available Products include:

A. Dow Corning Corporation; 786 Mildew Resistant
B. GE Silicones; Sanitary SCS1700
C. Pecora Corporation; 898 Sanitary Silicone.
D. Tremco; Tremsil 200

2.12 FSE SANITARY SILICONE SEALANT: (Food-Service-Equipment / food preparation type sealant without mold-mildew resistance): Comply with ASTM C 920 Type S (single-component) and Grade NS (nonsag) Class 25, white colored (unless otherwise indicated) acid-curing. Products include:

A. Dow Corning Corporation; 999-A.
B. GE Silicones; Sanitary SCS1700.
C. Pecora Corporation; 860 Silicone
D. Tremco; Tremsil 200.

2.13 PREFORMED FOAM JOINT SEALANT: Preformed, pre-compressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent, factory produced in pre-compressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

A. ACCEPTABLE PRODUCTS: Subject to compliance with above requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. Dayton Superior Specialty Chemicals; Polytite Standard.
2. EMSEAL Joint Systems, Ltd.; Emseal 25V.
3. Sandell Manufacturing Co., Inc.; Polyseal.
4. Schul International, Inc.; Sealtite or Sealtite 50N, as appropriate.
5. Willseal USA, LLC; Willseal 150 or Willseal 250, as appropriate.

2.14 ACOUSTICAL JOINT SEALANT: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

A. ACCEPTABLE PRODUCTS: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. Pecora Corporation; AC-20 FTR OR AIS-919.
2. USG Corporation; SHEETROCK Acoustical Sealant.

2.15 JOINT-SEALANT BACKING

A. PROVIDE SEALANT BACKINGS of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
B. CYLINDRICAL SEALANT BACKINGS: ASTM C 1330, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
C. ELASTOMERIC TUBING SEALANT BACKINGS: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
D. BOND-BREAKER TAPE: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.16 MISCELLANEOUS MATERIALS

A. PRIMER: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
B. CLEANERS FOR NONPOROUS SURFACES: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants to joint substrates.
C. MASKING TAPE: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
D. WEEPS: Absorbent, UV-resistant synthetic fiber rope, 3/8 inch minimum diameter, in length required to produce an initial 2-inch exposure on the exterior face extending through sealant backing into the internal drainage plane.

PART 3 - EXECUTION

3.01 EXAMINE JOINTS indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SURFACE CLEANING OF JOINTS: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

A. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
B. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include concrete and masonry.
C. Remove laitance and form-release agents from concrete.
D. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include metal and glass.

3.03 JOINT PRIMING: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.04 MASKING TAPE: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.05 INSTALLATION OF JOINT SEALANTS

A. COMPLY WITH JOINT-SEALANT MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS for products and applications indicated, unless more stringent requirements apply.
B. SEALANT INSTALLATION STANDARD: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
C. INSTALL SEALANT BACKINGS of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
    1. Do not leave gaps between ends of sealant backings.
    2. Do not stretch, twist, puncture, or tear sealant backings.
    3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

3.06 INSTALL WEEPS IN SEALANT JOINTS above head and sill flashings, at spacing not to exceed twenty-four (24) inch centers. Install with weeps two (2) inches outside of sealant joint face, and extend through the sealant backing into the internal drainage plane. After sealant is cured, cut off weeps flush with face of sealant joint.

3.07 INSTALL BOND-BREAKER TAPE behind sealants where sealant backings are not used between sealants and backs of joints.

3.08 INSTALL SEALANTS using proven techniques that comply with the following and at the same time backings are installed:

A. Place sealants so they directly contact and fully wet joint substrates.
B. Completely fill recesses in each joint configuration.
C. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

3.09 INSTALLATION OF PREFORMED FOAM SEALANTS: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.10 ACOUSTICAL SEALANT INSTALLATION: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.11 TOOLING OF NONSAG SEALANTS: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

A. Remove excess sealant from surfaces adjacent to joints.
B. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
C. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
D. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
E. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.12 FIELD QUALITY CONTROL

A. FIELD-ADHESION TESTING: Field test joint-sealant adhesion to joint substrates as follows:
    1. Extent of Testing: Test completed and cured sealant joints as follows:
    2. Perform 10 tests for the first 1000 feet Insert dimension of joint length for each kind of sealant and joint substrate.
    3. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
    4. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
    5. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
    6. Inspect tested joints and report on the following:
    7. Whether sealants filled joint cavities and are free of voids.
    8. Whether sealant dimensions and configurations comply with specified requirements.
    9. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    10. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
    11. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. EVALUATION OF FIELD-ADHESION TEST RESULTS: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.13 CLEAN OFF EXCESS SEALANT OR SEALANT SMEARS adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.14 PROTECT JOINT SEALANTS during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants 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 joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.15 JOINT / SEALANTS SCHEDULE:

EXTERIOR PAVEMENT JOINTS: at perimeter of building at pavement (including sidewalks and curbs), and at pavement expansion Joints: ..... **Urethane**

TYPICAL EXTERIOR VERTICAL BUILDING JOINTS, at perimeters of doors, windows, storefront frames (both sides) exterior wall penetrations, exterior building joints including metal siding, metal wall panels, wood siding, masonry or stone as applicable, and at material control joints in masonry and EIFS system: ..... **Exterior Silicone**

EXTERIOR DOOR THRESHOLDS: ..... **Butyl Rubber**

ACOUSTICALLY (SOUND) RATED DRYWALL PARTITIONS, ON BOTH SIDES OF STUDS BETWEEN GYPSUM BOARD AND ADJACENT MATERIALS AT BOTH BASE AND TOP OF PARTITION, AND WHERE INDICATED ON THE DRAWINGS: ..... **Acoustic Sealant**

TYPICAL INTERIOR JOINTS including but not limited to drywall joints: ..... **Latex**

TILE JOINTS and joints between countertops and walls:..... **Sanitary Silicone**

PLUMBING FIXTURES to walls: ..... **Sanitary Silicone**

TYPICAL INTERIOR JOINTS IN KITCHEN / FOOD SERVICE AREAS:..... **FSE Sanitary-Silicone**

END OF SECTION 07 92 00

Division 08 – Openings

SECTION 08 11 00 – METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 PROVIDE metal door frames and hollow metal doors, where noted on the Drawings and as specified herein. The Work of this Section includes:

A. Steel Doors & Frames - exterior locations: insulated and galvanized, including transom panels, when indicated
B. Steel Doors & Frames - interior locations: nonrated, honeycomb core units typically except as otherwise indicated.
C. Fire rated, mineral core door units, when indicated in the Door Schedule.
D. Acoustically rated doors and frames, where indicated.
E. Glass and glazing associated with metal doors and frames.
F. Door louvers, when indicated, and
G. Shop priming and field finishing.

1.02 COMPLY WITH applicable requirements of the Steel Door Institute's ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as indicated herein.

1.03 SUBMIT PRODUCT DATA for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

1.04 SUBMIT DOOR SCHEDULE indicating doors and frames with the same reference numbers for details and openings as those on Contract Drawings. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.05 DELIVER DOORS AND FRAMES cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

1.06 INSPECT DOORS AND FRAMES on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.

1.07 STORE DOORS AND FRAMES at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

A. Amweld International, LLC.
B. Ceco Door Products; an Assa Abloy Group company.
C. Commercial Door & Hardware Inc.
D. Curries Company; an Assa Abloy Group company.
E. Custom Metal Products.
F. Deansteel.
G. Door Components, Inc.
H. Hollow Metal Xpress.
I. Karpen Steel Custom Doors & Frames.
J. MPI Group, LLC (The).
K. National Custom Hollow Metal.
L. North American Door Corp.
M. Project Name Doors and Frames.
N. Steelcraft; an Ingersoll-Rand company.
O. Steward Steel; Door Division
P. EZConcept (Trimless Spec)

2.02 FIRE-RATED ASSEMBLIES: Comply with NFPA 80 and provide units listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C. Provide smoke- and draft-control assemblies with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2.03 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569.
B. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366, commercial quality, or ASTM A 620, drawing quality, special killed.
C. Galvanized Steel Sheets: Zinc-coated carbon steel complying with ASTM A 526, commercial quality, or ASTM A 642, drawing quality, hot-dip galvanized according to ASTM A 525, with A 60 or G 60 coating designation, mill phosphatized.
D. Supports and Anchors: Fabricated from not less than 0.0478-inch- thick steel sheet; 0.0516-inch- thick galvanized steel where used with galvanized steel frames.
E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

2.04 DOORS

A. STANDARD STEEL DOORS: Provide 1-3/4-inch- thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:
B. INTERIOR DOORS: Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
    1. Level 2 and Physical Performance Level B (Heavy Duty) with 0.042-inch (18 GA) steel faces both sides, Model 2 (seamless seams).
C. EXTERIOR DOORS: Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
    1. Level 3 and Physical Performance Level A (Extra Heavy Duty) with 0.053-inch (16 GA) steel faces both sides, Model 2 (seamless seams), galvanized.

2.05 HARDWARE REINFORCEMENT: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:

A. Hinges: Minimum 0.123 inch thick (10 gage) by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
B. Pivots: Minimum 0.167 inch thick (7 gage) by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
C. Lock Face, flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch thick (14 gage).
D. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick (14 gage).

2.06 FRAMES

A. PROVIDE STEEL FRAMES for doors, transoms, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.
B. FABRICATE frames with mitered corners and continuously welded construction, and as follows:
    1. Interior frames for Level 2 interior doors: 0.042-inch (18 gage) thick steel sheet
    2. Exterior frames for Level 3 Exterior Doors: 0.053-inch (16 gage) thick galvanized steel sheet.
C. HARDWARE REINFORCEMENT: Fabricate reinforcement plates from same material as frames to comply with the following minimum sizes:
    1. Hinges: Minimum 0.123 inch (10 gage) thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
    2. Pivots: Minimum 0.167 inch (7 gage) thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
    3. Lock Face, flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch (14 gage) thick.
    4. All Other Surface-Mounted Hardware: Minimum 0.067 inch (14 gage) thick.
    5. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
D. JAMB ANCHORS:
    1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (18 gage) thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
    2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (18 gage) thick.
    3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
    4. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (18 gage) thick, and as follows:
    5. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
    6. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.07 DOOR SILENCERS: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

2.08 MORTAR GUARD ENCLOSURES: When electrified hinges, strikes or power transfers are indicated to be provided in the Division-08 Hardware Section, provide frames fabricated with minimum 0.016-inch- (24 gage) thick steel enclosures on the back side of the hardware preparation(s) so that mortar or other materials will not obstruct hardware operation and to close off interior of the openings.

2.09 FIXED FRAME MOLDINGS: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.

2.10 GENERAL FABRICATION: Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Where possible, fit and assemble units in manufacturer's plant. Shop prime all hollow metal doors and frames.

2.11 INTERNAL CONSTRUCTION: One of the following manufacturer's standard core materials according to SDI standards:

A. Rigid polystyrene conforming to ASTM C 578.
B. Rigid mineral fiber with internal sound deadener on inside of face sheets.

2.12 CLEARANCES: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch (6.4 mm) between non-fire-rated pairs of doors. Not more than 3/4 inch at bottom.

2.13 FABRICATE EXPOSED FACES of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel sheet.

2.14 TOLERANCES: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

2.15 FABRICATE CONCEALED STIFFENERS, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

2.16 EXPOSED FASTENERS: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

2.17 THERMAL-RATED (INSULATING) ASSEMBLIES: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies. Unless otherwise indicated, provide thermal-rated assemblies with U-value rating as follows:

A. 0.41 Btu/sq. ft. x h x deg F or better.

2.18 HARDWARE PREPARATION: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

2.19 LOCATE HARDWARE as indicated on Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2.20 PREFIT DOORS at factory with clearance of 1/8" at vertical edges and at top, 1/8" in 2" bevel at lock edge, bottom clearance : 3/8" without threshold, 3/4" with threshold.

2.21 SHOP FINISHING:

A. SURFACE PREPARATION: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).
B. PRETREATMENT: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.
C. AT GALVANIZED STEEL SHEET FINISHES, apply zinc-dust, zinc-oxide primer paint complying with performance requirements of FS TT-P-641, Type II for field painting.
D. FACTORY PRIMING FOR FIELD-PAINTED FINISH: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.01 INSTALL STEEL DOORS, FRAMES, AND ACCESSORIES according to Shop Drawings, manufacturer's data, and as specified.

3.02 PLACING FRAMES: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

A. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
B. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
C. At concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
D. In framed metal or wood partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
E. In in-place gypsum board partitions, install knock-down, slip-on, drywall frames.

3.03 DOOR INSTALLATION: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.

3.04 ADJUSTING AND CLEANING

A. PRIME COAT TOUCHUP: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
B. PROTECTION REMOVAL: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08 11 00

SECTION 08 31 00 – ACCESS DOORS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide access doors as specified herein, and as necessary for complete installation. Provide units for both wall access, and for ceiling access at the following locations, and at locations indicated on the Drawings:

A. Access to concealed spaces
B. Access to valves, controls, panels and other concealed items requiring maintenance.
C. Provide fire-rated units when located within fire-rated partitions

1.02 SUBMIT PRODUCT DATA for each type of door and frame indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.

1.03 QUALITY ASSURANCE – FIRE RATED UNITS: Provide door and frame assemblies complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

A. NFPA 252 or UL 10B for vertical access doors and frames.

PART 2 - PRODUCTS

2.01 BASIS OF DESIGN PRODUCT / MANUFACTURER:

A. WILLIAMS BROTHER COPRORATION OF AMERICA:

1. Non-Rated Walls: WB-DWAL 412 Series drywall finish, frameless, mud-in, touch latch access panel with detachable door.
2. Non-Rated Ceilings: WB GY 3000 Series Glass-Fiber-Reinforced Gypsum (GFRG) Ceiling Access Panel
3. Rated Walls: WB FR-RDW 860 Series Recessed Drywall Fire Rated Access Door for Walls
4. Rated Ceilings: WB FR-RDW 870 Series Recessed Drywall Fire Rated Access Door for Ceilings

B. Substitutions must be approved by Architect through submittal process.

2.02 AVAILABLE MANUFACTURERS: Subject to compliance with requirements and aestetics, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

A. Acudor Products, Inc.
B. Babcock-Davis; A Cierra Products Co.
C. Bar-Co, Inc. Div.; Alfab, Inc.
D. Cendrex, Inc.
E. Cesco Products.
F. Elmdor/Stoneman; Div. of Acorn Engineering
G. Jensen Industries.
H. J. L. Industries, Inc.
I. Karp Associates, Inc.
J. Larsen's Manufacturing Company.
K. MIFAB Manufacturing, Inc.
L. Milcor Limited Partnership.
M. Nystrom Building Products Co.
N. Precision Plumbing Products, Inc.
O. Williams Bros. Corporation of America (The).

2.03 MATERIALS

A. Non-Rated Wall Access Panels:

1. Door: Fully detachable, corrosion resistant, welded aluminum frame with or without inlayed 1/2" or 5/8" drywall
2. Frame & Trim: 1 5/8" wide with outer and inner frame assembly consisting of high grade aluminum bonded with a special welding process
3. Reveal: Reveal of 1/16” of an inch is visible between the outer frame and door hatch
4. Finish: Mill finish
5. Latches: Concealed snap locks (two per door) open the access panel when pressure is applied to the spring loaded latch side
6. Hinge: Open pin hinge top and bottom, 12” x 12” and up access panels are equipped with a safety-system to prevent accidental opening - must be reattached after each opening
7. Application: Walls

B. Non-Rated Ceiling Access Panels

1. Glass-Fiber-Reinforced Gypsum (GFRG) ceiling panel with lightweight, tapered edge design
2. Finish: Unpainted natural GFRG, paintable surface

C. Rated Wall Access Panels:

1. Recess: Door is fitted with 5/8" fire rated drywall pre-installed
2. Hinge: Concealed Hinge
3. Door 22 Gauge Steel
4. Fire Rating: Meets 1-1/2 hour (90 minute) fire rating UL 10 (b)
5. Latch: Self-latching bolt, operated by flush key
6. Finish: Satin coat steel

7. Frame: Preforated to accept finish once installed for concealed flanges

D. Rated Ceiling Access Panels

1. Recess: Door is fitted with 5/8" fire rated drywall pre-installed
2. Hinge: Concealed Hinge
3. Door 22 GaugeSteel
4. Fire Rating: Meets 1-1/2 hour (90 minute) fire rating in accordance to CAN ULC S101-14, ASTM E119-16 and NFPA 251
5. Latch: Self-latching bolt, operated by flush key
6. Finish: Satin coat steel
7. Frame: Preforated to accept finish once installed for concealed flanges

2.04 FABRICATION:

A. PROVIDE ACCESS DOOR ASSEMBLIES manufactured as integral units ready for installation. For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness. Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels.

2.05 TYPICAL SIZE

A. FOR WALL ACCESS: 36 x 36 inch minimum, unless otherwise indicated.
B. FOR SOFFIT / CEILING ACCESS: 24 x 24 inch minimum, unless otherwise indicated.
C. Smaller sizes may be used for limited access to valves, junctions, etc. that are within arms reach of access door.

2.06 FINISHES

A. APPLY SHOP PRIMER to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.
B. Sheetrock panel finished flush and painted to match adjacent surface.
C. GFRG panel finished flush and painted to match adjacent surface.

PART 3 - EXECUTION

3.01 PREPARATION: Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.02 INSTALLATION: Comply with manufacturer's written instructions for installing access doors and frames. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces. Install access doors with trimless frames flush with adjacent finish surfaces or recessed to receive finish material.

3.03 ADJUSTING AND CLEANING: Adjust doors and hardware after installation for proper operation. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 00

SECTION 08 40 00 – ENTRANCE, STOREFRONT & CURTAIN WALLS

PART 1 - GENERAL

1.01 PROVIDE ALUMINUM-FRAMED entrance doors, and fixed storefront and curtain wall framing with field-applied glazing, where indicated on the Drawings, as required herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.02 ACCESSIBLE ENTRANCES: Provide entrance doors in compliance with both the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).", and ICC/ANSI A117.1.

1.03 QUALITY ASSURANCE: Drawings are based on one manufacturer's standard aluminum entrance, storefront and curtain-wall system. Other systems of a similar and equivalent nature will be acceptable when differences do not materially detract from design concept or intended performances.

1.04 STRUCTURAL CAPACITY:

A. MINIMUM EXTERIOR WIND LOAD: Design system to provide structural capacity to withstand a minimum inward and outward uniform pressure loading as indicated on the Drawing or as otherwise required below – whichever value is greater:

1. For clear spans up to 19 feet high: 30 PSF: Reference Structural drawings for specific site condition requirements.
2. DEFLECTION LIMITS– NORMAL TO WALL PLANE: Limit to 1/240 of clear span for spans up to 13 feet 6 inches
3. DEFLECTION LIMITS OF FRAMING MEMBERS – PARALLEL TO GLAZING PLANE: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller

1.05 SYSTEM PERFORMANCE: Provide assemblies designed and fabricated to comply with the following, as demonstrated by testing corresponding manufacturer's standard systems:

A. THERMAL MOVEMENT: Allow for expansion and contraction resulting from ambient temperature range of 120 deg. F.
B. AIR & WATER LEAKAGES - FIXED FRAMING: Air infiltration of not more than 0.06 CFM per sq. ft. of fixed area per ASTM E 283 and no uncontrolled water penetration per ASTM E 331 at pressure differential of 6.24 PSF.
C. AIR & WATER LEAKAGES - ENTRANCES: Air infiltration per linear foot of perimeter crack of not more than 0.50 CFM for single doors and 1.0 CFM for pairs of doors per ASTM E 283 at pressure differential of 1.567.
D. ENERGY PERFORMANCE: Provide exterior framing systems with certified and labeled energy performance ratings in accordance with NFRC and as follows.

1. Thermal Transmittance (U-factor) of fixed glazing and framing areas: U-factor of not more than 0.45 Btu/SF x h x deg F as determined according to NFRC 100.
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas must have SHGC of no greater than 0.35 per NFRC 200.

1.06 SUBMITTALS

A. SUBMIT PRODUCT DATA to include manufacturer's specifications, standard details, and installation recommendations for components required, including test reports certifying compliance with performance requirements.
B. SUBMIT SHOP DRAWING for fabrication and installation, including elevations, detail sections of typical composite members, hardware mounting heights, anchorages, reinforcement, expansion provisions, and glazing.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: Subject to compliance with requirements herein, products of one of the following manufacturers are acceptable:

A. Basis of Design: Kawneer Company, Inc. (www.kawneer.com)
B. Arch Amarlite – Arch Aluminum and Glass Inc. (www.archamarlite.com)
C. EFCO Corporation (www.efcocorp.com)
D. Manko Window Systems Inc., www.mankowindows.com
E. Tubelite Architectural Systems (www.tubeliteinc.com)
F. YKK AP America Inc. (www.ykkap.com)

2.02 EXTERIOR INSULATED ALUMINUM ENTRANCE DOORS: Thermally broken and insulated stile and rail type door, two (2) inches thick, with ten (10) inch high minimum bottom rail for accessibility compliance, of minimum 1/8" thick tubular aluminum frame members mechanically fastened and with reinforced joints, for insulated glazing:

A. BASIS OF DESIGN: Kawneer Isopour 500T Wide Stile Thermal Entrance Door
B. HARDWARE: Heavy-duty units of sizes, number, and type recommended by manufacturer for service required, finished to match door, unless otherwise indicated:

1. Pivots: top and bottom offset units with intermediate at doors over 7 feet high
2. Seals: Manufacturer's standard weatherstripping seals with concealed fasteners on mounting strips, to include bottom rail sweep, compression seals against fixed stops, and at astragals between door pairs, with meeting stile weather stripping retained in adjustable strip mortised into door edges.

3. CLOSERS: manufacturer's standard heavy duty surface mounted parallel-arm type unit with cast-iron body and cylinder (aluminum cylinder not acceptable) with integral stop, to comply with local codes and national handicapped accessibility requirements, as applicable.
4. PULLS: 12 inch high min. x 1 inch diameter satin-stainless steel offset tubular pull
5. PUSH-BARS: 1 inch diam. satin-stainless steel tubular push bar x 3"LDW (except at exit devices)
6. EXIT DEVICES: Manufacturer's standard "push-bar" type rim or concealed rod exit devices with exterior cylinder in one leaf
7. THRESHOLD: 1/2" H x 5" wide "saddle" type with seal
8. FLOOR STOP: rubber cushioned cast bronze, 626 finish, 2-1/8" H x 2-3/8" long min.

2.03 STOREFRONT, DOOR & WINDOW FRAMING: Fabricated system from minimum 1/8 inch thickness ASTM B 221 aluminum extrusions and ASTM B 209 sheet, with integral "C" slot-type sections for glazing, and as follows:

A. Typical member size: 2 inch x 4-1/2 inch deep
B. Glazing location: front set, to match curtain wall glazing
C. Thermally broken members at exterior framing system only
D. BASIS OF DESIGN: Kawneer 451T: Clear Anodized

2.04 ACCESSORIES:

A. BRAKE-METAL ALUMINUM TRIM: Fabricate flat aluminum sheet in profiles indicated on Drawings or as required to provide closure at adjacent construction elements.
B. FASTENERS: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components. Exposed fasteners must match finish of members and hardware being fastened.
C. CONCEALED FLASHING: Dead-soft stainless steel, 26 gauge minimum, or extruded aluminum, 0.062" minimum, as selected by manufacturer for compatibility with other components.
D. BRACKETS AND REINFORCEMENTS: Manufacturer's high-strength aluminum units where feasible; or non-magnetic stainless steel or hot-dipped galvanized steel complying with ASTM A-386.

2.05 GLAZING SYSTEM: Provide manufacturer's standard compression type molded or extruded glazing gaskets that maintain uniform pressure and watertight seal, inside-outside matched, with provisions for glass replacement. Provide elastomeric type spacers and setting blocks.

2.06 FABRICATION: Complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation. Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish. Install reinforcing if required for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion. Maintain accurate relation of planes and angles, with hairline fit of contacting members. Conceal fasteners wherever possible.

2.07 TYPICAL ALUMINUM FINISH: CLASS I ANODIZED meeting AAMA 611-98 and AA-M12C22A41 (for clear) or AA-M12C22A44 (for colored) - 0.018 mm or thicker.

A. Color: Clear anodized or as otherwise indicated on the Drawings

PART 3 - EXECUTION

3.01 TAKE FIELD MEASUREMENTS prior to fabrication, to ensure proper fitting of Work.

3.02 EXAMINE AREAS with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 COMPLY with manufacturer's instructions and recommendations for installation of aluminum entrances and storefronts.

3.04 SET UNITS PLUMB, level, and true to line, without warp or rack of framing members, doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

3.05 DRILL AND TAP frames and doors and apply surface-mounted hardware items, complying with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

3.06 SET SILL MEMBERS in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets. Install glazing as required by Division-08 "Glazing" Section.

3.07 ADJUST OPERATING HARDWARE to function properly, without binding, and to prevent tight fit at contact points and weather-stripping.

3.08 CLEAN COMPLETED SYSTEM, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and joint sealants, dirt, and other substances from aluminum surfaces.

3.09 INSTITUTE PROTECTIVE MEASURES and precautions required to assure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at Substantial Completion.

END OF SECTION 08 40 00

SECTION 08 56 19 – PASS-THRU WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fully-Automatic pass, service and teller window units.
2. Self-Closing pass, service and teller window units.

B. Related Sections:

1. Section 04 20 00 - Unit Masonry
2. Section 06 10 00- Rough Carpentry
3. Section 07 62 00 - Sheet Metal Flashing And Trim
4. Section 07 92 00 -Joint Sealers
5. Section 08 40 00 – Entrance, Storefront & Curtain Walls
6. Electrical Drawings for Electrical requirements

1.02 REFERENCES

A. American Architectural Manufacturers Association:

1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

B. American Society Mechanical Engineers Standards:

1. ASME SA-240/SA-240M - Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

C. ASTM International:

1. ASTM A27/A27M - Standard Specification for Steel Castings, Carbon, for General Application.
2. ASTM A 36/A 36M. - Standard Specification for Carbon Structural Steel.
3. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
7. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
9. ASTM B221/B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
10. ASTM C1036 - Standard Specification for Flat Glass.
11. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
12. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
13. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
14. ASTM E488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
15. ASTM E699 - Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.
16. ASTM E2188 - Standard Test Method for Insulating Glass Unit Performance.
17. ASTM E2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
18. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
19. ASTM F588 - Standard Test Methods for Resistance of Window Assemblies to Forced Entry Excluding Glazing.
20. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

D. Consumer Products Safety Commission:

1. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing.

E. National Association of Architectural Metal Manufacturers.

1. NAAMM No. 3 Finish: Ground unidirectional uniform finish obtained with 80 - 100 grit abrasive.

F. SAE International:

1. AMS5511 - Steel, Corrosion-Resistant, Sheet, Strip, and Plate, 19Cr - 9.5Ni (304L), Solution Heat Treated.
2. AMS5513 - Steel, Corrosion-Resistant, Sheet, Strip, and Plate 19cr 9.2Ni (SAE 30304) Solution Heat Treated.

G. Steel Structures Painting Council:

1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

H. Underwriters Laboratory:

1. UL 73 - Motor-Operated Appliances.

2. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.
3. UL 752 - Ballistic Standards:
    a. Level I MPSA 9mm.
    b. Level III SPSA .44 Magnum.
4. UL 1995 - Heating and Cooling Equipment.

1.03 PERFORMANCE REQUIREMENTS

A. System Design: Design and size components to withstand dead loads and live loads caused by pressure and negative wind loads acting normal to plane of window as calculated in accordance with applicable code.
B. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, and migrating moisture occurring within system, to exterior by weep drainage network.
C. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with [inside] pane of glass and heel bead of glazing compound. [Position thermal insulation on exterior surface of air barrier and vapor retarder.]
D. Forced-Entry-Resistance Performance: Provide units identical to those tested for compliance with requirements indicated, and as follows:
    1. Tested for forced-entry resistance according to ASTM F588 by a testing agency acceptable to authorities having jurisdiction.
E. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
    1. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
F. Structural Design: Design glass and glazing in accordance with applicable code for most critical combination of wind, snow, seismic, and dead loads.
G. Electrical Requirements:
    1. Motor operated to comply with CAN/CSA C22.2 No. 68-92 and UL 73.
    2. Operators and systems for doors, gates, and window operators to comply with CAN/CSA C22.2 No. 247 and UL 325.

1.04 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
B. Shop Drawings:
    1. Indicate configuration, sizes, rough-in, mounting, construction and glazing details as well as installation clearances and finishes.
C. Product Data:
    1. Submit manufacturer's product data for specified Products indicating materials, operation characteristics, and finishes.
D. Samples:
    1. Submit two samples, 4 x 4 inches (100 x 100 mm) in size illustrating metal finishes for each finish specified.
E. Manufacturer's Installation Instructions:
    1. Submit installation instructions with requirements to accommodate specific site conditions.

1.05 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by UL or testing firm acceptable to authority having jurisdiction.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 10 years documented experience.
    1. Participates in a Quality Assurance validation Program.
        a. Facility Audit.
B. Installer: Company specializing in installation of window systems specified with minimum three years documented experience.
C. Testing Agency Qualifications:
    1. Qualified according to ASTM E699 and experienced in [ballistics-] [and] [forced-entry-] resistance testing.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Section 01 60 00 - Product Requirements {01600 - Product Requirements}: Requirements for transporting, handling, storing, and protecting products.
B. Ordering: To avoid construction delays comply with ordering instructions and lead time requirements as set by window system manufacturer.
C. Pack window units and accessories in manufacturer's standard shipping containers and protective packaging. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.
D. Store window units and accessories on raised blocks to prevent moisture damage protected from exposure to weather and vandalism.

1.08 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication and record on shop drawings.

1.09 COORDINATION

A. Section 01 30 00 - Administrative Requirements {01300 - Administrative Requirements}: Requirements for coordination.
B. Coordinate work with adjacent materials specified in other Sections and as indicated on Drawings and approved shop drawings.
C. Coordinate installation of anchorages for security windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in masonry. Deliver such items to Project site in time for installation.

1.10 WARRANTY

A. Furnish manufacturer's standard warranty document, executed by an authorized Quikserv Corp. officer in which manufacturer agrees to repair or replace windows, drawers and air curtains that fail in materials or workmanship within specified warranty period. This warranty is in addition to, and not a limitation of other rights Owner has under the contract.
    1. Warranty Period:
        a. One year parts and labor from date of installation.
    2. Failures include, but are not limited to, the following:
        a. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
        b. Structural failures including deflections exceeding 1/4 inch.
        c. Failure of welds.
        d. Excessive air leakage.
        e. Faulty operation of sliding window hardware.
        f. Faulty operation of transaction drawers.
        g. Faulty operation of air curtains.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum Extrusions: ASTM B221/B221M. Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength and not less than 0.125 inch (3.2 mm) thick at any location for main frame and sash members.
B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
C. Metallic-Coated Steel Sheet:
    1. ASTM A653/A653M, CS (Commercial Steel), Type B; with G90 (Z275)zinc (galvanized) coating designation.
    2. AMS5511, steel, corrosion-resistant, sheet, strip, and plate, 19Cr - 9.5Ni (304L), solution heat treated.
    3. AMS5513, steel, corrosion-resistant, sheet, strip, and plate 19cr 9.2Ni (SAE 30304) solution heat treated.
D. Stainless Steel Sheet, Strip, Plate, and Flat Bars:
    1. ASTM A666, austenitic stainless steel, Type 304, stretcher-leveled standard of flatness.
    2. ASME SA-240/SA-240M, chromium and chromium-nickel stainless steel plate, sheet, and strip for general applications.
E. Concealed Bolts: ASTM A307, Grade A unless otherwise indicated.
F. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.
G. Gaskets: For gaskets required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Gaskets shall remain permanently elastic, nonshrinking, and nonmigrating.

2.02 WINDOW COMPONENTS

A. Comply with requirements of UL listing for ballistics-resistance levels as specified.
B. Glass:
    1. Insulated Glass: 5/8 inch thick overall thickness.
C. Track/Slides: Stainless steel ball bearing slides all windows and drawers.
D. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers, and with a proven record of compatibility with surfaces contacted in installation:
    1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
    2. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.
    3. Spacers: Elastomeric blocks or continuous extrusions with a Type A Shore durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
    4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
E. Flashing.
F. Welding Materials.
G. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, of sufficient strength to withstand design pressure indicated.

2.03 FULLY-AUTOMATIC PASS, SERVICE AND TELLER WINDOW UNITS

A. Manufacturers: Quikserv Corp.
    1. Model SS-4035E (Single Horizontal Sliding Window Unit):
        a. Service Opening: 20-3/4 inches (w) x 29 inches (h).

b. Rough Opening: 48-3/8 inches (w) x 41-3/8 inches (h).
c. Operating Sensor: Thru-Beam Horizontal Eye Bar.
d. Glazing: 5/8 inch insulated
e. Finish: Clear
f. Hand: Left.

B. Substitutions: In accordance with Contract Documents.

2.04 SELF-CLOSING PASS, SERVICE AND TELLER WINDOW UNITS

A. Manufacturers: Quikserv Corp.

1. Model SC-4030 (Single Horizontal Sliding Window Unit):

a. Service Opening: 20-1/4 inches (w) x 29 inches (h).
b. Rough Opening: 48-3/8 (w) x 36-3/8 (h).
c. Glazing: 5/8 inch insulated
d. Finish: Clear
e. Hand: Right

B. Substitutions: In accordance with Contract Documents.

2.05 GLAZING

A. Float Glass Materials:

1. Annealed Glass: ASTM C1036, Type 1 transparent flat, Quality Q3, float glass.

a. Furnish annealed glass except where tempered glass is required to meet specified performance requirements.

2. Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind FT fully tempered, Condition A uncoated, float glass with horizontal tempering.

a. Fabricate tempered glass with roller-wave distortion parallel to bottom edge of glass as installed.
b. Furnish tempered glass conforming to CPSC 16 CFR 1201 Category II.

B. Insulating Glass:

1. Insulating Glass: ASTM E2190 certified by Insulating Glass Certification Council and Insulating Glass Manufacturers Alliance; with Low E coating on surface 2 and glass elastomer edge seal; purge interpane space with dry air; tested in accordance with ASTM E2188 for unit performance and ASTM E2189 for resistance to fogging.

a. Insulating Glass Unit Edge Seal Construction: Aluminum, bent and spot welded corners.
b. Double Pane Insulating Vision Glass (IG-DP):

(1) Total Unit Thickness: 5/8 inch.

2.06 SECURITY DEVICE ACCESSORIES

A. Hook-Lock: Maximum security Adams Rite style hook lock on all sliders.

2.07 ELECTRICAL REQUIREMENTS

A. Electrical Windows: 120V / 60 Hz, 20 amp branch circuit, single phase. Conforms to UL Standard 325 – Certified to CAN/CSA C22.2 NO. 247.

2.08 FABRICATION

A. Fabricate window to dimensions indicated on Drawings.
B. Fabricate windows, and accessories to provide a complete system for assembly of components and anchorage of window, and accessories.

1. Provide units that are reglazable from the secure side without dismantling the nonsecure side of framing.

C. Provide weep holes and internal water passages for exterior security windows to conduct infiltrating water to the exterior.
D. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.
E. Prepare components with reinforcement required for hardware.
F. Welding: To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
G. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
H. Preglazed Fabrication: Preglaze window units at factory, where required for applications indicated.
I. Weather Stripping: Factory applied.
J. Bottom Sills: Stainless steel construction, no bottom tracks and no pop rivets.
K. Handles: Stainless steel, manufacturer's standard profile and finish.

2.09 SHOP FINISHING

A. Aluminum Finishes:

1. Mill Finished Aluminum Surfaces: manufacturer's standard finish.
2. Clear Anodized Aluminum Surfaces: AA-M10C22A31 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class II 0.7 mils (0.018 mm) clear anodized coating.

a. Conform to AAMA 611

B. Concealed Steel Items: Galvanized in accordance with ASTM A123 to thickness Grade 85, 2.0 oz/sq ft.
C. Stainless Steel: 304 Stainless Steel with NAAMM No. 3 finish.
D. Apply bituminous paint to concealed metal surfaces in contact with cementitious or dissimilar materials.
E. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
F. Extent of Finish:
    1. Apply factory coating to all surfaces exposed at completed assemblies.
    2. Apply finish to surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
    3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
B. Verify construction is ready to receive Products specified in this section.
C. Verify rough openings are correct size and in correct location.
D. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.
E. Inspect built-in and cast-in anchor installations, before installing security windows, 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 anchor inspection reports.
F. For glazing materials whose orientation is critical for performance, verify installation orientation.
G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Furnish frames and anchors to other sections as required for installation in surrounding partition and casework construction.

3.03 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.
B. Align Products plumb, level and square.
C. Rigidly secure Products to adjacent supporting construction.
D. Seal perimeter joints in accordance with Section 07 92 00
E. Connect electrical components to power source.
F. Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.04 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for adjusting.
B. Adjust horizontal-sliding, transaction security windows to provide a tight fit at contact points for smooth operation and a secure enclosure.
C. Adjust transaction drawers to provide a tight fit at contact points for smooth operation and weathertight and secure enclosure.
D. Remove and replace defective work, including security windows that are warped, bowed, or otherwise unacceptable.

3.05 CLEANING AND PROTECTION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
B. Remove protective material from factory finished surfaces.
C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.
E. Clean metal and glass surfaces to polished condition.
    1. Lubricate sliding security window hardware.
    2. Lubricate transaction drawer hardware.
F. Provide temporary protection to ensure that security windows are without damage at time of Substantial Completion.

3.06 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain operable windows.

END OF SECTION

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

1.03 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:
    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.04 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
D. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
E. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
    1. Function of building, purpose of each area and degree of security required.
    2. Plans for existing and future key system expansion.
    3. Requirements for key control storage and software.
    4. Installation of permanent keys, cylinder cores and software.
    5. Address and requirements for delivery of keys.
F. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
    1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
    2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
    3. Review sequence of operation narratives for each unique access controlled opening.
    4. Review and finalize construction schedule and verify availability of materials.
    5. Review the required inspecting, testing, commissioning, and demonstration procedures
G. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.06 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.07 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
    1. Structural failures including excessive deflection, cracking, or breakage.
    2. Faulty operation of the hardware.
    3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
D. Special Warranty Periods:
1. Seven years for heavy duty cylindrical (bored) locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual overhead door closer bodies.

1.08 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.02 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
5. Manufacturers:
a. Bommer Industries (BO).
b. Hager Companies (HA).
c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
B. Pivots: ANSI/BHMA A156.4, Grade 1, certified. Space intermediate pivots equally not less than 25 inches on center apart or not more than 35 inches on center for doors over 121 inches high. Pivot hinges to have oil impregnated bronze bearing in the top pivot and a radial roller and thrust bearing in the bottom pivot with the bottom pivot designed to carry the full weight of the door. Pivots to be UL listed for windstorm where applicable.
1. Manufacturers:
a. Architectural Builders Hardware (AH).
b. Rixson Door Controls (RF).

2.03 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.

3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
5. Manufacturers:
    a. Burns Manufacturing (BU).
    b. Hiawatha, Inc. (HI).
    c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.04 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
    1. Threaded mortise cylinders with rings and cams to suit hardware application.
    2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
    3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
    4. Tubular deadlocks and other auxiliary locks.
    5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
    6. Keyway: Manufacturer's Standard.
D. Keying System: Each type of lock and cylinders to be factory keyed.
    1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
    2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
    3. New System: Key locks to a new key system as directed by the Owner.
E. Key Quantity: Provide the following minimum number of keys:
    1. Change Keys per Cylinder: Two (2)
    2. Master Keys (per Master Key Level/Group): Five (5).
    3. Construction Keys (where required): Ten (10).
F. Construction Keying: Provide construction master keyed cylinders.
G. Key Registration List (Bitting List):
    1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
    2. Provide transcript list in writing or electronic file as directed by the Owner.

2.05 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
    1. Manufacturers:
        a. Lund Equipment (LU).
        b. MMF Industries (MM).
        c. Telkee (TK).

2.06 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
    1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
    2. Locks are to be non-handed and fully field reversible.
    3. Manufacturers:
        a. Corbin Russwin Hardware (RU) - CL3300 Series.
        b. Sargent Manufacturing (SA) - 10 Line.
        c. Yale Commercial(YA) 5400LN Series.

2.07 STAND ALONE ACCESS CONTROL LOCKING DEVICES

A. Stand Alone Touchscreen Locksets: ANSI A156.2, Series 4000, Grade 1 locking mechanism complete with integrated touchscreen for access and programming. Voice-guided programming with 12-digit PIN code selection and up to 1000 user option. Locks to accept standard, small format interchangeable core, security and patented cylinders. Battery-operated, with low power indicator, or hard-wired (9 Volt external power supply) option.
    1. Manufacturers:
        a. Yale Commercial(YA) - nexTouch Series.

2.08 AUXILIARY LOCKS

A. Narrow Case Deadlocks and Deadlatches: ANSI/BHMA 156.13 Series 1000 Grade 1 certified narrow case deadlocks and deadlatches for swinging or sliding door applications. All functions shall be manufactured in a single sized case formed from 12 gauge minimum, corrosion resistant steel (option for fully stainless steel case and components). Provide minimum 2 7/8" throw laminated stainless steel bolt. Bottom rail deadlocks to have 3/8" diameter bolts.
   1. Manufacturers:
      a. Adams Rite Manufacturing (AD) - MS1850S / MS1950 Series.

2.09 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards: Comply with the following:
   1. Strikes for Mortise Locks and Latches: BHMA A156.13.
   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
   4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
   2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
   3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
   4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
   5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
      a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
      b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
   6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
   7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
   8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
   9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
   10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
   1. Manufacturers:
      a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
      b. Sargent Manufacturing (SA) - 80 Series.
      c. Yale (YA) - 7000 Series.

2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
   1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
   2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
   3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
   4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - DC6000 Series.
b. Norton Door Controls (NO) - 7500 Series.
c. Sargent Manufacturing (SA) - 351 Series.
d. Yale Commercial(YA) - 4400 Series.

C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - Unitrol Series.
b. Norton Door Controls (NO) - Unitrol Series.
c. Yale Commercial(YA) - Unitrol Series.

D. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - DC6000 Series.
b. Norton Door Controls (NO) - 8500 Series.
c. Sargent Manufacturing (SA) - 1431 Series.
d. Yale Commercial(YA) - 3500 Series.

2.12 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

a. Burns Manufacturing (BU).
b. Hiawatha, Inc. (HI).
c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.13 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
F. Manufacturers:

1. National Guard Products (NG).
2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
3. Reese Enterprises, Inc. (RE).

2.14 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.02 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
    1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
    1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
    2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
    3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
    4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.04 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures” and “Cash Allowances”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
    1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
    2. Submit documentation of incomplete items in the following formats:
        a. PDF electronic file.
        b. Electronic formatted file integrated with the Openings Studio™ door opening management software platform.

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.

3.06 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.
C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.07 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

PART 4 - Hardware Sets

Set: 1.0
Doors: 102

1	Pivot Set	147	626	RF
1	Intermediate Pivot	M19	626	RF
1	Rim Exit Device, Classroom	7200 AU506F 1109 x 6-Pin	630	YA
1	Drop Plate	7788	689	NO
1	Surface Closer	UNI7500 2018D	689	NO
1	Threshold	171A		PE
1	Set Weatherstrip	by Door Manufacturer		
1	Sweep	by Door Manufacturer		

Set: 2.0
Doors: 103

3	Hinge (heavy weight)	T4A3386/T4A4386 NRP 4-1/2" x 4-1/2"	US32D	MK
1	Entry Lock	AU 5407LN MK	626	YA
1	Surface Closer	PR7500	689	NO
1	Threshold	2005AT		PE
1	Gasketing	2891AS		PE
1	Rain Guard	346C		PE
1	Sweep	3452AV		PE
1	Latch Protector	320/321	US32D	RO

Set: 3.0
Doors: 108.1

1	Pivot Set	147	626	RF
1	Intermediate Pivot	M19	626	RF
1	Mortise Deadlock	MS1850S	628	AD
1	Cylinder thumbturn	4066	130	AD
1	Status Indicator	4089	130	AD
1	Mortise Cylinder	2153	630	YA
1	Push Bar & Pull	BF15847	US32D	RO
1	Surface Closer	PR7500	689	NO
1	Drop Plate	7788	689	NO
1	Blade Stop	6891	689	NO
1	Door Stop	441	US26D	RO
1	Threshold	171A		PE
1	Set Weatherstrip	by Door Manufacturer		
1	Sweep	3452AV		PE

Set: 4.0
Doors: 112.1, 112.2

3	Hinge, Full Mortise, Hvy Wt	T4A3386/T4A4386 NRP 5" x 4-1/2"	US32D	MK
1	Rim Exit Device, Nightlatch	7100 AU627F 1109 x 6-Pin	630	YA
1	Surface Closer	CLP7500R	689	NO
1	Threshold	2005AT		PE
1	Gasketing	2891AS		PE
1	Rain Guard	346C		PE
1	Sweep	3452AV		PE
1	Viewer	622	DCRM	RO

Set: 5.0
Doors: 106

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Entry Lock	AU 5407LN MK	626	YA
1	Door Stop	441	US26D	RO
3	Silencer	608		RO
1	Coat Hook	RM812	US26D	RO

Set: 6.0
Doors: 107, 109

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Lock	AU 5402LN	626	YA
1	Surface Closer	8501	689	NO
1	Wall Stop	409	US32D	RO
1	Gasketing	S773D		PE

Set: 7.0
Doors: 108.2

3	Hinge (heavy weight)	T4A3786/T4A4786 4-1/2" x 4-1/2"	US26D	MK
1	Access Control Cyl Lock, PUSHBUTTON	AU NTB610-NR MK	626	YA
1	Surface Closer	8501ST	689	NO
1	Gasketing	S773D		PE
1	Sweep	315CN		PE

Notes: ACCESS BY AUTHORIZED CODE OR MANUAL KEY. ALWAYS FREE EGRESS. FREE EGRESS TO HALL 108.

Set: 8.0
Doors: MISC

1	BITTING LIST	KEY RECORDS	
1	KEY BLANKS	BOX OF 50	
1	Key Cabinet	Sized per specification documents	LU
1	Knox Box	Knox Box (coordinate with local fire station for requirements and location)	

END OF SECTION 08 71 00

SECTION 08 80 00 – GLASS, GLAZING AND MIRRORS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide glass and glazing at windows, doors, sidelights, interior borrowed lites, storefronts and curtainwalls as indicated on the Drawings, as specified herein, and as needed to meet the requirements of the construction. This Section includes glazing sealants and accessories and applies to both field-applied glazing as well as factory-glazed units, as applicable.

A. Interior glass
B. Exterior glass
C. Mirrors

1.02 DEFINITIONS

A. GLASS MANUFACTURER: Firm that produces primary glass, fabricated glass, or both, as defined in referenced glazing publications.
B. GLASS THICKNESS: Indicated by thickness designations in millimeters per ASTM C 1036
C. INTERSPACE: Space between lites of an insulating glass unit.

1.03 COORINATION: Coordiate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tollerances.

1.04 SUBMITTALS:

A. SUBMIT PRODUCT DATA for each type of product.
B. SUBMIT SAMPLES for each type of glass product other than clear monolithic vision glass, including tinted, coated, or insulating glass units.
C. SUBMIT GLAZING SCHEDULE listing glass types and thicknesses for each size opening and location. Use same designations as indicated in the Drawings.
D. SUBMIT PRODUCT TEST REPORTS for tinted, coated, or insulating glass units for tests performed by a qualified testing agency.

1.05 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS FOR INSULATING GLASS WITH LOW-E SPUTTER-COATING: Utilize a qualified insulating-glass manufacturer who is approved by the coated-glass manufacturer.
B. INSTALLER QUALIFICATIONS: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for the Project and whose work has resulted in construction with a record of successful in-service performance over a three (3) year period.
C. DELIVERY, STORAGE, AND HANDLING: Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.
D. FIELD CONDITIONS
    1. ENVIRONMENTAL LIMITATIONS: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
    2. DO NOT INSTALL LIQUID GLAZING SEALANTS when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).
E. WARRANTIES:
    1. SPECIAL WARRANTY FOR COATED-GLASS: Manufacturer agrees to replace coated-glass units that deteriorate within the specified Warranty period. Deterioration is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indicates of deterioration in coating.
        a. WARRANTY PERIOD: Ten (10) years from date of Substantial Completion
    2. SPECIAL WARRANTY FOR LAMINATED GLASS: Manufacturer agrees to replace laminated-glass units that deteriorate within the specified warranty period. Deterioration is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standards.
        a. WARRANTY PERIOD: Ten (10) years from date of Substantial Completion
    3. SPECIAL WARRANTY FOR INSULATED GLASS: Manufacturer agrees to replace insulated glass units that deteriorate within the specified Warranty period. Deterioration is defined as failure of hermetic seal under normal use not attributed to glass breakage or to maintaining and cleaning insulated glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture or film on interior-surfaces of glass.
        a. WARRANTY PERIOD: Ten (10) years from date of Substantial Completion
    4. WARRANTY FOR DECORATIVE GLASS
        a. WARRANTY PERIOD: Ten (10) years from date of Substantial Completion

PART 2 - PRODUCTS

2.01 MANUFACTURERS / SOURCE LIMITATIONS: For each glass type and glazing accessory, obtain from a single manufacturer. Approved manufacturers of glass include the following:

A. AGC
B. Cardinal
C. Guardian
D. Vitro (formerly PPG)
E. Viracon

2.02 PERFORMANCE REQUIREMENTS

A. PROVIDE GLASS LITES for various size openings in thickness and strengths (heat treated or tempered) required to meet or exceed the following performance criteria. Glass thickness indicated either on the Drawings or within this Specification are minimum requirements and must be verified by analyzing Project loads and in-service conditions.

1. Minimum nominal glass lite thickness: 1/4 inch (6 mm)

2.03 GENERAL PERFORMANCE REQUIREMENTS: Installed glazing must withstand normal thermal movement, wind and impact loads (for operating sash and doors) without failure, including:

A. loss or glass breakage attributable to defective manufacturer, fabrication, or installation,
B. failure of sealants or gaskets to remain watertight and airtight,
C. deterioration of glazing materials, and
D. other defects in construction.

2.04 STRUCTURAL PERFORMANCE: Glazing must witstand the following design loads within limits and under conditions indicated per the IBC and per ASTM E 1300. Determine wind pressure per ASCE/SEI 7, based on heights above grade as indicated on the Drawings, and as follows:

A. Basic Wind Speed: Reference local code requirements shown on Structural drawings.
B. Importance Factor: 1.0
C. Exposure Category: “C” unless higher category is indicated on the Structural Drawings
D. Minimum uniform wind pressure loading: Reference local code requirements shown on Structural drawings..
E. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for units set vertically or not more than 15 degrees off vertical and under wind action, with 60 second load duration.
F. Snow loading (for sloped glazing): 30 PSF minimum or greater if indicated on the Structural Drawings, with a probability of breakage for glass surfaces sloped more than 15 degrees from vertical of not greater than 0.001.
G. Maximum Lateral Deflection: For glass supported on all four (4) edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or one (1) inch, whichever is less.

2.05 DIFFERENTIAL SHADING: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

2.06 THERMAL MOVEMENTS: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

A. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.07 WINDBORNE-DEBRIS-IMPACT RESISTANCE: Provide exterior glazing that passes basic-protection testing requirements in ASTM E 1996 for Wind Zone 1 when tested according to ASTM E 1886. Test specimens must be no smaller in width and length than glazing indicated for use on the Project and must be installed in same manner as glazing indicated for use on the Project.

A. Large-Missile Test: For glazing located within 30 feet of grade.
B. Small-Missile Test: For glazing located more than 30 feet above grade.

2.08 THERMAL AND OPTICAL PERFORMANCE PROPERTIES: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

A. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
B. For laminated-glass lites, properties are based on products of construction indicated.
C. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
D. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
E. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
F. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.09 SAFETY GLAZING: Where safety glass is indicated or otherwise required by the building code or AHJ representatives, provide products which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

A. PERMANENTLY MARK safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to AHJ representatives.

2.10 GLASS PRODUCTS

A. COMPLY WITH published recommendations of glass product manufacturers and organizations indicated below unless more stringent requirements are indicated. Refer to the following for glazing terms not otherwise defined in this Section or in referenced standards:

1. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

a. AAMA GDSG-1: “Glass Design for Sloped Glazing”

b. AAMA TIR A7: “Sloped Glazing Guidelines”

2. INSULATED GLASS MANUFACTURERS ASSOCIATION (IGMA):
   a. IGMA SIGMA TM-3000: “North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use
   b. IGMA TB-3001: “Guidelines for Sloped Glazing”
3. GLASS ASSOCIATION OF NORTH AMERICA (GANA):
   a. GANA "Glazing Manual"
   b. GANA "Laminated Glass Design Guide."

B. ANNEALED CLEAR FLOAT GLASS: ASTM C 1036, Type I, Class I (clear), Quality-Q3, unless otherwise indicated,

C. HEAT-STRENGTHENED FLOAT GLASS: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) or Class 2 (tinted) as indicated, Quality Q3. Fabricate by horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. TEMPERED GLASS: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) or Class 2 (tinted) as indicated, Quality-Q3. Fabricate by horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated. Provide tempered glass permanently marked with certification label of Safety Glazing Certification Council or another certification agency acceptable to AHJ representatives.

E. CERAMIC COATED SPANDREL GLASS: ASTM C 1048, Type I, Condition B, Quality-Q3.

F. SILICONE-COATED SPANDREL GLASS: ASTM C 1048, Type I, Condition C, Quality-Q3, with an elastomeric paint coating on the # 2 surface:.

1. Basis-of-Design: PPG Spandrel Glass with –Opaci-Coat 300 silicone.
2. Glass: Ultraclear float.
3. Silicone Coating Color: As selected by Architect from manufacturer's full range of available color options.

G. LAMINATED GLASS: ASTM C 1172, using materials with a proven record of no tendancy to bubble, discolor, or to lose physical or mechanical properties after fabrication and installation. Fabricate with polyvinyl butyral interlayer (unless otherwise indicated) to comply with interlayer manufacturer’s written instructions, with interlayer in material thickness not less than that needed to comply with requirements, and in clear color unless otherwise indicated. Fabricate laminated glass to produce glass free of foreign substances or air pockets. Laminate lites with polyvinyl butyral interlayer in an autoclave with both heat and pressure.

H. INSULATED-GLASS (IG) UNITS: Factory-assembled, hermetically sealed assembly consisting typically of two (2) each 1/4 inch thick (6 mm) glass sheets with a 1/2 inch thick desicant-filled tubular aluminum perimeter spacer bar frame all around, dual-edge sealed and bonded to both sheets of glass and the spacer bar with manufacturer’s standard polysulfide, silicone or hot-melt butyl elastomeric sealant (fabricators option):

1. COLOR OF SPACER BARS & SEALANT: Provide clear anodized spacer bar and clear sealant at adjacent clear anodized aluminum framing and provide black colored spacer bar with black sealant at all other colors of adjacent framing.
2. INTERMEDIATE SPACERS: Provide additional, intermediate spacers to align with surface applied, decorative vertical or horizontal mullions intended to be field-applied to the insulated glass unit.

2.11 INSULATING GLASS UNITS: Two (2) sheets of glass with a pyrolytic low-E coating on the # 2 surface, and with a 1/2" air-filled space with a desiccant-filled tubular aluminum spacer bar frame. Spacer bar to be milled aluminum for “light” colored frames; Black in color for “dark” frames. Provide dual edge seals bonded to both sheets of glass and spacer bar of polysulfide, silicone or hot-melt butyl elastomeric sealant (fabricators option) the hermetic seal. Provide the glass product /

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM *U*-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
Vertical fenestration																
***U*-factor**																
Fixed fenestration	0.50		0.50		0.46		0.38		0.38		0.36		0.29		0.29	
Operable fenestration	0.65		0.65		0.60		0.45		0.45		0.43		0.37		0.37	
Entrance doors	1.10		0.83		0.77		0.77		0.77		0.77		0.77		0.77	
SHGC																
Orientation[a]	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N
PF < 0.2	0.25	0.33	0.25	0.33	0.25	0.33	0.36	0.48	0.38	0.51	0.40	0.53	0.45	NR	0.45	N
0.2 ≤ PF < 0.5	0.30	0.37	0.30	0.37	0.30	0.37	0.43	0.53	0.46	0.56	0.48	0.58	NR	NR	NR	NR
PF ≥ 0.5	0.40	0.40	0.40	0.40	0.40	0.40	0.58	0.58	0.61	0.61	0.64	0.64	NR	NR	NR	NR
Skylights																
U-factor	0.75		0.65		0.55		0.50		0.50		0.50		0.50		0.50	
SHGC	0.35		0.35		0.35		0.40		0.40		0.40		NR		NR	

NR = No Requirement, PF = Projection Factor.

a. “N” indicates vertical fenestration oriented within 45 degrees of true north. “SEW” indicates orientations other than “N.” For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.

manufacturer as indicated on the Drawings, and with the minimum U-Value and Solar Heat Gain Coefficient (SHGC) performance characteristics as follows:

A. Basis-of-Design: PPG Solarban 90 (2) Clear + Clear unless otherwise indicated on the Drawings

2.12 INSULATED SPANDREL GLASS: Low-e pyrolytic coating on # 2 surface of silicone-coated, heat-strengthened or tempered outside lite, with an air- or argon-filled interspace, and with a heat-strengthened or tempered inside lite with an opaque colored coating on the # 4 surface, and as follows:

A. Winter Nighttime U-Factor: .29 maximum.
B. Summer Daytime U-Factor: .27 maximum.

2.13 OBSCURE FILM pressure sensitive vinyl (PSV) with Class A Fire classification, for a sandblasted, obscure transparency – suitable for either exterior or interior application:

A. OBSCURE FILM: “3M” “Fasara”– San Marino SH2MA MM (fully obscure) or approved equal

2.14 MIRROR GLASS & ACCESSORIES: 1/4 inch (6 mm) thick Quality q2 clear float glass with full silvered, copper and organic coating and finished with “pencil edge” on all sides. Secure to wall substrate with “Palmers” Mirror-Mastic or equal to wall backing and provide polished-finish aluminum “J” channel equal to CRL # D638P “FHA Type J-Channel” support at base of mirror typically.

2.15 GLAZING SEALANTS:

A. GENERAL: PROVIDE GLAZING SEALANTS that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

1. Sealants used inside the weatherproofing system, must have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Exposed Glazing Sealant Colors: As selected by Architect from manufacturer's full range.

B. GLAZING SEALANT: Elastomeric, neutral-curing silicone sealant complying with ASTM C 920, Type S (single component), Grade NS (nonsag), Class 25, Use NT (non-traffic); specially compounded and tested to show a minimum of 20 years resistance to deterioration in normal glazing applications. Provide at exterior glazing. Subject to compliance with requirements, approved products include the following:

1. Dow Corning Corporation; 790.
2. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
3. Pecora Corporation; 890.
4. Sika Corporation, Construction Products Division; SikaSil-C990.
5. Tremco Incorporated; Spectrem 1.

2.16 GLAZING TAPE: Preformed, back-bedding butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

A. AAMA 804.3 tape, where indicated.
B. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
C. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.17 MISCELLANEOUS GLAZING MATERIALS: Provide cleaners, primers and sealers, setting blocks, spacers and edge blocks of size and shape complying with referenced glazing standards, and with requirements of glass manufacturer for application indicated.

2.18 FABRICATION:

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.

PART 3 - EXECUTION

3.01 EXAMINE FRAMING, glazing channels, and stops, with Installer present, for compliance with the following:

A. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
B. Presence and functioning of weep systems.
C. Minimum required face and edge clearances.
D. Effective sealing between joints of glass-framing members.
E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. WATERTIGHT AND AIRTIGHT INSTALLATION of each glass product is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
B. COMPLY with FGMA "Glazing Manual" and manufacturer’s instructions and recommendations. Use manufacturer's recommended spacers, blocks, primers, sealers, gaskets and accessories.
C. PROVIDE FULLY TEMPERED “SAFETY” GLASS where indicated on the Drawings, in all door units, and within sixty (60) inches horizontally of a door in any position (open or closed), and when a glass lite is within eighteen (18) inches from the finished floor – even if not specifically indicated on the drawings.

D. CLEAN GLAZING CHANNEL and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
E. INSTALL glass with uniformity of pattern, draw, bow and roller marks. Install sealants to provide complete wetting and bond and to create a substantial wash away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
F. INSTALL INSULATING GLASS UNITS to comply with recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers
G. TAPE GLAZING: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped.
    1. Seal joints in tapes with compatible sealant approved by tape manufacturer.
    2. Do not remove release paper from tape until right before each glazing unit is installed.
    3. Apply heel bead of elastomeric sealant. 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.
    4. Start gasket applications at corners and work toward centers of openings.
    5. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.03 PROTECT EXTERIOR GLASS FROM BREAKAGE immediately upon installation, by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces. Cure sealants for high early strength and durability.

3.04 REMOVE and replace damaged glass and glazing. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion. Comply with glass product manufacturer's recommendations for final cleaning.

END OF SECTION 08 80 00

Division 09 – Finishes

SECTION 09 05 61 – MOISTURE VAPOR EMISSION CONTROL

PART 1 - GENERAL

1.01 PROVIDE an epoxy based vapor mitigation and alkaline resistant floor treatment under new floor finishes (except sealed concrete) when indicated to be installed over concrete substrates, as indicated herein.

1.02 QUALITY ASSURANCE:

A. VERIFY COMPATIBILITY of materials including surface sealers, if any, with indicated vapor mitigation floor treatment and with the finish flooring products, including adhesives.
B. INSTALLER must be trained, certified or otherwise specifically approved as an applicator by the product Manufacturer in writing.

1.03 PROJECT CONDITIONS: Do not install material below 50° F surface and air temperatures, and maintain during and for 48 hours after installation. Install per manufacturer's recommendations if substrate is warm.

1.04 SUBMITTALS:

A. Product Data

PART 2 - PRODUCT:

2.01 VAPOR MITIGATION FLOOR TREATMENT: Pourable, single-coat, 100% solids, high-quality two (2) component epoxy based coating specifically formulated to reduce moisture vapor transmission (MVT) to less than 3 pounds when applied to correct thickness of material, and primer ready within 5 to 6 hours of application at 73 degrees F.

A. Basis-of-Design: Custom Building Products "CMVC", - in 15 mils Dry Film Thickness (DFT)
B. Equivalent Products: Pending compliance with indicated characteristics of Basis-of-Design material, products manufactured by Ardex, Mapei, Laticrete, or USG are also acceptable.

PART 3 - EXECUTION

3.01 INSPECT existing conditions per ASTM F1869 or ASTM F2170. Concrete substrates must be sound, solid, clean, and free of oil, grease, dirt, curing compounds and any substance that might act as a bond breaker.

3.02 PREPARE AND CLEAN SUBSTRATES: Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair bond. If substrate surface is smoother than an ICRI CSP # 3 concrete surface profile, use shot blasting until acceptable surface profile is achieved. Acid etching and the use of sweeping compounds or solvents is not acceptable.

3.03 SUBSTRATE JOINTS: At expansion, isolation, and other moving joints, allow joint of same width to continue through floor treatment.

3.04 APPLY FLOOR TREATMENT to produce uniform, level surface, in accordance with Manufacturer's recommendations. Use chemical resistant gloves, such as nitrile, when handling material. Install at temperatures within +/¬ 10 degrees F of the operating temperature of the facilities in service (but not lower than 50 degrees F). Observe dew point requirements. Immediately after mixing, pour the entire contents of the mix on the floor and spread. Apply with a notch squeegee and back-roll with a lint free roller to obtain minimum DFT as required. Ensure that all voids and pinholes are filled/sealed before moving on to the next flooring area. "Shave-off" tops of any bubbles that protrude, and then apply a second tight coat over the surface void(s) in question to insure a continuous surface film. Note that in many instances, bubbles are reduced or not present at all if product is applied when temperatures are falling.

3.05 REMOVE AND REPLACE MATERIAL that evidence lack of bond with substrate. Take care to prevent the application from becoming soiled or punctured during and after application. Protect from foot traffic and dust or other contaminates until underlayment, protective layer or floor covering is applied.

3.06 DO NOT INSTALL FINISH FLOORING over floor treatment until after time period recommended by manufacturer.

END OF SECTION 09 05 61

SECTION 09 21 16 – GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 PROVIDE screw-type gypsum drywall with metal framing system(s), or wood as applicable, where indicated on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.02 PROVIDE SUPPLEMENTARY FRAMING, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

1.03 RELATED SECTIONS include the following:

A. Division-05 Section "Cold-Formed Metal Framing" for load-bearing steel framing, typically at exterior walls.
B. Division-06 Section "Rough Carpentry" for blocking installed within gypsum board assemblies.
C. Division-07 Section "Building Insulation" for insulation installed in gypsum board assemblies.

1.04 REFERENCED STANDARDS:

A. American Society of Testing Materials International (ASTM):

1. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
3. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
4. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard . .
5. ASTM C1396 - Standard Specification for Gypsum Board.
6. ASTM C1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels

B. Gypsum Association (GA): www.gypsum.org:

1. GA-201 - Gypsum Board for Walls and Ceilings.
2. GA-214 - Recommended Levels of Levels of Gypsum Board Finish.
3. GA-216 - Specifications for the Application and Finishing of Gypsum Board.
4. GA-226 - Application of Gypsum Board to Curved Surfaces.
5. GA-235 - Gypsum Board Typical Mechanical and Physical Properties.
6. GA-600 - Fire Resistance Design Manual.
7. GA-801 - Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors

C. Wall and Ceiling Bureau (WCB) - wallandceilingbureau.org: TB-52010 - Control Joints for Gypsum Board
D. UL Fire Resistance Directory (UL): Fire Resistance Volume 1 – with Hourly Ratings for Beams, Floors, Roofs, Columns, Walls and Partitions.
E. United States Gypsum's "Gypsum Construction Handbook."

1.05 DEFINITIONS - GYPSUM BOARD TERMINOLOGY: Refer to ASTM C 1396 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.06 SUBMIT PRODUCT DATA of each type of accessory product required, except for typical gypsum board panels, metal stud framing, and panel fasteners meeting requirements herein.

1.07 QUALITY ASSURANCE

A. FIRE-TEST-RESPONSE CHARACTERISTICS: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
B. FIRE-RESISTANCE-RATED ASSEMBLIES: Indicated by design designations from UL's "Fire Resistance Directory."
C. DELIVERY, STORAGE, AND HANDLING

1. DELIVER MATERIALS in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
2. STORE MATERIALS inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.
3. ENVIRONMENTAL LIMITATIONS: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

A. STEEL FRAMING & FURRING:

1. ClarkDietrich Building Systems.
2. Consolidated Fabricators Corp
3. Marino\Ware; Division of Ware Ind.
4. National Gypsum Company.
5. Scafco Corporation.
6. Telling Industries

B. GYPSUM BOARD AND RELATED PRODUCTS:

1. American Gypsum Co.
2. CertainTeed Corp
3. Georgia-Pacific Gypsum (GP - Basis-of-Design Manufacturer)
4. National Gypsum Company.
5. PABCO Gypsum
6. United States Gypsum Co.

2.02 NON-STRUCTURAL METAL FRAMING: Provide ASTM C 645 metal studs of 0.015 minimum base-steel thickness (25 gage) 50 KSI units or "Equivalent Gage (EQ) thickness units with third-party testing verifying compliance with ICC ES AC86, in 1-1/4 inch wide flanges and in 3-5/8 inch depth typical unless otherwise noted. Provide runners matching studs, of type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work. Provide studs in unit size as indicated on the Drawings, and in compliance with the Steel Stud Manufacturer's Association (SSMA)'s limiting heights table for L/360 deflection at 5 PSF load, as summarized below:

A. MAXIMUM STUD SYSTEM FRAMING HEIGHT PER UNIT SIZE, APPLICATION & SPACING:

1. For Non-composite Drywall Assemblies (w/ gyp. bd. short of wall top & w/ studs braced at 48" OC vertical max)

a.	3-5/8 inch x 25 gage studs at 12 inch centers:	12' – 6"
b.	3-5/8 inch x 25 gage studs at 16 inch centers:	11' – 4" (max allowable stud spacing)
c.	3-5/8 inch x 20 gage studs at 12 inch centers:	14' – 10"
d.	3-5/8 inch x 20 gage studs at 16 inch centers:	13' – 6" (max allowable stud spacing)

2. For Composite Drywall Assemblies (with gypsum board full-height each side to top of wall)

a.	3-5/8 inch x 25 gage studs at 12 inch centers:	14' - 7"
b.	3-5/8 inch x 25 gage studs at 16 inch centers:	13' – 3" (max allowable stud spacing)
c.	3-5/8 inch x 20 gage studs at 12 inch centers:	16' - 4"
d.	3-5/8 inch x 20 gage studs at 16 inch centers:	14' 10" (max allowable stud spacing)
e.	6 inch x 25 gage studs at 12 inch centers:	19' – 11"
f.	6 inch x 25 gage studs at 16 inch centers:	18' – 1" (max allowable stud spacing)
g.	6 inch x 20 gage studs at 12 inch centers:	23' – 8"
h.	6 inch x 20 gage studs at 16 inch centers:	21' – 6" (max allowable stud spacing)

B. BASIS-OF-DESIGN: "ProSTUD 25 EQ" as manufactured by ClarkDietrich

2.03 DRYWALL FURRING CHANNELS: 7/8 inch minimum deep ASTM C-645 hat-shaped rigid units of 0.0312 inch (20 gage) minimum commercial steel sheet with manufacturer's standard corrosion-resistant zinc coating. Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners and other accessories as needed for a complete stud system.

2.04 RESILIENT FURRING CHANNELS: 1/2-inch-deep x 2-5/8 inch wide 22 mil steel sheet members with extra-wide 1-1/2 inch screw flange, designed to reduce sound transmission, in asymmetrical configuration face attached to single flange by a slotted leg (web).

A. Basis-of-Design: ClarkDietrich RC Deluxe Single Leg Resilient Channel or equal

2.05 Z-FURRING CHANNELS: Rigid Z-shaped units of 0.018 inch (25 gage) minimum commercial steel sheet per ASTM C 645 with manufacturer's standard corrosion-resistant zinc coating, with 3/4 inch wide mounting leg, 1-1/4 inch wide flange for screw attachment of gypsum board, and in unit depth as indicated on the Drawings Provide manufacturer's standard clips, shoes, ties, fasteners and other accessories as needed for a complete furring system installation.

2.06 TOP-OF-WALL DEFLECTION TRACK: Provide at all interior non-load bearing partitions to prevent compression of stud framing or cracking of gypsum board resulting from deflection of the structure above. Provide ASTM C 645 steel-sheet top-runner units in base metal thickness of next thicker available metal thickness than metal thickness indicated for the partition's stud framing members. Track units must provide not less than 1 inch vertical movement of the structural framing system:

A. TYPICAL NON-FIRE RATED SLOTTED DEFLECTION TRACK: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. The Steel Network, Inc.; VertiTrack VTD Series.
2. Delta Star, Inc., Superior Metal Trim; Superior Flex Track System (SFT).
3. Metal-Lite, Inc.; Slotted Track.
4. ClarkDietrich MaxTrak Slotted Deflection Track

B. DEFLECTION TRACK WITH GYPSUM BOARD EXTENDING TO DECK and at fire-rated top-of-wall assemblies: Units manufactured to maintain continuity of fire-resistance-rated assemblies without crushing gypsum board. Products that may be incorporated into the Work include, but are not limited to, the following:

1. The Steel Network, Inc.; VertiClip SLD Series or VertiTrack VTD Series.
2. Fire Trak Corp.; ShadowLine
3. Metal-Lite, Inc.; The System.

2.07 SUSPENDED CEILING/SOFFIT FRAMING: Comply with ASTM C 754 for conditions indicated, using steel members noted above, and as follows:

A. EXPANSION ANCHOR HANGER ANCHORS TO CONCRETE: Post-installed expansion-anchor type units fabricated from corrosion-resistant materials with holes or loops for attaching hanger wires and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by a qualified independent testing agency.

B. POWDER-ACTUATED HANGER ANCHORS TO CONCRETE: Suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by a qualified independent testing agency.
C. SUSPENSION WIRE (typical between hangers or structural steel framing units above to CRC's noted below): ASTM A 641/A soft-tempered carbon steel wire with Class 1 galvanized zinc coating, pre-stretched, with yield-stress load of at least four (4) times load of suspended materials, but not less than 0.1620 inch-diameter (# 8 ASWG) wire minimum (for up to 210 lbs material load per wire) – space not more than four (4) feet centers to CRC's below.
D. SPLAY-WIRE BRACES: ASTM A 641/A soft-tempered carbon steel wire with Class 1 galvanized zinc coating, pre-stretched, not less than # 12 ASWG) wire minimum at not more than 45 degree angles from compression stud braces.
E. COMPRESSION STRUTS: Provide at exterior suspension framing typically and at interior seismic braces, when indicated. Assemble from minimum 3-5/8 inch x 0.0312 inch (20 gage) drywall stud minimum parallel with # 8 suspension wire, and with four (4) each spay wires anchored to structure above, to resist uplift wind or seismic pressures
F. COLD ROLLED CHANNELS (CRC's): 0.0538-inch bare steel thickness (16 gage), with minimum 1/2-inch- wide flange, 1-1/2 inch deep or greater if indicated, suspended from above at four (4) feet centers unless otherwise noted.
G. TIE WIRE: ASTM A 641/A (to connect CRC's to furring units), Class 1 zinc coating, soft temper, 0.0625-inch-diameter (# 16 ASWG) wire minimum, or double strand of 0.0475-inch- diameter (# 18 ASWG) wire minimum.
H. FURRING CHANNELS (hat-shaped typically) at 16 inch centers maximum, except where otherwise indicated, or where indicated to be resilient furring channels at acoustical ceiling assemblies.

2.08 ACOUSTICAL INSULATION: ASTM C 665, Type I sound attenuation blankets (without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag or rock wool.

A. Provide 3-1/2 inch thick units except as otherwise indicated on the Drawings.

2.09 GYPSUM WALLBOARD (GWB) MATERIALS:

A. TYPICAL GYPSUM BOARD: All gypsum board shall be Impact resistant, ASTM C1629/C1629M, 5/8'', ''Type X'' or "Type LWX" unless noted otherwise. Panels with tapered long edges, 4 feet wide x 5/8 inch thick typical except as otherwise indicated on the Drawings, in maximum length available which will minimize end joints.
   1. Provide 5/8 inch thickness at drywall ceilings, unless otherwise indicated on the Drawings.
   2. Curved walls should use Typical gypsum board specified here unless curve can not be achieved with satisfactory results.
B. FLEXIBLE GYPSUM BOARD: 1/4 inch thick gypsum board panels, specifically manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness:
   1. Basis-of-Design: "ToughRock FlexRoc" by GP, or equal
C. GLASS-MAT GYPSUM BOARD (GM-GWB – where indicated): ASTM C 1658 compliant inorganic gypsum board panels with embedded fiberglass mat laminated to both sides, mold resistant per ASTM D 3273 with score of 10 per ASTM D 3274:
   1. Basis-of-Design: "DensArmor Plus Panel" by GP, "Gold Bond eXP Interior Extreme" by National Gypsum, "Sheetrock Glass-Mat Mold Tough Firecode X" panels by USG, or equal
D. WATER RESISTANT GYPSUM BOARD: Provide high impact, water-resistant gypsum board at all areas subject to moist conditions that are NOT tiled.(restrooms and Hydro).
   1. Basis of Design: "Gold Bond Hi-Impact XP Gypsum Board" by National Gypsum or equal.
   2. Joint Treatment: Use only ASTM C 1047 plastic trims, set trims and mud joints with 2 inch wide 10x10 fiberglass mesh tape embedded with setting-type waterproof joint compound.
E. TILE-BACKER CEMENT BOARD (Provide behind all wall tile and up 12 inches minimum at tile or resinous floor base):
   1. ASTM C1325 compliant water and mold resistant cement board panels with a fiberglass reinforced core:
   2. Basis-of-Design: "PermaBase" by National Gypsum or equal
   3. Thickness: 5/8-inch
   4. Anchors: Type S-12 bugle head self-tapping, rust-resistant fine-thread panel anchors
   5. Joint Treatment: Use only ASTM C 1047 plastic trims, set with 2 inch wide 10x10 fiberglass mesh tape embedded with setting-type waterproof joint compound. At joints between surfaces, provide silicone joint sealer equal to "Dow Corning 795", "Pecora 895", "GE Silpruf" or "Tremco Dymonic" or equal.

2.10 TRIM ACCESSORIES:

A. PROVIDE MANUFACTURER'S STANDARD TRIM ACCESSORIES of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads. Stapling of trim accessories will not be permitted.
B. TEAR-AWAY EDGE TRIM: Where indicated, provide rigid plastic edge trim with a 5/16 inch high tear-off leg that acts as a guide and a protective mask for taping and mudding, consisting of dent-resistant PVC meeting ASTM D 3678, D 1784, C 1047 with a Class A flame-spread rating:
   1. Basis-of-Design Manufacturer: Trim-Tex, Inc., Lincolnwood IL, P: 800-874-2333, www.trim-tex.com
   2. TEAR-AWAY L-TRIM BEAD: Trim-Tex # 9110 with 5/8 inch leg
   3. TEAR-AWAY FLAT BEAD: Trim-Tex # 9000 Flat Tear Away Bead (no leg)

C. TYPICAL CONTROL JOINT TRIM: Manufacturer's standard trim unit with 1/8 inch or less exposed joint, or provide two (2) each standard L-type edge trim beads – butted 1/8 inch apart, in lieu of manufacturer's standard one-piece control joint beads.

D. EXTRUDED EDGE TRIM: Whenever a "reveal" profile" is indicated on the Drawings, at locations such as intersections of partitions, at base or top of walls, at door or window frames, and at other locations where indicated, provide trim members of extruded aluminum ally 6063 T5, with a chemical conversion finish coating, and as follows:

1. Finish Color: clear anodized except as otherwise indicated on the Drawings.
2. Approved Manufacturer: Fry Reglet Corporation, p: 800-237-9773, website: www.fryreglet.com, or approved equivalent manufacturer:
    a. L-TRIM: Series # DRML, in exposed flange width as indicated on Drawings or to coordinate with the construction indicated
    b. Z-REVEAL TRIM: Series # DRMZ in depth and width of reveal as indicated on the Drawings
    c. F-REVEAL TRIM: Series # DRMF in depth and width of reveal as indicated on the Drawings
    d. WALL BASE REVEAL TRIM: 4 inch high x 5/8 inch deep continuous trim - # DRMB-625-400 unless noted otherwise
    e. PARTITION END-CLOSURE TRIM (to terminate exposed drywall edge): # DMEC-4875 (4-7/8 inch wide) for typical interior drywall partitions with 3-5/8 inch wide metal studs, or # DMEC-7250 (7-1/4 inch wide) for drywall partitions with six (6) inch metal studs.
    f. CEILING EDGE TRIM: for in-plane transition between drywall and acoustical ceilings without a joint: DMPT-75

E. ALUMINUM REVEAL TRIM: Provide flat, 0.032 inch thick prefinished aluminum sheet metal trim mounted behind drywall edge trim, for reveal-joint of width and at locations indicated on the Drawings. Extend metal reveal trim behind gypsum board not less than 1 inch to be secured with drywall edge trim anchorage.

F. COLOR: As indicated on the Drawings, or if not indicated, as selected by Architect from sheet-metal Manufacturer's full range of both baked-on solid and satin-anodized finishes , including black and metalics.

2.11 JOINT TREATMENT: Comply with ASTM C 475, using multi-purpose grade, ready-mixed vinyl-type joint compound, with perforated-type paper joint tape typically.

A. At glass-mat faced gypsum board panels, use fiberglass mesh tape.
B. At water-resistant gypsum board, use fiberglass mesh tape embedded in a waterproof joint compound.

2.12 ACOUSTICAL JOINT SEALANT: ASTM C 834 compliant product with VOC content of 250 or less, that effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90. Subject to compliance with requirements, available products include: "BOSS 824 Acoustical Sound Sealant" by Accumetric LLC; "Acoustical Sealant GSC" by Grabber; "AC-20 FTR" by Pecora; "Smoke N Sound Acoustical Sealant by Specified Technologies Inc.; and "Sheetrock Acoustical Sealant" by USG.

2.13 GYPSUM BOARD FASTENERS: Steel Drill Screws meeting ASTM C 1002 unless otherwise indicated.

2.14 MISCELLANEOUS MATERIALS: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer gypsum boards.

PART 3 - EXECUTION

3.01 EXAMINE AREAS AND SUBSTRATES, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SUSPENDED DRYWALL CEILINGS:

A. Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
B. Furnish concrete inserts and other devises indicated to other trades for installation in advance of time needed for coordination and construction.
C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
D. INSTALLATION

1. PREPARATION FOR METAL SUPPORT SYSTEMS: Coordinate work with structural ceiling work to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling hangers. Furnish steel deck hanger clips and similar devices to other trades for installation well in advance of time needed for coordination with other work.
2. INSTALLATION OF WALL/PARTITION SUPPORT SYSTEMS: Install supplementary framing, blocking and bracing to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported on gypsum board alone.
3. ISOLATE STUD SYSTEM from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Install runner tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated. Terminate partition stud system at ceilings, except where indicated to be extended to structural support or substrate above.
4. SPACE STUDS 16" O.C., except as otherwise indicated. Provide runner tracks of same material thickness as jamb studs. Space jack studs same as partition studs.
5. DOUBLE STUDS AT DOOR OPENINGS, frame with 2 each 0.032 inch (20 gage) studs extending to or otherwise braced to lateral support above at both jambs, securely attached by screws either directly to door

frames or to jamb anchor clips on door frame. Install runner track sections (for jack studs) at head and secure to jamb studs.

6. DOUBLE STUDS AT WALL BACKING where secure attachment of wall mounted items is required to drywall partitions, including but not limited to wall-mounted cabinets, flat-screen monitor units, grab-bars, and wall-stops at doors. Provide back-to-back doubled 0.032 inch (20 gage) studs extending to or otherwise braced to lateral support above, and securely attached by screws together and to the wall backing material.
7. FRAME OPENINGS OTHER THAN DOOR OPENINGS in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
8. INSTALL SUPPLEMENTARY FRAMING, runners, furring, blocking and bracing at opening and terminations in the work, and at locations required to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board alone.

3.03 GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS:

A. INSTALL insulation where indicated, prior to gypsum board unless readily installed after board has been installed. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 1'-0" in alternate courses of board. Install ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'-0".
B. INSTALL WALL/PARTITION BOARDS vertically to avoid end-butt joints wherever possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.
C. INSTALL EXPOSED GYPSUM BOARD with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.
D. LOCATE either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board black-blocking is provided behind end joints. Position boards so that both tapered edge joints abut, and mill-cut or field-cut end joints abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
E. ATTACH gypsum board to framing and blocking as required for additional support at openings and cutouts. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are properly braced internally.
F. ISOLATE perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4" to ½" space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant. Do not fasten drywall directly to stud system runner tracks.
G. STC-RATED ASSEMBLIES: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
H. SPACE FASTENERS in gypsum boards in accordance with referenced standards and manufacturer's recommendations. On partitions/walls apply gypsum board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints. Fasten gypsum board supports with screws.
I. DIRECT-BONDING TO SUBSTRATE: Where necessary to install gypsum board adhered directly to a substrate (other than studs, joints, furring members or base layer of gypsum board), comply with gypsum board manufacturers recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.04 INSTALLATION OF DRYWALL TRIM ACCESSORIES: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing in accordance with manufacturer's instructions and recommendations. Install metal corner beads at external corners of drywall work.

A. INSTALL METAL EDGE TRIM whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound. Install L-type trim where work is tightly abutted to other work and install special kerf-type where other work is kerfed to receive long leg of L- type trim. Install U-type where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
B. INSTALL METAL CONTROL JOINTS above both sides of all door frames, and as otherwise required not to exceed a 30'-0" maximum uninterrupted surface.

3.05 INSTALLATION OF DRYWALL FINISHING: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fasteners heads, surface defects and elsewhere as required to prepare work for decoration. Prefill open joints and rounded or beveled edges, using type of compound recommended by manufacturer. Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated. Apply joint compound in three (3) coats (not including prefill of openings in base), and sand between last two (2) coats and after last coat. At water-resistant gypsum board base for ceramic tile, tape and finish joints with two (2) coats water-resistant joint material.

A. PARTIAL FINISHING: Omit third coat (if specified) and sanding on concealed drywall work which is indicated for drywall finishing or which requires finishing to achieve fire resistance rating, sound rating or to act as air or smoke barrier. Refer to sections on painting, coating and wall-coverings in Division 9 for decorative finishes to be applied to drywall work.
B. FINISH GYPSUM BOARD to levels indicated below, according to ASTM C 840, for locations indicated:
C. LEVEL 1 FINISH (typical at concealed areas): Embed tape at joints in ceiling plenum or other concealed areas
D. LEVEL 4: (TYPICAL EXPOSED GYPSUM-BOARD FINISH): Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

E. LEVEL 5 FINISH (where indicated). Embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories; and apply two (2) each thin, uniform skim coats of joint compound over entire surface. For skim coats, use joint compound specified for third coat, or a product specially formulated for this purpose and acceptable to gypsum board manufacturer. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects, tool marks, and ridges and ready for decoration.

3.06 PROTECTION OF WORK: Installer must advise Contractor of required procedures for protecting gypsum drywall work from damage and deterioration during remainder of construction period.

END OF SECTION 09 21 17

SECTION 09 24 00 – CEMENT PLASTERING (STUCCO)

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide exterior lath and plaster, where indicated on the Drawings, as specified herein, and as necessary for complete installation.

1.02 RELATED SECTIONS include the following:

A. Division-06 Section "Sheathing" for sheathing substrates
B. Division-07 Section "Joint Sealants" for sealing cement platering joint

1.03 REFERENCED STANDARDS: American Society For Testing And Materials (ASTM): latest published versions (unless otherwise indicated) as follows:

A. C144 - Aggregate For Masonry Mortar.
B. C150 - Portland Cement.
C. C206 - Finishing Hydrated Lime.
D. C207 - Hydrated Lime For Masonry Purposes.
E. C260 - Air Entraining Admixtures For Concrete.
F. C847 - Standard Specifications For Metal Lath.
G. C897 - Specification For Aggregate For Job Mixed Portland Cement-Based Plasters.
H. C926 - Application Of Portland Cement-Based Plaster.
I. C1063 - Lathing And Furring For Portland Cement And Portland Cement Lime Plastering, Exterior (Stucco) And Interior.

1.04 SUBMITTALS:

A. SUBMIT PRODUCT DATA consisting of manufacturer's product specifications and installation instructions for each product, including data showing compliance with the requirements. Include typical details of components, details of penetration and terminations, flashing details, joint configurations, and attachments to other work.
B. SUBMIT SHOP DRAWINGS indicating locations and installation details of control and expansion joints, including plans, elevations, sections, details of components, and attachment to other Work.
C. SAMPLES FOR VERIFICATION: Twenty-four (24) inch square panels on typical sheathing for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work - including an aesthetic reveal and a typical control joint filled with sealant of color selected.
D. LIST OF MOCKUP MATERIALS: List manufacturer's product/color names, finishes, and other information as required to identify materials used. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.
E. MAINTENANCE DATA: For plaster system to include in maintenance manuals.
F. SUBMIT REPORTS by the local, cement plaster manufacturer's representative of the pre-installation conference and installation "observation reports" at the following stages of Work progress for each portion of the Project:

1. At start of "lath installation"
2. At start of "plaster installation", and
3. At start of "finish coat installation"
4. At completion of Work

1.05 QUALITY ASSURANCE:

A. INSTALLER QUALIFICATIONS: An entity with a minimum of 5 years demonstrable experience in installation of cement plaster systems, capable of providing system manufacturer's certification of installation training. Installer's responsibilities include furnishing skilled technicians specifically trained and experienced with application of the cement plaster system.
B. SOURCE LIMITATIONS: Obtain cement plaster materials through one source from a single manufacturer or from sources approved in writing by the primary manufacturer as compatible with system components.

1.06 MOCKUP:

A. PROVIDE MATERIALS for construction of a field mockup of each different color and finish indicated, showing the full range of exposed textures, and dimensions to be expected in the completed construction.
B. SIZE: Provide mockup of not less than 100 square feet of surface area to demonstrate aesthetic effects and to set quality standards for materials and execution. Approved mockup may become part of the completed Work if undisturbed at time of Substantial Completion if acceptable to Architect.
C. BEFORE INSTALLING the Work of this Section, build mockup to verify selections made under sample Submittals and to demonstrate aesthetic effects. Refer to Division-01 Section "Project Materials Mockup" for requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. DELIVER MATERIALS in original packages, containers, or bundles bearing brand name and identification of manufacturer.
B. STORE MATERIALS inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes.

1.08 PROJECT CONDITIONS

A. COMPLY WITH ASTM C 926 requirements and recommendations of plaster manufacturer for environmental conditions before, during, and after application of plaster.

B. APPLY AND CURE using methods to prevent plaster from drying out during the curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred. Comply with manufacturer's written recommendations for environmental conditions for applying finishes.
C. COLD WEATHER PROTECTION: When ambient outdoor temperatures are below 40 deg F, maintain continuous uniform temperature of not less than 40 deg F nor more than 80 deg F for not less than 1 week prior to beginning plaster application, during its application, and until plaster is dry but for not less than one week after application is complete. Distribute heat evenly; prevent concentrated or uneven heat from contacting plaster near heat source. Adjust the application schedule as required by cool, or damp conditions as the normal curing time will be retarded.
D. PROTECT CONTIGUOUS WORK from soiling, spattering, moisture deterioration and other harmful effects that might result from plastering.

1.09 COORDINATION

A. CONDUCT A PRE-INSTALLATION CONFERENCE with the plaster manufacturer's local representative at the Project Site to review substrate requirements, field conditions, critical details of installation, overall project scheduling, and timing of subsequent manufacturer representative's site observations.
B. COORDINATE INSTALLATION OF PLASTER WITH RELATED WORK specified in other Sections to ensure that wall assemblies, including sheathing, flashing, trim, joint sealants, windows, and doors, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes.
C. COORDINATE INSTALLATION of air-barrier components with other trades to provide a continuous air-tight membrane.
D. COORDINATE INSTALLATION OF FLASHING and other moisture protection with other trades to achieve complete moisture protection so that water is directed to the exterior (not into the wall assembly) and drained to the exterior at sources of leaks, at all windows, doors and other penetrations through the wall assembly.

1.10 WARRANTEE:

A. MANUFACTURER'S WARRANTEE: Provide system manufacturer's warrantee to supply replacement materials for any materials shown to be defective when originally supplied, for the following term:
1. WARRANTY PERIOD: Seven (7) years from date of Substantial Completion

PART 2 - PRODUCTS

2.01 CEMENT PLASTER STUCCO: This specification is based on products as manufactured by:

A. Basis-of-Design: "StoPowerwall DrainScreen" by STO Corporation" (www.stocorp.com)
B. Subject to compliance with requirements, equivalent products of the following manufacturers are also acceptable:
1. Dryvit Systems, Inc. (www.dryvit.com)
2. Parex USA
3. Senergy Inc.; SKW-MBT Construction Chemicals

2.02 OTHER MANUFACTURERS may be proposed only as a substitution request as required in Division-1 Sections.

2.03 COMPATIBILITY: Provide substrates, water-/weather-resistive barriers, insulation board and adhesive, fasteners, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and approved for use by the primary system manufacturer.

2.04 COLORS, TEXTURES, AND PATTERNS OF FINISH COAT: As selected by Architect from manufacturer's full range. Provide the quantity of different colors and textures as indicated within the color/materials schedule in the Drawings, or if not indicated, provide up to three (3) different colors and three (3) different textures throughout project with no additional cost for "special colors" or "color matching".

2.05 DRAINAGE PLANE MEMBRANE: STO's "DrainScreen", textured membrane that creates an air gap to facilitate drainage and faster drying, or equivalent with equal or greater airspace.

2.06 SELF-FURRING PAPER-BACKED DIAMOND MESH LATH: Fabricate from ASTM A 653 - G60 zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C 847, Self-furring type, 2.5 lbs. per sq. yd. weight with integral asphalt-impregnated paper factory-bonded to back complying with FS UU-B-790, for Type I, Grade D (vapor permeable), Style 2.

2.07 LATH ATTACHMENT DEVICES of material and type required by referenced standards and recommended by lath manufacturer for secure attachment of lath to framing members and of lath to lath.

A. Wire: ASTM A 641, Class 1 zinc coated soft tempered, not less than 0.0475-inch diameter (# 18 SWG)

2.08 STEEL DRILL SCREW FASTENERS: For anchoring metal lath through sheathing to framing members, provide units per ASTM C 1002 or ASTM C 954 as required by thickness of metal being fastened; with pan heads suitable for application; in lengths required to achieve penetration through joined material of no fewer than three (3) exposed threads, and as follows:

2.09 AT WOOD FRAMING: Minimum 11 gage, 7/16 inch diameter head galvanized roofing nails with minimum 3/4-inch penetration into studs or minimum #8 Type S wafer head fully threaded corrosion resistant screws with minimum 3/4-inch penetration into studs.

2.10 AT STEEL FRAMING: Minimum #8 Type S or S-12 wafer head fully threaded corrosion resistant screws with minimum 3/8 inch penetration into studs

2.11 PLASTER ACCESSORIES: Fabricate from ASTM A 653 – G60 zinc-coated (galvanized) steel, and comply with material provisions of ASTM C 1063 coordinating depth of accessories with thickness and number of coats required, with thickness generally to be .125 inch less than thickness of plaster, to allow for thickness of the lath below accessories:

A. CORNERBEADS: Small nose units with expanded flanges of large-mesh diamond lath to allow full encasement by plaster.
B. CASING BEADS: Square-edged type units, with expanded flanges and removable protective tape
C. CONTROL JOINTS: One (1) piece type folded pair of unperforated screeds in M-shaped configuration, with perforated flanges and removable protective tape on plaster face of unit.
D. EXPANSION JOINTS: Two (2) piece type unit prefabricated with slip-joint and square-edged reveal adjustable from 1/4 to 5/8 inch wide, with perforated flanges.
E. EXTERNAL-CORNER REINFORCEMENT: fabricate from galvanized metal lath
F. FOUNDATION WEEP SCREED: Fabricate with integral drip edge

2.12 PORTLAND CEMENT PLASTER MATERIALS:

A. Plaster: Factory blended mix of acrylic-modified ASTM C 150 Type I or II Portland cement, and alkaline-resistant glass or polypropylene fibers of 1/2-inch length, intended for field addition of sand and water only:
B. Sand Natural sand aggregate for Base Coats: graded per ASTM C 897.
C. Water: Drinkable and free of all substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
D. Bonding agent: ASTM C 932 (per requirements of plaster manufacturer).

2.13 CONCRETE PRIMER: Manufacturer's standard factory-mixed elastomeric-polymer primer for preparing surface for application of finish coat – tinted to match color of finish coat:

A. “Dryvit Color Prime”
B. “Sto Primer” or equal

2.14 TEXTURED FINISH COAT: Manufacturer's elastomeric, textured finish requiring addition of water only at the project site, and including integral colorfast pigments, sound, graded stone aggregates, and fillers:

A. “Omega ArkoFlex Finish”, by Omega Products International, Inc.
B. “Sto-Powerflex” or equal

2.15 MIXING

A. COMPLY WITH MANUFACTURER'S REQUIREMENTS and with ASTM C 926 as applicable for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by manufacturer. Mix materials in clean containers. Use materials within time period specified by manufacturer or discard.
B. FOR NON-FACTORY BLENDED MIX, add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.
C. SINGLE BASE COAT MIX (for 2-coat plasterwork): Mix 1 part Portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
D. FACTORY-PREPARED FINISH-COAT MIXES: For acrylic-based finish coatings, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. EXAMINE SUBSTRATES, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of plaster work.
B. EXAMINE ROOF EDGES, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where plaster will be installed.
C. PROCEED WITH INSTALLATION only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. PROTECT CONTIGUOUS WORK from moisture deterioration and soiling caused by application of plaster. Provide temporary covering and other protection needed to prevent spattering on other work.
B. PROTECT PLASTER, SUBSTRATES, AND WALL CONSTRUCTION behind them from inclement weather during installation. Prevent penetration of moisture behind plaster and deterioration of substrates.

3.03 AT FIRE-RATED ASSEMBLIES, install components according to requirements for design designations from listing organization and publication as indicated on Drawings.

3.04 INSTALLATION OF EXPANDED METAL LATH:

A. INSTALL LATH with the long dimension at right angles to structural framing behind sheathing. Terminate lath at all expansion and control joints - do no install continuously beneath joints. Overlap side seams minimum 1/2 inch and end seams minimum 1 inch. Stagger end seams. Overlap casing beads and control joints a minimum 1 inch over narrow wing accessories – or a minimum 2 inches over expanded flange accessories.
B. ATTACH METAL LATH securely through sheathing into structural framing at 7 inches on center maximum vertically at each framing member supporting the substrate. Wire tie at no more than 9 inches on center at: side laps, accessory overlaps, and where end laps occur between supports.
C. AT PAPER BACKED LATH, lap lath over lath, do not lap paper over lath. For horizontal overlaps the paper backing must lap shingle style behind the lath to lath overlap.

3.05 INSTALLATION OF PLASTERING ACCESSORIES:

A. COMPLY WITH REFERENCED INSTALLATION STANDARDS for provision and location of plaster accessories of type indicated. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and alignment during plastering.
B. LOCATE PLASTER CONTROL JOINTS where indicated on the Drawings, and not to exceed the following:

C. To delineate panels of not more than 144 square feet (SF) for vertical surfaces, or 100 SF for horizontal and other non-vertical surfaces
    1. Distance between control joints not exceeding 18 feet in any direction (horizontal or vertical)
    2. Panel areas with length-to-width ratio of not greater than 2-1/2 : 1.
    3. Where control joints occur in surface of construction directly behind plaster.
    4. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
D. INSTALL CONTROL JOINTS after installation of lath, by cutting lath in a straight line with shears at the joint location (do not cut into or damage the substrate moisture barrier). Install control joints over lath at through wall penetrations, including above and below doors or windows (unless another type of joint is provided, including building expansion joints). Wire tie control joints to lath at no more than 7 inches on center. Verify that lath is discontinuous beneath joints.
E. INSIDE AND OUTSIDE CORNERS: Bend lath at inside corners and lap 24 inches minimum to adjacent plaster panel. Anchor through lath into framing at no more than 7 inches on center with appropriate fasteners. Install corner bead at outside corners over lath, attached at no more than 7 inches on center intro framing with appropriate fasteners.
F. AT CONCRETE OR CMU SUBSTRATES, install control joints to comply with control or expansion joints of substrate and as indicated above.
G. AT REVEALS provide butyl tape backup in accordance with manufacturer's recommendations. Run vertical joints continuous through "+" intersections. Seal all splices and intersections.

3.06 PLASTER APPLICATION:

A. PREPARE CONCRETE OR CMU SURFACES for bonded base coats and use bonding compound or agent to comply with requirements of referenced plaster application standards for conditioning of monolithic surfaces.
B. SEQUENCE PLASTER APPLICATION with the installation and protection of other work so that neither will be damaged by the installation of the other.
C. PORTLAND-CEMENT PLASTER APPLICATION STANDARD Apply Portland cement plaster materials, compositions, and mixes to comply with ASTM C 926.
D. APPLY PLASTER with sufficient pressure to key into and embed the metal lath. Apply sufficient material, to fully cover the metal lath, to a uniform thickness that matches the grounds of the accessories. Apply in multiple coats (scratch and brown) each 3/8 inch thick, scoring the initial scratch coat horizontally and allowing it to moisture cure 48 hours before application of the brown coat. Use a rod or straight edge to bring the finished surface to a true, even plane. Fill depressions in plane with cement plaster. After the plaster has become slightly firm, float the surface lightly with a darby or wood float to densify the surface and to provide a smooth, even surface.
    1. Total overall thickness of plaster required (including lath): 3/4 inch minimum (not including finish coat)
E. MOISTURE CURE PLASTER after it has set per requirements of ASTM C 926, including recommendations for time between coats and curing. Moisture cure by lightly fogging for 48 hours minimum – fogging as frequently as required to prevent loss of moisture from the plaster. Avoid eroding the plaster surface with excess moisture. If the relative humidity exceeds 75%, the frequency of moisture curing may be reduced.

3.07 INSTALL PRIMER evenly with brush, roller or proper spray equipment over the clean, dry stucco and foam trim, and allow to dry thoroughly before applying finish.

3.08 FINISH COAT: Apply over dry primer maintaining a wet edge at all times for uniform appearance, in thickness required by manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations. Apply sealer coat over dry finish coat, in number of coats and thickness required by EIFS manufacturer

3.09 INSTALL FINISH COAT directly over the primed plaster and foam trims when dry. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified, and as follows:

A. Avoid application in direct sunlight.
B. Apply finish in a continuous application, and work a wet edge towards the unfinished wall area.
C. Work to an architectural break in the wall before stopping to avoid cold joints.
D. Do not install separate batches of finish side-by-side.
E. Do not apply finish into or over joints or accessories.
F. Apply finish to outside face of wall only.
G. Do not apply finish over irregular or unprepared surfaces
H. Do not apply finish to surfaces not in compliance with the requirements of these specifications

3.10 AT SEALANT JOINTS, mask the base coat at the contact surfaces to receive the sealant. Align the masking so that when the sealant is applied after the finish coat is applied, the sealant will overlap the finish coat slightly. Apply the finish coat to the mask line.

3.11 INSTALLATION TOLLERANCES:

A. FLAT PLASTER SURFACES: Do not deviate more than 1/8 inch in 10'-0" from a true plane in finished plaster surfaces, as measured by a 10'-0" straightedge placed at any location on surface.
B. ACCESSORIES: Free of visible wave, straight within 1/16 inch in 1 foot and 1/8 inch in 10 feet of any plane through the axis of the accessory, when tested with a straightedge; horizontal accessories shall be installed level.
C. CURVED SURFACES: true to the radius indicated with no flat spots or waves; radii shall be uniform and not vary from indicated dimensions by more than 1/8" in 10 feet.
D. CORNERS AND EDGES: sharp with no build up of surface material; straight within 1/16 inch in 1 foot and 1/8 inch in 10 feet.

E. JOINTS BETWEEN ACCESSORIES: aligned to within 1/32 inch.

3.12 CUTTING AND PATCHING:

A. CUT, PATCH, POINT UP, AND REPAIR plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to the substrate has failed. Sand smooth-troweled finishes lightly to remove trowel marks and arrises.

3.13 CLEANING AND PROTECTION:

A. REMOVE TEMPORARY PROTECTION and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces that are not to be plastered. Repair floors, walls, and other surfaces that have been stained, marred, or otherwise damaged during the plastering work. When plastering work is completed, remove unused materials, containers, and equipment and clean floors of plaster debris.

B. PROTECT installed materials from water infiltration into or behind them. Protect installed materials from dust and debris. Provide protection from precipitation and freezing for at least 24 hours after initial set of plaster. Protect from precipitation into or behind the plaster during and after construction. Protect installed finish from dust, dirt, precipitation, freezing and continuous high humidity until fully dry.

C. MAINTAIN CONDITIONS in a manner suitable to Installer that ensure plaster work being without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 24 00

SECTION 09 30 00 – TILING

PART 1 - GENERAL

1.01 PROVIDE TILE WORK where indicated on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.02 SUBMITTALS

A. PRODUCT DATA: Submit manufacturer's technical information and installation instructions for materials required. Include certifications and other data to show compliance with these specifications.

B. SAMPLES FOR SELECTION: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

1.03 QUALITY ASSURANCE: Provide materials obtained from one source for each type and color of unit, grout, and setting materials. To include waterproof/crack isolation membrane and sealant.

A. DRY-LAID MOCKUPS: Lay out tiles in dry-laid mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Lay out mockup of each type of ceramic tile installation, utilizing products, materials, including installation accessories (spacers) and techniques, intended for completed Work.
2. Maintain dry-laid mockups in an undisturbed condition until equivalent areas of the completed Work are approved to serve as a quality standard for completed Work.

B. JOB CONDITIONS:

1. PRODUCT HANDLING: Deliver materials in original unopened containers with labels intact and legible at time of use. Store under conditions recommended by the manufacturer. Do not retain at the project site any material which has exceeded the shelf life recommended by its manufacturer.
2. MAINTAIN ENVIRONMENTAL CONDITIONS and protect work during and after installation in accordance with referenced standards and manufacturer's printed recommendations. Provide weatherproof, heated enclosure of the work area when temperatures are lower than that required for installation.
3. SEQUENCE OF FLOOR TILE INSTALLATION: Where integral tile-cove base is indicated, install tile work after installation of gypsum board, base cabinets, or other base substrate as applicable.

C. EXTRA MATERIALS

1. EXTRA STOCK: Upon completion of the work of this Section, deliver to the Owner an extra stock equal to 10 square feet of each color or pattern of material used.

PART 2 - PRODUCTS

2.01 TILE MATERIALS & GROUT COLORS: Refer to the Drawings for tile materials and grout colors.

A. TILE:

1. Refer to drawing finish schedule for all specified tile.
2. Approved Alternate: Roca “BG Red Pepper” 3x6 tile -U739-36

B. TILE TRIM UNITS:

1. Provide units matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide manufacturer's standard shapes, including but not limited to coved base units, wainscot caps, external corner units and other trim units as applicable.
2. Cove base is required at all tile wall to tile floor conditions.

C. TILE-EDGE TRIM AT CONCRETE FLOORING: Satin anodized aluminum trim in height required to match tile thickness and with minimum 0.75 inch transition leg. Provide typically at edge of tile abutting exposed concrete or resilient flooring.

1. Basis-of-Design: “Reno-V – AEVT/B” as manufactured by Schluter, or equal.

D. TILE TRANSITION TRIM - AT CONCRETE OR RESIL / RESINOUS FLOORING: Schluter “Reno-Ramp” series (brushed anodized aluminum), ADA compliant sloping “ramp” profile – in height required to match tile thickness. Provide typically where tile edge transitions to adjacent exposed concrete or thin-flooring finishes.

1. Basis-of-Design: “Reno-Ramp” as manufactured by Schluter, or equal.

2.02 MANDATORY MANUFACTURER of installation materials:

A. Andy’s has a Corporate agreement with MAPEI Corporation for ALL tile setting materials and grout. Contractor MUST use and install according to Mapei specifications to ensure the product warranty is valid.

B. MAPEI Architectural Representative: Connie Drees 785-521-5252

2.03 WATERPROOFING & CRACK-SUPPRESSION MEMBRANE (liquid applied): Waterproof membrane material complying with ANSI A118.10, to waterproof tile assembly as specified in ANSI A108.13.

A. Basis-of-Design: Mapelastic AquaDefense Exceeds ANSI A118.10 and A118.12 with reinforcing fabric as manufactured by MAPEI Corporation

2.04 TYPICAL THIN-SET MORTAR: ANSI A118.4 latex modified, Portland cement mortar consisting of prepackaged dry-mortar mix combined with acrylic resin liquid-latex additive. For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4:

A. Basis-of-Design: Keraflex Plus, by MAPEI Corp. Exceeds ANSI 118.4HTE and ANSI A118.11; ISO 13007: Classification C2TE , by MAPEI Corp.

2.05 STAIN-RESISTANT GROUT (for all surfaces): single component stain resistant premixed grout.

A. Basis-of-Design: “Flexcolor CQ” Design “Ready to Use” grout with color match coated Quartz aggregate. ANSI A118.3, ANSI A118.6 by MAPEI Corp. No sealer required.

1. Color: “Avalanche” or in one of the 40 standard colors as approved by the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION & INSPECTION: Examine areas and conditions under which the Work of this Section will be performed. Do not proceed if conditions exist that are detrimental to proper and timely completion. Commencement of this Work will be construed as acceptance of existing conditions or prior work by others, and assumption of responsibility for satisfactory installation.

A. Verify that substrates for setting tile are firm and dry, and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
B. Deflection of substrate: not to exceed 1/360th of the span (1/2 inch in 15 feet) in accordance with ANSI A108.01-2.3. Allow for live and impact load as well as dead load weight of tile and setting bed.
C. Verify that installation of electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
D. Verify that joints in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 COMPLY WITH MANUFACTURER'S instructions for mixing and installation of materials. Protect existing adjacent surfaces before beginning tile installation Work.

3.03 EXTEND tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

3.04 PREPARATION

A. REMOVE COATINGS, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
B. BLENDING: For tile exhibiting color variations within ranges selected during Sample submittals, 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.

3.05 TILE INSTALLATION

A. ANSI STANDARDS: Comply with applicable requirements of ANSI’s “Standard Specifications for the installation of Ceramic Tile” except as otherwise indicated.
B. INSTALLATION GUIDELINES: Tile Council of North America’s (“TCNA”) "2020 TCNA Handbook for Ceramic, Glass, and Stone Tile Installation." Comply with TCNA installation methods indicated in ceramic tile installation schedules.
C. TERMINATE WORK NEATLY at obstructions, edges, and corners without disrupting pattern or joint alignments.
D. ACCURATELY FORM intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
E. JOINTING PATTERN: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths as follows, unless otherwise indicated. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
F. CONTROL JOINTS: Provide a joint in tile where tile overlays a control joint in concrete slab, typ. Joint should be finished with color match sealant to match grout. Cut joint in a straight line directly over concrete control joint. Tile joint width should match tile spacing if on pattern, or width of tile saw blade.
G. WHERE STAGGERED (brick) joints are indicated for tile over 12” in size, provide joints at 33.3% of the tile, per TCNA. E.G. “1/3rd overlap”
H. INSTALL TYPES OF TILE designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCNA installation methods and ANSI setting-bed standards.
I. GROUT TILE TO COMPLY WITH requirements of ANSI A108.10.

3.06 CLEANING AND PROTECTING

A. CLEANING: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
B. REMOVE LATEX-PORTLAND CEMENT GROUT RESIDUE from tile as soon as possible.
C. 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 only cleaners recommended by tile and grout manufacturers and 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.
D. APPLY COAT OF NEUTRAL PROTECTIVE CLEANER to completed tile work, if recommended by tile manufacturer.

E. FINISHED TILE WORK: Leave finished installation clean and free of cracked, chipped, broken un-bonded, or otherwise defective tile work.
F. PROTECTION: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear. Prohibit foot and wheel traffic from using tiled floors for at least three (3) days after grouting is completed.
G. BEFORE FINAL INSPECTION remove protective coverings and rinse neutral cleaner from tile surfaces.

PART 4 - TILE INSTALLATION SCHEDULE

4.01 TYPICAL INTERIOR WALL TILE (limited-wet areas, including toilets):

A. Installation Standard: Comply with TCNA Method # W243 and as follows:
   1. Wall Tile grouted with typical polymer modified Portland cement grout, on
   2. Thin-set Portland cement mortar, over
   3. Water Resistant Gypsum Tile Backer Board on wood studs.

END OF SECTION 09 30 00

SECTION 09 51 00 – SUSPENDED ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide acoustical ceilings as shown on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.02 QUALITY ASSURANCE

A. INSTALLER: Firm with no less than three (3) years of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.

1.03 SUBMITTALS:

A. PRODUCT DATA: Manufacturer's product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications.
B. INCLUDE manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.
C. DELIVER MATERIALS in original unopened containers and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

1.04 JOB CONDITIONS:

A. SPACE ENCLOSURE: Do not install interior acoustical ceilings until space enclosed and weatherproof, and until wet-work in space is completed and nominally dry, and until work above ceilings is completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.
B. MAINTENANCE STOCK: At time of completing installation, deliver stock of maintenance material to Owner. Furnish full size units matching units installed, packaged with protective covering for storage, and identified with appropriate labels. Furnish amount equal to 2.0% of each type of the total acoustical panels installed.

PART 2 - PRODUCTS:

2.01 REFER TO DRAWINGS for ceiling panel materials and suspension grids, and as follows:

2.02 CEILING SUSPENSION MATERIALS: Comply with ASTM C 635, as applicable to type of suspension system required for type of ceiling units indicated. Coordinate with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, and partition system (if any).

2.03 ATTACHMENT DEVICES: Size for five (5) times design load indicated in ASTM C 635, Table 1, Direct Hung.

2.04 HANGER WIRES: Galvanized carbon steel, ASTM A 641, soft temper, pre-stretched, yield-stress load of at least three (3) times design load, but not less than 12 gage (0.106").

2.05 EDGE MOLDINGS: Manufacturer's recessed channel molding for edges and penetrations of ceiling, with single flange of molding exposed, baked enamel finish to match balance of grid.

2.06 EXPOSED SUSPENSION SYSTEM: Manufacturer's standard exposed runners, cross-runners and accessories, of types and profiles indicated, with exposed cross-runners coped to lay flush with main runners. Provide uniform factory-applied finish on exposed surfaces of ceiling suspension system, including moldings, trim, and accessories, in manufacturer's baked enamel finish, to match type of ceiling.

PART 3 - INSTALLATION:

3.01 MEASURE EACH CEILING AREA and establish layout of acoustical units to balance border widths at opposite edges of each ceiling, except as otherwise indicated on the Drawings. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

3.02 COMPLY with manufacturer's printed instructions, and with governing regulations, fire-resistance rating requirements and with industry standards applicable to the Work.

3.03 ARRANGE acoustical units and orient directionally-patterned units in the manner shown by reflected ceiling plans, with pattern running in one direction.

3.04 INSTALL SUSPENSION SYSTEM to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and space 4'-0"; along each carrying channel or direct-hung runner. 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.

3.05 INSTALL EDGE MOLDINGS at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units. Screw-attach moldings to substrate at levels not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" to 12'-0". Miter corners accurately and connect securely.

3.06 INSTALL ACOUSTICAL PANELS with undamaged edges throughout and fitted accurately into suspension system runners and edge moldings, with unfinished edges fully concealed by support of suspension members. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

3.07 AT CUT EDGES of reveal-edged panels exposed after installation, trim cut edges to match profile of un-cut edges, and paint exposed surfaces using coating recommended for this purpose by acoustical panel manufacturer.

3.08 INSTALL PANEL HOLD-DOWN CLIPS where indicated or as required for fire-resistance ratings, and in all vestibules with acoustical ceilings, and within a twenty (20) foot radius of any exterior door.

3.09 ADJUST AND CLEAN EXPOSED SURFACES of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00

SECTION 09 65 13 – RESILIENT BASE

PART 1 - GENERAL

1.01 PROVIDE resilient base, where noted on the drawings and as specified herein.

1.02 FIRE PERFORMANCE CHARACTERISTICS: Provide resilient flooring materials meeting the following requirements as tested by UL or other testing agency acceptable to AHJ representatives, in accordance with the following ASTM requirements:

1.03 CRITICAL RADIANT FLUX: 0.45 watts per square CM or more per ASTM E 648.

1.04 SMOKE DENSITY: less than 450 per ASTM E 662.

1.05 PRODUCT DATA SUBMITTAL: Submit sample, specifications, installation instructions, and general recommendations from the manufacturer.

PART 2 - PRODUCTS

2.01 RESILIENT BASE:

A. 4" high rubber meeting ASTM F-1861, Group 1 – Type TS (thermoset vulcanized rubber) with color uniform throughout the entire thickness of the material, flat, topset, type as required for compatibility with flooring material.

B. Base color to be selected by Architect from manufacturer's standard color range, as manufactured by one of the following manufacturers:

1. Basis of Design: MW-XX-N Millwork by Johnsonite
2. Burke Flooring Products Division,
3. Flexco Division., Textile Rubber Co.
4. Johnson Rubber Co., Inc.
5. R. C. Musson Rubber Co., Inc.
6. Roppe Rubber Corp.
7. Tarkett

2.02 ADHESIVES (Cements): Latex water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.

PART 3 - EXECUTION

3.01 EXAMINE AREAS where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF BASE: Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, (mitered outside corners from flat base will NOT be accepted), with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece.

3.03 INITIAL CLEANING: Immediately after completing tile installation remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by manufacturer.

END OF SECTION 09 65 13

SECTION 09 67 23 – RESINOUS FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes one resinous flooring system, one with urethane body.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required
B. Samples for Verification: For each resinous flooring system required, 8 inches square, applied to a rigid backing
C. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule
D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements and have performed appropriate trainings
E. Maintenance Data: For resinous flooring

1.04 QUALITY ASSURANCE

A. No request for substitution shall be considered that would change the generic type of floor system specified (i.e. urethane mortar-based system). Equivalent materials of other manufacturers may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section
B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is approved by the resinous flooring manufacturer
    1. Contractor shall have completed at least 20 projects of similar size and complexity
C. Source Limitations: Obtain primary resinous flooring materials through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials
D. Manufacturer Field Technical Service Representatives: Resinous flooring manufacturer shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project
E. Field Technical Services Representatives shall be employed by the system manufacturer to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer
F. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
G. Apply full-thickness mockups on 48-inch square floor area selected by Architect
    1. Include 48-inch length of integral cove base
H. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion
I. Sign off from Architect and Owner/Owners agent on texture for slip resistance must be complete before installation of flooring system
J. Pre-installation Conference:
    1. General contractor shall arrange a meeting not less than thirty days prior to starting work
    2. Attendance:
        a. General Contractor
        b. Architect/Owner's Representative
        c. Manufacturer/Installer's Representative

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components
B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects. Store material per product data sheet
C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application
B. Maintain material and substrate temperature between 60 and 85 deg F during resinous flooring application and for not less than 24 hours after application
C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period

D. Concrete substrate shall be properly cured. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout may be required prior to the resinous flooring

1.07 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation or provide a joint and several warranties signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation

PART 2 - PRODUCTS

2.01 RESINOUS FLOORING

A. Available Products: Subject to compliance with requirements, product that may be incorporated into the work include
   1. Unsealed or "self-sealing" urethane mortar systems, multiple layers of liquids and broadcasts will not be accepted and will result in disqualification from bid

B. REQUIRED Manufacturer
   1. Res-Tek, Inc.

C. Products: Subject to compliance with requirements:
   1. Res-Tek, Inc.; MAC-Guard Acrylic Flooring System

D. System Characteristics:
   1. Color and Pattern: Custom as described below.
   2. Wearing Surface: Medium or heavy texture
   3. Integral Cove Base: Matching sand cove base, 6" height
   4. Overall System Thickness: nominal 1/8" – 3/16".

E. System Components: Manufacturer's standard components that are compatible with each other and as follows:
   1. Mortar:
      a. Material design basis: MAC-Guard Acrylic Flooring System MAC-800 SL pigmented P5 Silver Gray with micro colored flake broadcast.
   2. Formulation Description: (4) four-component, 100% solids
   3. Application Method: Notched Squeegee
      a. Thickness of Coats: 1/8"
      b. Number of Coats: One
      c. Broadcast into wet mortar base
   4. Aggregate: Color Flake
      a. Custom Andy's Frozen Custard Flake CF#1=45%, CF#2=45%, CF#19=10%
   5. Topcoat
      a. Material design basis: MAC-Guard MAC-925
      b. Resin: 100% solid Acrylic
      c. Formulation Description: (2) two-component, 100% solids
      d. Type: Clear
      e. Finish: #60 white aluminum oxide broadcast into first topcoat @ 0.5 lbs per 100 square feet
      f. Number of Coats: Two

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
   1. Compressive Strength: 5,800 psi after 7 days per ASTM C579
   2. Tensile Strength: 3,200 psi per ASTM C307
   3. Modulus of Elasticity: 19,500 (lbf. / sq. in.)
   4. Water Absorption: < 0.1%
   5. Impact Resistance: No visible damage at minimum 160 in.-lb.
   6. Hardness: 75-80, Shore D per ASTM D2240
   7. Abrasion Resistance: 26 per ASTM D4060

2.02 ACCESSORY MATERIALS

A. Primer: Type recommended by manufacturer for substrate and body coats indicated. Formulation Description: PUR-Guard HD-P single component primer should be applied in cases were concrete off gassing occurs
B. Patching and Leveling: Use PUR-Guard HD-T kits to repair any damaged concrete, or to slope any areas as needed

PART 3 - EXECUTION

3.01 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean and dry substrate for resinous flooring application
B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring
C. Mechanically prepare substrates as follows:

1. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup
2. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent

D. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
E. Verify that concrete substrates are dry

1. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 99%
2. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 20 lb. of water/1000 sq. ft. of slab in 24 hours
3. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing

F. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions
G. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations

3.02 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated
B. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion
C. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes
D. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations

1. Apply joint sealant to comply with manufacturer's written recommendations

E. If necessary, apply PUR-Guard HD-P where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate
F. Integral Cove Base: Trowel a mortar by manufacture’s recommendations, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners
G. Integral Cove Base: 6 inches high
H. Mortar Body Coat: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate at manufacturer’s recommended height using specially designed trowel and or Screed box. Broadcast desired texture directly into mortar base. Field verify texture needed
I. Apply first topcoat in one pass as indicated for flooring system and at spreading rates recommended in writing by manufacturer. Broadcast specified aluminum oxide at specified size and rate evenly
J. Apply second topcoat in one pass as indicated for flooring system and at spreading rates recommended in writing by manufacturer

3.03 TERMINATIONS

A. Chase edges to “lock” the flooring system into the concrete substrate along lines of termination
B. Penetration Treatment: Lap and seal the flooring system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement
C. Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks
D. Treat floor drains by chasing the flooring system to lock in place at point of termination

3.04 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection
B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces
C. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered

3.05 FIELD QUALITY CONTROL

A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements
B. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor
C. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data
D. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements

3.06 CLEANING, PROTECTING, AND CURING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours
B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats
C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer

END OF SECTION 09 67 23

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.01 THE WORK INCLUDES surface preparation and painting or finishing of surfaces exposed to view, throughout the Project and in accordance with requirements herein. Paint or otherwise field-finish all exposed material surfaces throughout the project unless otherwise indicated to have no finish, or when materials are pre-finished or integrally-finished. Finish all exposed surfaces even if not specifically indicated on the Drawings.

A. Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas.
B. Finish closets, alcoves, aisles, hallway and recessed areas without a room number with the same finishes as in the adjoining rooms or spaces.
C. Paint finish structural elements including columns, beams, joists, braces and decking - including applied fire-protection materials when applicable – except when concealed by ceilings, soffits, chases or other finished construction elements.
D. Paint finish mechanical and plumbing components when exposed to view, including HVAC units, ductwork, devices piping and valves – except when located within a mechanical room.
E. Paint finish exposed electrical & control panel enclosures of mechanical or electrical equipment and exposed conduits when not located within electrical or mechanical rooms.
F. Paint finish exposed concrete housekeeping pads and equipment bases with sealer and min 2-coat semi-gloss enamel paint, unless otherwise indicated.
G. Paint finish exposed metal including doors and frames, metal trim & guards, handrails & railings, bollards, equipment supports and similar items.

1.02 PAINTING NOT REQUIRED: Unless otherwise indicated, painting is not required on plastic laminate, prefinished sheet metal, plumbing fixtures, electrical equipment (excluding exposed distribution cabinet(s) or electrical devices. Painting is not required on surfaces such as walls or ceilings in concealed or inaccessible areas. Metal surfaces of anodized aluminum, stainless steel, chromium plate and similar finished materials will not require finish painting, except as otherwise indicated in the finish hardware schedule. Do not paint over code-required labels or equipment identification labels.

1.03 SUBMITTALS

A. PRODUCT DATA: For each paint system specified. Include block fillers and primers associated with finish products.
B. MATERIAL LIST: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
C. MANUFACTURER'S INFORMATION: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
D. VOC CERTIFICATION: Certification by the manufacturer that products supplied comply with local regulations and LEED requirements controlling use of volatile organic compounds (VOCs).
E. SAMPLES FOR INITIAL SELECTION: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated. After color selection, the Architect will approve contractor provided color chips for surfaces to be coated.
F. SAMPLES FOR VERIFICATION: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
    1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
    2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
    3. Submit Samples on the following substrates for the Architect's review of color and texture only:
    4. Ferrous Metal: Provide two 4-inch- square samples of flat metal and two 8-inch- long samples of solid metal for each color and finish.
G. LIST OF MOCKUP MATERIALS: List manufacturer’s product/color names, finishes, and other information as required to identify materials used. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.
H. QUALIFICATION DATA: For firms and persons specified in the "Quality Assurance" Article 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.

1.04 QUALITY ASSURANCE

A. PRODUCT STANDARDS: Comply with Master Painters Institute (MPI) standards indicated and provide products as listed in "MPI Approved Products List" available at www.paintinfo.com. Provide best quality grade of various types of coatings indicated as regularly manufactured by listed paint materials manufacturers. Materials not displaying manufacturers identification as a standard, best-grade product will not be acceptable.
    1. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
B. SOURCE LIMITATIONS: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. FINAL APPROVAL of colors will be from job-applied samples.
D. MOCKUP: Provide materials for construction of a field mockup of each different color and finish indicated. Before execution of the Work of this Section, finish the mockup to verify selections made under sample submittals and to demonstrate aesthetic effects. Refer to Division-01 Section Quality Requirements for general requirements of Mockup.
E. PROVIDE PRIMERS and undercoat paints produced by the same manufacturer as the finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.
F. PREPARE surfaces and apply coatings in strict accordance with the coating manufacturer's recommendations.
G. USE ONLY SKILLED painters for mixing and applying paint. Quality workmanship is required. In the acceptance or rejection of finish painting, no allowance will be made for the painters' lack of skill or in adequate lighting during painting operations.
H. DELIVER MATERIALS to job site in original, new and unopened packages and containers bearing manufacturer's name and label. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue. Keep storage area neat and orderly. Remove rags and water daily. Take all precautions to ensure that workmen and Work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.
I. JOB CONDITIONS: Apply paints only when temperature of surfaces to be painted and surrounding air temperatures are within recommended range permitted by the paint manufacturer's printed instructions. Do not apply paint when relative humidity exceeds 85%, or to damp or wet surfaces.
J. FURNISH EXTRA PAINT MATERIALS from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.
K. QUANTITY: Furnish the Owner with an additional 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.01 PAINT TYPES: Refer to Paint Schedule at end of this Section for material specifications per applications involved and refer to Drawings for paint colors to be provided.

2.02 MATERIAL COMPATIBILITY: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.03 MATERIAL QUALITY: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturers identification as a standard, best-grade product will not be acceptable.

PART 3 - EXECUTION

3.01 EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

3.02 DO NOT BEGIN TO APPLY PAINT until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

3.03 COORDINATION OF WORK: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

3.04 NOTIFY THE ARCHITECT about anticipated problems using the materials specified over substrates primed by others.

3.05 PREPARATION

A. SURFACE PREPARATION: Clean surfaces of dirt, rust, scale, grease, moisture, or other conditions otherwise detrimental to formation of a durable paint film. Perform preparation and cleaning procedures in accordance with paint manufacturer's printed instructions for each particular substrate condition.
B. REMOVE hardware, accessories, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
C. PROVIDE BARRIER COATS over incompatible primers or remove and reprime.
D. CLEAN WOOD SURFACES of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
E. PRIME, STAIN, OR SEAL WOOD to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling. When transparent finish is required, backprime with spar varnish. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery or after installation, if unit is cut in the field.
F. FERROUS METALS: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
    1. Blast steel surfaces clean as recommended by paint manufacturer and according to requirements of SSPC-SP 10.

2. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
3. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

G. GALVANIZED SURFACES: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

H. TOUCH UP SHOP-APPLIED PRIME COATS that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.

3.06 MATERIALS PREPARATION:

A. CAREFULLY MIX AND PREPARE PAINT MATERIALS in accordance with manufacturer's directions. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using. Use only thinners approved by the paint manufacturer, and only within recommended limits.

B. TINTING: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.07 APPLICATION:

A. APPLY PAINT according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied. Paint colors, surface treatments, and finishes are indicated in the drawings.

B. DO NOT PAINT OVER dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

C. PROVIDE FINISH COATS that are compatible with primers used.

D. THE TERM "EXPOSED SURFACES" INCLUDES areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

E. PAINT SURFACES BEHIND MOVABLE EQUIPMENT and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

F. PAINT INTERIOR SURFACES of ducts with a flat, nonspecular black paint where visible through registers or grilles.

G. PAINT BACK SIDES OF ACCESS PANELS and removable or hinged covers to match exposed surfaces.

1. FINISH EXTERIOR DOORS on tops, bottoms, and side edges the same as exterior faces.
2. FINISH INTERIOR OF WALL AND BASE CABINETS and similar field-finished casework to match exterior.
3. SAND LIGHTLY between each succeeding enamel or varnish coat.
4. PROVIDE PAINTING at all exterior exposed unsightly pipes, conduits panels, as specified by Owner or Architect.

3.08 SCHEDULING PAINTING: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

3.09 THE NUMBER OF COATS AND THE FILM THICKNESS required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

3.10 OMIT PRIMER ON METAL SURFACES that have been shop primed and touchup painted.

3.11 IF UNDERCOATS, STAINS, OR OTHER CONDITIONS SHOW THROUGH final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

3.12 ALLOW SUFFICIENT TIME BETWEEN SUCCESSIVE COATS to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

3.13 APPLICATION PROCEDURES: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

A. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.

B. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

C. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

3.14 MINIMUM COATING THICKNESS: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

3.15 MECHANICAL AND ELECTRICAL WORK: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces. Refer to Sections 15 and 16.

3.16 BLOCK FILLERS: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

3.17 PRIME COATS: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others.

3.18 RECOAT PRIMED AND SEALED SURFACES where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

3.19 PIGMENTED (OPAQUE) FINISHES: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

3.20 APPLY STAINS in accordance with the stain and substrate manufacturer's recommendations (when applicable) to ensure proper penetration of the stain, and to produce an even, consistent, color that enhances the natural characteristics of the substrate material. Apply with spray and brush applicators using means and techniques best suited for the substrate and the type of stain being applied. Provide a consistent application of stain without color irregularities, brush marks, or other surface irregularities not inherent with the substrate material. Stain edges and ends of boards, and brush out excess stain that collects in surface textures or joints, as applicable. Do not apply stain on surfaces that are not sufficiently dry, or that are in direct sunlight.

3.21 TRANSPARENT (CLEAR) FINISHES: Use multiple coats to produce a glass-smooth surface film of even luster. Lightly sand the surface between each successive coat. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections. Typically, provide satin finish for final coats, unless noted otherwise.

3.22 COMPLETED WORK: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.23 FIELD QUALITY CONTROL: The Owner reserves the right to engage the services of an independent testing laboratory to sample the paint material being used. Samples of material delivered to the project may be taken, identified, sealed, and certified in the presence of the Contractor. The testing laboratory will perform appropriate tests as required by the Owner. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are noncompatible.

3.24 CLEAN-UP: During the progress of the Work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day. Upon completion of painting Work, clean window glass and other paint-spattered surfaces. Remove spattered paint or otherwise damage finish surfaces. Touchup and restore all damaged or defaced painted surfaces after completion of Work of other trades.

3.25 PROTECT work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Owner. Provide "wet paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

PART 4 - PAINT MATERIALS SCHEDULE:

4.01 RE: www.paintinfo.com for MPI's "Approved Product List" – except as indicated below

4.02 EXTERIOR FINISHES:

A. EXTERIOR NATURAL-FINISHED WOOD (AND DECKING): SEMI-TRANSPARENT OIL/ALKYD STAIN FINISH:

1. One (1) Coat of "Cetol SRD" Semi-Transparent Stain by Sikkens,
2. Two (2) Finish Coats: "Penofin Verde (low VOC), Natural by Sikkens

B. EXTERIOR PAINTED DRYWALL SOFFITS: FLAT ACRYLIC LATEX:

1. Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
2. 2 Finish Coats: MPI # 10 - Latex, Exterior flat (MPI Gloss Level 1-2)

C. EXTERIOR WOOD TRIM: EGGSHELL/SATIN ENAMEL:

1. Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
2. Finish Coat: MPI # 15 - Latex, Exterior, Low Sheen (MPI Gloss Level 3-4)

D. EXTERIOR WOOD TRIM: SEMI-GLOSS LATEX FINISH

1. Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
2. 2 Finish Coats: MPI #11 - Latex, Exterior Semi-Gloss (MPI Gloss Level 5)

E. EXTERIOR MASONRY OR CMU WALLS: SATIN ELASTOMERIC COATING:

1. Block Filler / Primer: Masonry primer or acrylic block filler
   a. Benjamin Moore:
      (1) Moore's High Build Acrylic Masonry Primer 068 or
      (2) Latex Block Filler M88
   b. Pittsburgh Paints;
      (1) PERMA-CRETE High Build Acrylic Primer, 4-2 or
      (2) PERMA-CRETE LTC Concrete Block/Masonry Surfacer, 4-100
   c. Sherwin Williams;
      (1) PrepRite Masonry Primer or
      (2) PrepRite Block Sealer
2. Two (2) Finish Coats: Low-Luster water-based elastomeric paint:

a. Benjamin Moore; Moorlastic Acrylic Elastomeric Waterproof Coating - Low Lustre 055
b. Pittsburgh Paints; PERMA-CRETE PITT-FLEX Elastomeric Coating
c. Sherwin Williams; Sherlastic Elastomeric Coating Series A5-100

F. EXTERIOR CMU WALLS: SATIN/EGGSHELL ENAMEL:
1. Block Filler: MPI # 4 X-Green - Block Filler, Latex, Interior/Exterior
2. Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
3. 2 Finish Coats: MPI # 15 - Latex, Exterior, Low Sheen (MPI Gloss Level 3-4)

G. EXTERIOR CMU WALLS: SEMI-GLOSS ACRYLIC LATEX ENAMEL:
1. Block Filler: MPI # 4 X-Green - Block Filler, Latex, Interior/Exterior
2. Primer: MPI #6 X-Green - Primer, Latex for Exterior Wood
3. 2 Finish Coats: MPI # 11 - Latex, Exterior Semi-Gloss (MPI Gloss Level 5)

H. EXTERIOR CMU WALLS: SEALED:
1. Prosoco Siloxane WB Concentrate applied as directed by manufacturer.

I. EXTERIOR FERROUS METAL: SEMI-GLOSS ALKYD
1. Primer: MPI # 23 - Primer, Metal, Surface Tolerant (w/ SSPC SP1 + SP 2 or SP3 prep)
a. Note: Primer not required to be applied in field on pre-primed items – verify compatibility
2. 2 Finish Coats:
a. MPI # 94 - Alkyd, Exterior, Semi-Gloss (MPI Gloss Level 5), or
b. MPI # 81 - Alkyd, Quick Dry, Semi-Gloss

J. EXTERIOR ZINC-COATED (GALVANIZED) METAL: SEMI-GLOSS ALKYD:
1. Primer: MPI # 134 - Primer, Galvanized, Water Based
2. 2 Finish Coats:
a. MPI # 94 - Alkyd, Exterior, Semi-Gloss (MPI Gloss Level 5), or
b. MPI # 81 - Alkyd, Quick Dry, Semi-Gloss

4.03 INTERIOR FINISHES:

A. INTERIOR DRYWALL (ALL WALLS EXCEPT AS NOTED BELOW): EGGSHELL/SATIN LOW-VOC LATEX
1. Primer Coat: MPI # 149 X-Green - Primer Sealer, Interior, Institutional Low Odor/VOC
2. 2 Finish Coats: MPI # 44 X-Green - Latex, Interior, (MPI Gloss Level 2)
3. Apply finish coats with roller, unless otherwise indicated

B. INTERIOR DRYWALL (ALL WALLS NOTED AS HIGH PERFORMANCE ON FINISH SCHEDULE): EGGSHELL/SATIN LOW-VOC LATEX
1. Primer Coat: MPI # 149 X-Green - Primer Sealer, Interior, Institutional Low Odor/VOC
2. 2 Finish Coats: MPI # 138 or #138 X-Green - Latex, Interior, (MPI Gloss Level 2)
3. Apply finish coats with roller, unless otherwise indicated

C. INTERIOR DRYWALL: WASHABLE (USDA COMPLIANT FOR FOOD CONTACT AREAS) WATER-BASED SATIN EPOXY
1. Primer Coat: "Rust-Oleum" – Zinsser Bulls-Eye Zero VOC water based Primer – 1.0 to 1.5 DFT minimum
2. 2 Finish Coats: Rust-Oleum" – Sierra # S62 Series "Satin Gloss" Water-Based Epoxy – 2.0 to 3.0 DFT per coat
3. Apply with brush or roller

D. INTERIOR DRYWALL: WASHABLE, WATER-BASED SEMI-GLOSS EPOXY (ALL WALLS IN MECHANICAL AND TRASH ROOMS)
1. Primer Coat: MPI # 45 Primer Sealer, Alkyd, Interior, or as otherwise recommended by finish coat manufacturer
2. 2 Finish Coats: MPI # 215 –Two component water-based semi-gloss epoxy – 2.5 to 4.0 DFM per coat
3. Basis-of-Design: Sherwin Williams Tile-Clad High Solids – with MR (mildew resistant) hardener
4. Apply finish coats with spray or roller

E. INTERIOR METAL: SEMI-GLOSS ALKYD ENAMEL
1. First Coat: MPI # 107 - Primer, Rust-Inhibitive, Water Based
2. Note: Primer not required on pre-primed items but coordinate compatibility requirements of finish coat
3. 2nd & 3rd. Coats: MPI # 54 X-Green - Latex, Interior, Semi-Gloss (MPI Gloss Level 5)
4. Brush apply finish coats unless otherwise indicated
5. If applied over intumescent coatings verify compatibility with intumescent coating manufacturer prior to painting!

F. INTERIOR LATEX CHALKBOARD PAINT
1. Apply to primer as indicated above for substrate and per manufacturer's requirements
2. Use the following material in lieu of finish costs where indicated to be "chalkboard" painted:
3. 2nd & 3rd Finish Coats: Rust-Oleum Chalkboard Brush-On paint
4. Manufacturer's standard flat green or black color as selected by Architect

G. INTERIOR EXPOSED STRUCTURE: DRY-FALL FLAT LATEX
Note: Primer not required to be applied in field on pre-primed items
1. Verify compatibility of finish with existing primer(s) and adjust if necessary
2. 2 Coats: MPI # 118 – Dry Fall Latex flat

H. INTERIOR PAINTED WOOD AND TRIM: FLAT ALKYD ENAMEL

1. Prime Coat: MPI # 172 - Interior Alkyd Primer Water Based
2. 2nd & 3rd Coats: MPI # 165 - Interior Alkyd, Matte
3. Brush apply finish coats unless otherwise indicated

I. INTERIOR PAINTED WOOD AND TRIM: EGGSHELL HP ARCHITECTURAL

1. Prime Coat: MPI # 172 - Interior Alkyd Primer Water Based
2. 2nd & 3rd Coats: MPI # 139 - Latex, Interior, High Performance Architectural, (MPI Gloss Level 3)
3. Brush apply finish coats unless otherwise indicated

J. INTERIOR PAINTED WOOD AND TRIM: SEMI-GLOSS HP ARCHITECTURAL

1. Prime Coat: MPI # 172 - Interior Alkyd Primer Water Based
2. 2nd & 3rd Coats: MPI # 141 - Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)
3. Brush apply finish coats unless otherwise indicated

K. INTERIOR CMU WALLS: SEMI-GLOSS LATEX

1. Block Filler & Primer Coat: MPI # 4 latex block filler
2. Primer Coat: MPI # 149 X-Green - Primer Sealer, Interior, Institutional Low Odor/VOC
3. 2 Finish Coats: MPI # 54 X-Green - Latex, Interior, Semi-Gloss (MPI Gloss Level 5)

L. INTERIOR "NATURAL-FINISHED" STAINED HARDWOOD: EGGSHELL SHEEN (Level 3) WATER-BASED SYSTEM

1. Tinted-paste filler coat: MPI # 91
   (omit on close-grained woods)
2. Stain coat(s): MPI # 90 color/intensity per sample
3. 1st, 2nd & 3rd Finish Coat: Eggshell (Gloss Level 3) water-based varnish - MPI # 181

M. INTERIOR "NATURAL-FINISHED" STAINED HARDWOOD: SATIN SHEEN - WATER-BASED SYSTEM

1. Tinted-paste filler coat: MPI # 91
   (omit on close-grained woods)
2. Stain coat(s): MPI # 90 color/intensity per sample
3. 1st, 2nd & 3rd Finish Coat: Satin water-based varnish - MPI # 128

N. INTERIOR "NATURAL-FINISHED" STAINED HARDWOOD – CONVERSION VARNISH FINISH:

1. Apply in fabricator's shop to minimize VOC's on-site
2. Basis-of-Design approved finish system manufacturer:
   a. AcromaPro (AP) – a division of Sherwin-Williams - www.acromapro.com
3. Solvent-based stain coat(s): "Aqua Chroma Wiping Stain Base", color/intensity to match Architect's sample
4. 1st & 2nd Sealer Coat: AP's "Care Seal" HS two-pack solvent born sealer
5. Sand with 320 grit or finer sandpaper after both sealer coats
6. 3rd & 4th Finish Coat: AP's "Amerivar 20" (satin sheen) # DM5361, two component clear conversion varnish
7. Sand with 1500 and then 2000 grit sandpaper successively after finish coat application
8. Paste Wax all surfaces on site prior to Substantial Completion

O. INTERIOR "SATIN OPAQUE" WOODWORK FINISH – CONVERSION VARNISH FINISH:

1. Apply only to "Medex" waterproof particleboard substrate
2. Apply in fabricator's shop to control airborne surface contaminates and VOC's
3. Basis-of-Design approved finish system manufacturer:
   a. AcromaPro (AP) – a division of Sherwin-Williams - www.acromapro.com
4. 1st & 2nd Sealer Coats: AP's "Bernyl Unisurfacer", post-catalyzed primer
5. Sand with 320 grit or finer sandpaper after both sealer coats
6. 3rd & 4th Finish Coat: AP's "Matador 20" (satin sheen) # DH560001X, post-catalyzed coating – pigmented to match Architect's color sample

P. INTERIOR "GLOSS OPAQUE" (AUTOMOTIVE LIKE) WOODWORK FINISH – OPAQUE CONVERSION VARNISH FINISH:

1. Apply only to "Medex" waterproof particleboard substrate
2. Apply in fabricator's shop to control airborne surface contaminates and VOC's
3. Basis-of-Design approved finish system manufacturer:
   a. AcromaPro (AP) – a division of Sherwin-Williams - www.acromapro.com
4. 1st & 2nd Sealer Coats: AP's "Bernyl Unisurfacer", post-catalyzed primer
5. Sand with 320 grit or finer sandpaper after both sealer coats
6. 3rd, 4th & 5th Finish Coat: AP's "Matador 80" (gloss sheen) # DH560001X, post-catalyzed coating – pigmented to match Architect's color sample
7. Buff finish with 3M's "Perfect-It" paint finishing system, consisting of successive surface buffing using 3M's "EX Rubbing Compound", then 3M's "Machine Polish", and finally 3M's "Ultrafine Machine Polish" until a smooth, consistent mirror-like gloss luster is achieved.

Q. INTERIOR "NATURAL-FINISHED" STAINED HARDWOOD: OIL-BASED POLYURETHANE SYSTEM

1. Apply in fabricator's shop to minimize VOC's on-site
2. Basis-of-Design approved finish system manufacturer:

a. General Finishes (GF) - 800-783-6050 - www.generalfinishes.com

3. 1st Finish Coat: Gloss Polyurethane: GF “Arm R Seal” Gloss
4. 2nd & 3rd Finish Coat: Satin Polyurethane: GF “Arm R Seal” Satin
5. 4th Finish Coat: Gloss Polyurethane: GF “Arm R Seal” Gloss
6. 5th Finish Coat: Satin Polyurethane: GF “Arm R Seal” Satin
7. Sand with 320 grit or finer sandpaper between successive coats
8. Paste Wax all surfaces on site prior to Substantial Completion

R. INTERIOR NATURAL-FINISHED STAINED HARDWOOD: ALKYD VARNISH SYSTEM

1. Tinted-paste filler coat: MPI # 91 (omit on close-grained woods)
2. Oil/Alkyd-based stain coat(s): MPI # 90 color/intensity per sample
3. Alkyd-based clear wood sanding sealer: MPI # 102 (lightly sanded)
4. First Finish Coat: MPI # 75 Alkyd Varnish - gloss (lightly sanded)
5. Second Finish Coat: MPI # 73 Alkyd Varnish - satin (lightly sanded)
6. Paste Wax (OPTIONAL)

END OF SECTION 09 91 00

END OF DIVISION 9

Division 10 – Specialties

SECTION 10 14 00 – SIGNAGE

PART 1 - GENERAL

1.01 PROVIDE signage to comply with requirements indicated for manufacturing process, material finishes, style, size and message content, as specified herein, and as required for a complete and proper installation. Types of signage required include to the following:

A. Exterior PSV building address numbers
B. Fire-sprinkler control-valve room door signage
C. Handicapped parking signs (RE Site / Civil Drawings for requirements)
D. ADA Door Signs for exits and toilet room doors
E. Fire / smoke wall or partition signs
F. Foundations / concrete work for all Owner provided signage including flag pole and pole signage.

1.02 INSTALL INTERIOR SIGNAGE furnished by the Owner.

1.03 SEPARATE CONTRACT: The Owner will arrange for the following signage to be provided by Pinnacle Sign Co.:

A. Monument (or pole type) development / site sign(s)
B. Exterior Building signage
C. Site traffic signage

1.04 COORDINATE with the Owner's separate Sign Contractor regarding field dimensions, shop drawings, site access, scheduling, power requirements, and other items necessary for timely installation of signs.

1.05 COMPLY WITH applicable requirements of the Americans with Disabilities Act (ADA), requirements of the Building Code, including but not limited to accessibility requirements of ANSI A117.1 (most recent edition), and local regulations or ordinances. Obtain and pay for all exterior signage permits, which may require a separate permit application to the AHJ.

1.06 COORDINATE with Division-26 Electrical Work to provide electrical power to illuminated signage, where indicated on the Drawings.

1.07 SHOP DRAWINGS: Submit shop drawings of all signage items prior to fabrication and erection. Include plans, elevations and large scale details of fabrication, text, and layout, when applicable. Show details of anchorages to other materials, connector housings, and accessory items.

1.08 PERMITS: Obtain approval of governmental AHJ representatives and obtain approval of the Owner before fabrication of signage. Costs for permits and approval is a part of this Section.

1.09 LABELS: With the exception of required UL labels, do not apply fabricator's identification labels to any exposed surface of signs.

PART 2 - PRODUCTS

2.01 FABRICATED ITEMS:

A. ACCESSIBLE PARKING SIGNS (provide one unit at each accessible parking space): 12 x 18 inch white rectangle with longer dimension vertical, with a green message and a blue and white international barrier-free symbol, and including the text: “Disabled Parking – State Permit Required” and “Violators fined up to $200.00” (verify and coordinate final text with local regulations). Provide with standard mounting post set in a concrete post foundation base and set bottom of sign five (5) feet above grade.

B. ACCESSIBLE DOOR SIGNAGE (per ANSI A117.1 & ADA): 6 x 8 inch minimum radius cornered Pictorial Symbol Signs, with 1/32" raised pictogram symbols, 1/32" x 5/8" high upper case raised letter text, and with 1/32" Grade II Braille text. Text and pictogram to be white on black colored sign panel with matte finish. Provide double sided 1/32" thick Scotchmount tape for attaching at 60" above floor to center of sign on the wall adjacent to the latch side of a door:

1. 1 each sign reading “RESTROOM” at each uni-sex Toilet Room: Cal-Royal # NEWUCHS10 in Black or equal
2. 1 each sign reading “MEN” at each public Men’s Toilet Room: Cal-Royal # MH68 in Black or equal
3. 1 each sign reading “WOMEN” at each public Women’s Toilet Room: Cal-Royal # WH68 in Black or equal
4. 1 each sign reading “EXIT ROUTE” at each exit door: Cal-Royal # CAEXRT4534 in Black or equal

C. WAYFINDING, DIRECTIONAL & ROOM / DOOR SIGNS: Provide tactile accessible sign units with raised letters, raised symbols (when indicated) and with Grade II Braille text meeting requirements of ANSI A117.1 and the 2010 ADA Standard for Accessible Design for fabrication and for installation requirements.

1. COMPOSITION: Multi-layer, ultraviolet resistant, moisture-resistant, non-glare interior photosensitive photopolymer sheet with minimum 1/8 inch thick PETG base, with surface burning characteristics that consist of a flame spread of 75 and a smoke development of 120 when tested in accordance to UL 723 (ASTM E 84). Provide in “letter” color as selected by Architect from Manufacturer’s full range of available color options.
2. SECOND SURFACE or “background” surface to be painted with non-glare acrylic paint as recommended by Manufacturer, in a contrasting color to the remaining character surface, in colors (potentially different on each floor) as selected by the Architect from the manufacturer’s full range of available color options.
3. TYPICAL FONT: “Helvetica Neue Light” – upper case typical
4. BRAILLE CHARACTERS: Fabricate each sign unit with corresponding Grade II Braille text.

5. FABRICATION PROCESS: Camera ready artwork is reproduced onto the photosensitive surface and exposed to light – with the background surface removed where not exposed, producing a integrated solid sign panel. Laminated photopolymers, added-on characters, and engraved characters are not acceptable.

2.02 ACCESSIBILITY REQUIREMENTS: Comply with requirements of the ADA (even if not indicated herein):

A. Character Proportions: Letters and numbers on signs must have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
B. Color Contrast: Characters and symbols must contrast with their background - either light characters on a dark background or dark characters on a light background.
C. Raised Characters or Symbols: Letters and numbers on signs must be raised 1/32 in minimum and be sans serif characters. Raised characters or symbols must be at least 5/8 in high but no higher than 2 inches. Symbols or pictograms on signs must be raised 1/32 in minimum.

2.03 PSV LETTERING: Die-cut copy from PSV mounted to paper backing sheet for field application, and as follows:

A. PSV BUILDING NUMBERS: 8" high white reverse-mount to interior side of glass facing main street
B. PSV FIRE-SPRINKLER ROOM DOOR SIGN: 1-1/2" High “RED” colored PSV letters reading: "FIRE-SPRINKLER VALVE” (verify text with AJH)

2.04 MISCELLANEOUS MATERIALS:

A. FASTENERS: Use concealed fasteners, unless otherwise indicated, which are fabricated from metals which are non-corrosive to either sign materials or mounting surface.
B. ANCHORS AND INSERTS: Use nonferrous metal or hot dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

PART 3 - EXECUTION

3.01 INSTALL signage in accordance with the approved shop drawings, to be level, plumb, and at height indicated, free from distortion or other defects of appearance. Remove and reinstall signage materials that do not comply with these requirements.

3.02 MOUNT accessible room signs directly onto wall surface centered nine (9) inches from the strke-side edge of the door, at 5'-0" AFF to center of sign. Use double sided foam tape to mount to smooth nonporous surfaces.

3.03 MOUNT PSV signs on inside of glass, or directly to surface face of solid doors, as applicable.

3.04 CLEAN soiled sign surfaces and protect units from damage until Substantial Completion.

SIGN SCHEDULE - WAYFINDING, DIRECTIONAL AND ROOM / DOOR SIGNS:

SIGN TYPE / NAME:	SIZE & CHARACTERS:	LOCATION:
“BUILDING COMMON” ROOM DOORS:	Eight (8) inch wide x 4 inch high, with names of rooms accessed from public corridors in up to two (2) lines of 1.3 inch high text, centered.	Provide at each floor from stairs and elevator areas, at building common room doors, at exit doors, and specifically as follows: EXIT (locate at each illuminated exit sign) MANAGER’S OFFICE RESTROOM (and similar room names as indicated on the Drawings)

END OF SECTION 10 14 00

SECTION 10 23 13 – TOILET ACCESSORIES

PART 1 - WORK INCLUDED: Provide toilet accessories throughout the project, as specified herein, and as required for a complete and proper installation. Provide units as indicated on the Drawings.

1.01 SUBMIT PRODUCT DATA for each accessory item required, including construction details relative to materials, dimensions, gauges, profiles, mounting method, specified options, and finishes.

1.02 PROVIDE SETTING DRAWINGS where cutouts are required in other work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.

1.03 COORDINATION: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: Subject to compliance with requirements, provide toilet accessories by one of the following: American Specialties, Inc., Bradley Corporation, Bobrick Washroom Equipment, Inc. or McKinney/Parker.

2.02 STAINLESS STEEL: AISI Type 302/304, with polished No. 4 finish, 0.034-inch (22-gauge) minimum thickness.

2.03 BAKED ENAMEL FINISH: Factory-applied, gloss white, baked acrylic enamel coating.

2.04 MIRROR GLASS: Nominal 6.0-mm (0.25-inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.

2.05 FASTENERS: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

2.06 KEYS & CYLINDERS: Provide universal keys, with all cylinders keyed alike, for access to toilet accessory units requiring internal access for servicing, re-supply, etc. Provide minimum of six keys to Owner's representative.

PART 3 - INSTALL TOILET ACCESSORY units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.

3.01 SECURE MIRRORS TO WALLS in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.

3.02 INSTALL GRAB BARS to withstand a downward load of at least 250 lbf, complying with ASTM F 446.

3.03 ADJUST TOILET ACCESSORIES for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

3.04 CLEAN AND POLISH all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10 23 13

SECTION 10 26 00 – WALL PROTECTION

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide wall protection systems, where indicated on the drawings, as specified herein and as needed for a complete and proper installation. Install stainless steel wall paneling, furnished by others.

1.02 SUBMITTALS: Submit samples of each product as follows:

A. Corner Guard: 8 inch sample
B. Paneling: 8x8 inch sample
   1. Panel Trim, Joint Dividers, Edge Trim, Inside Corners, Outside Corners: 8 inch sample
C. Data Sheets on all adhesives as applicable.

PART 2 - PRODUCTS

2.01 STAINLESS STEEL:

A. Stainless-Steel Sheet, Strip, Plate, and flat Bars: ASTM A 666, Type 304 unless noted otherwise
B. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304 unless noted otherwise

2.02 CORNER GUARDS (CG's): Provide manufacturer's standard paper-covered No. 4 satin finished stainless steel units, of 0.059-inch (16 gage) minimum, AISI Type 304 stainless steel sheet, full-height (unless otherwise indicated on the Drawings). Provide 90 degree turn, unless otherwise indicated, and with formed edges.

A. Wing Size: 2-1/2 x 2-1/2 inch wide unless otherwise indicated.
B. Mounting Method: Countersunk screws with holes 8 inches OC
C. Corner Radius: 1/8 inch.

2.03 STAINLESS STEEL WALL PANELING: Stainless-Steel Plate: Type 304, minimum 0.0625 inch thick (16 gauge), with bright, directional polished No. 4 finish. Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary covering before shipping.

A. PANEL HEIGHT: Provide full-height stainless steel wall paneling extending from top of base to ceiling, except as otherwise indicated on the Drawings
B. PANEL TRIM: Formed stainless steel trims as manufactured by "Flame Gard": P: 800-536-3694, www.flamegard.com, or Stainless Supply, P: 877-484-0088, www.stainlesssupply.com, or equal.
C. JOINT DIVIDER TRIM: All stainless steel unit, with 7/16 inch deep pockets each side, and minimum 7/8 inch wide stainless steel face.
D. EDGE TRIM: "J-profiled" stainless steel with minimum 5/16 inch exposed edge.
E. INSIDE CORNER TRIM: 1-3/4 x 1-3/4 inch 90 degree inside corner unit with one 3/4 inch wide pockets both sides and a 1 x 1 inch inside coved finished corner.
F. OUTSIDE CORNER TRIM: use surface mounted, stainless steel corner guards over panel edges.

2.04 FASTENERS: Provide aluminum, nonmagnetic stainless steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with components, hardware, anchors, and other items being fastened. Use theft-proof fasteners where exposed to view. Provide inserts and other anchorage devices for connecting components to concrete or masonry. Fabricate anchoring devices to be capable of withstanding imposed loads. Coordinate anchoring devices with the supporting structure.

2.05 ADHESIVE: Low VOC type as recommended by the manufacturer for use with material on the substrate indicated. Verify compatibility of adhesive material with fire-retardant treated (FRT) plywood substrate, when applicable.

2.06 FABRICATE wall and door protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thicknesses of components. Preassemble components in the shop to the greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling. Fabricate components with tight seams and joints with exposed edges rolled.

2.07 PROVIDE SURFACES free of evidence of wrinkling, chipping, uneven coloration, dents, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

PART 3 - EXECUTION

3.01 EXAMINE AREAS and conditions in which wall surface protection components and wall protection systems will be installed. Complete all finishing operations, including painting, before beginning installation of wall surface protection system materials.

3.02 PREPARATION: Before installation, acclimate wall protection, trim, and adhesives not less than 24 hours before installation. Store panels and trim on a level surface while acclimating. Verify that building temperature will be maintained between 70 to 80 degrees F from 24 hours before, and 48 hours, after installation with relative humidity below 80%. Do not proceed with installation if such conditions will not be maintained.

3.03 SUBSTRATE material must be dry, well-sealed, and free of dirt, loose paint, wax and grease. Sand or otherwise roughen glossy surfaces to promote adhesion. Remove substrate coatings designed to improve clean-up as these coatings may affect adhesion. Prior to installation, clean substrate to remove dust, debris, and loose particles.

3.04 INSTALL WALL SURFACE PROTECTION UNITS plumb, level, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished work. Install retainers, mounting brackets, and other accessories in strict accordance with the manufacturer's instructions.

3.05 INSTALLATION OF STAINLESS STEEL WALL PANELING:

A. Acclimate stainless steel panels, trim and adhesive to room temperature not less than twenty-four (24) hours before installation.
B. Store panels and trim on a level surface while acclimating.
C. Maintain temperature between 70 to 80 degrees F with relative humidity (RH) no greater than 80% for not less than twenty-four (24) hours before installation, and forty-eight (48) hours after installation of wall paneling.
D. If field cutting is required at electrical receptacles or switch boxes, use a sheet-metal nibbler for cuts, wearing a face shield and other appropriate PPE. Finish cut edges with a metal file, so that cut edges will be free of burs or other projections.
E. Attach panels with full-spread of adhesive applied to back of panels for 100% coverage, with a notched trowel. Before adhesive skins over, set panels in position and press against wall. Pull entire panel back away from wall to flash off solvents, if applicable. Press back in place, and apply adequate pressure to make full contact between panel and substrate.
F. INSTALL MECHANICAL ANCHORS by drilling through the installed panel into partition substrate framing, unless otherwise indicated in the Drawings. Space anchors at not less than twenty-four (24) inches OC vertically at each framing member (not to exceed 24 inch centers), or as otherwise required for not less than one anchor per four (4) square feet.
G. SEAL PANEL JOINTS with FSE type clear, silicone sealant struck flush to the panel face.

3.06 CLEANING: Immediately upon completion of installation, clean surface protection units and accessories using a standard ammonia based household cleaning agent. Clean metal components in accordance with the manufacturer's recommendations. Remove excess adhesive and sealant while it is still wet.

3.07 REMOVE SURPLUS materials, rubbish, and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition. Replace removed plates and fixtures.

END OF SECTION 10 26 00

SECTION 10 44 00 – FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide fire –protection specialties throughout the project, as specified herein, and as required for a complete and proper installation.

A. Provide recessed “Knox-Box” for each building, per requirements of local fire-department
B. Provide Fire-extinguishers, and fire-extinguisher cabinets, where indicated on the Drawings

1.02 SUBMIT PRODUCT DATA for each type of product specified. For fire extinguisher cabinets include rough in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

1.03 SUBMIT MAINTENANCE INSTRUCTIONS including service recommendations.

1.04 SINGLE-SOURCE RESPONSIBILITY: Obtain fire extinguishers and cabinets from one source from a single manufacturer.

1.05 COORDINATION: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing.

1.06 UL-LISTED PRODUCTS: For fire extinguishers, provide UL-listed units bearing the UL "Listing Mark" for type, rating, and classification of extinguisher.

PART 2 - PRODUCTS

2.01 EMERGENCY KEY-ACCESS BOX: “Knox-Box” 3200 Series with hinged door, with optional recessed mounting kit (#3270) as manufactured by the Knox Company (www.knoxbox.com) Mount at 48 inch above grade or as otherwise required by AHJ representatives, in location indicated on the Drawings. Coordinate keying of key-access box cylinder with local Fire Department officials.

2.02 FIRE EXTINGUISHERS

A. TYPICAL FIRE EXTINGUISHERS (FE): Manufacturer's standard multipurpose dry chemical type unit, 10 lb capacity, UL rated: 4A-80BC equal to JL “Cosmic 10E” # MB846.
B. KITCHEN CLASS-K FIRE EXTINGUISHERS (KFE) at cooking area(s): Manufacturer's standard wet-chemical type, 15 lb, UL rated: for “Class K” (liquid cooking or wet-chemical media fires) equal to JL “Saturn 15” # MB810.

2.03 FIRE EXTINGUISHER CABINETS

A. PREFINISHED STEEL FIRE EXTINGUISHER CABINET (FEC): Provide assembly of formed steel cabinet/tub unit complete with extinguisher and mounting bracket, in tub size of nominal 9 x 18 x 5-1/2 inch deep (or as otherwise required to fit extinguisher unit),
    1. CABINET, TRIM & DOOR MATERIAL: Cold-rolled steel with white powder-coat finish.
    2. DOOR STYLE: Flush panel door with recessed ADA pull, safety locking hardware and narrow vertical “view” window with inside mounted decal reading “FIRE EXTINGUISHER” in red lettering on clear film.
    3. SEMI-RECESSED WALL CABINET (typical unless otherwise indicated or required for installation indicated): One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge, of 1-1/4 to 1-1/2 inch backbend depth.
    4. SURFACE-MOUNTED CABINET (when indicated or required): Fully exposed cabinet box without additional trim to be fully exposed and mounted directly onto wall.
    5. BASIS-OF-DESIGN: JL Industries: “Ambassador Series # 8116 (1-1/2” square trim) with Vertical Duo door with recessed pull and “Saf-T-Lok” closure, or equal

2.04 ACCEPTABLE MANUFACTURERS: Subject to compliance with requirements, equivalent products of the following manufactures are also acceptable:

A. American Specialties, Inc.; ASI Group.
B. Fire-End & Croker Corporation.
C. Kidde Residential and Commercial Division.
D. Larsens Manufacturing Company.

2.05 MOUNTING BRACKETS: Manufacturer's standard steel unit of plated or baked-enamel finish, provided at each fire-extinguisher unit. Design brackets to secure fire extinguisher of sizes, types and capacities required, to prevent accidental dislodgement of extinguisher unit.

2.06 IDENTIFICATION: Provide wall signage decals and lettering as required by AHJ representatives for letter style, size, spacing, and location. Locate as directed by Architect.

PART 3 - INSTALLATION

3.01 INSTALL UNITS in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of AHJ. Where exact location of surface-mounted cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Architect, and per approval of the AHJ.

3.02 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 00

SECTION 10 75 00 – FLAGPOLES

PART 1 - GENERAL

1.01 WORK INCLUDED: Coordinate with Pinnacle Signage; signage provider scope includes flagpole. Contractor scope includes pouring foundation for flagpole and lighting.

1.02 SUBMIT PRODUCT DATA and installation instructions for each type of flagpole required. Include details of foundation system for ground-set poles.

1.03 MANUFACTURING STANDARDS: Provide each flagpole as a complete unit produced by a single manufacturer, including fittings, accessories, bases, and anchorage devices.

1.04 DESIGN CRITERIA: Provide flagpoles and installations constructed to withstand a 90-mph wind velocity minimum when flying flag of appropriate size. 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.

1.05 DELIVERY, STORAGE, AND HANDLING: Spiral wrap flagpoles with heavy Kraft paper or other weather-tight wrapping and prepare for shipment in hard fiber tube or other protective container. Deliver flagpoles and accessories completely identified for installation procedure. Handle and store flagpoles to prevent damage or soiling.

PART 2 - PRODUCTS

2.01 AVAILABLE MANUFACTURERS: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

A. American Flagpole; a Kearney-National Inc. Company.
B. Baartol Company Inc. (The)
C. Concord Industries, Inc.
D. Eder Flag Manufacturing Company, Inc.
E. Ewing International.
F. Lingo Inc.; Acme Flagpole Division.
G. Michigan Flagpole Inc.
H. Morgan-Francis Div.; Original Tractor Cab Co., Inc.
I. PLP Composite Technologies, Inc.
J. Pole-Tech Company Inc.

2.02 EXPOSED HEIGHT: Thirty (30) feet, or otherwise as indicated in the Drawings.

2.03 ALUMINUM FLAGPOLES: Fabricate from seamless extruded tubing complying with ASTM B 241, alloy 6063-T6, having a minimum wall thickness of 3/16 inch, tensile strength not less than 30,000 psi, and a yield point of 25,000 psi. Heat-treat and age-harden after fabrication. Provide cone-tapered aluminum flagpoles.

2.04 FLAGPOLE MOUNTING: For ground-set flagpoles, provide 16-gage minimum galvanized corrugated steel tube, or 12-gage 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. Provide manufacturer's standard cast aluminum flash collar, finished to match flagpole.

2.05 SHAFT FINISH: Provide manufacturer's standard fine, directional, medium satin aluminum finish.

2.06 FINIAL: Provide manufacturer's standard flush-seam spun-aluminum finial ball.

2.07 INTERNAL HALYARD, WINCH SYSTEM: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

2.08 ACCESSORIES:

A. HALYARD: Two (2) each continuous 5/16 inch (No. 10) polypropylene, braided, white halyards for each flagpole.
B. HALYARD FLAG SNAPS: Provide two each chromium-plated bronze or stainless-steel swivel snap hooks per halyard, with neoprene or vinyl covers, or provide "Quiet Halyard flag clasp" by Lingo Inc.; Acme Flagpole Division.
C. FLAG: Provide 4' x 6 foot (minimum) fully sewn (not printed) USA flag of UV resistant materials.

PART 3 - EXECUTION

3.01 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 placing concrete. Back fill open excavation after concreting with original excavated material.

3.02 PROVIDE CONCRETE composed of Portland cement, coarse and fine aggregate, and water mixed in proportions to attain 28-day compressive strength of not less than 3000 psi, complying with ASTM C 94 and in accordance with Division-03 Section. Place concrete immediately after mixing. Compact concrete in place by use of vibrators. Moist-cure exposed concrete for not less than 7 days or use a non-staining curing compound in cold weather. Finish trowel exposed concrete surfaces to smooth, dense surface. Provide positive slope for water runoff to base perimeter.

3.03 FLAGPOLE INSTALLATION: Prepare and install flagpoles where shown and in compliance with accepted shop drawings and manufacturer's instructions. Provide positive lightning ground for each flagpole installation. Paint below-grade portions of ground-set flagpole with heavy coat of bituminous paint.

END OF SECTION 10 75 00
END OF DIVISION 10

Division 11 – Equipment

SECTION 11 40 00 – FOODSERVICE EQUIPMENT INSTALLATION

PART 1 - GENERAL

1.01 WORK INCLUDED: Install food service equipment where shown on the drawings, as specified herein, and as needed for a complete and proper installation. Procure all required permits required by officials having jurisdiction, and arrange for all inspections and certifications of acceptance required. Arrange for delivery, receive at the site, unload, protect, set-in-place, and coordinate final connections, and adjustment.

1.02 INSTALLER'S QUALIFICATIONS: Engage an experienced Installer who has completed food service similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

1.03 CODES AND STANDARDS: In addition to complying with pertinent requirements of governmental agencies having jurisdiction, equipment items and installation must comply with:

A. National Sanitation Foundation (NSF)
B. Underwriters Laboratory (UL) for items with electrical components
C. American National Standards Institute (ANSI) standards for vacuum breakers and air gaps to prevent siphonage in water piping
D. National Fire Prevention Association (NFPA)
E. National Electrical Manufacturers Association (NEMA)

1.04 HANDLE food service equipment carefully to avoid damage to components, enclosures, and finish. Do not install damaged food service equipment; replace and return damaged components to equipment manufacturer.

1.05 COORDINATION: Take field measurements to assure accurate fit of fabricated equipment. Verify and coordinate rough-in locations of electrical and plumbing connections. Examine and inspect roughed-in services, and installation of floor, ceiling or other conditions under which the equipment is to be installed - verify that dimensions of such items are acceptable before installation of the Work. Do not proceed until unsatisfactory conditions have been corrected.

PART 2 - PRODUCTS

2.01 Owner Furnished, Contractor Installed. Refer to Drawings for all equipment being provided.

PART 3 - INSTALLATION:

3.01 EXAMINE ROUGHED-IN mechanical and electrical services, installation of floors, walls, columns, and ceilings, and other conditions under which food service work is to be installed; verify dimensions of services and substrates before fabricating work. Do not proceed with fabrication and installation until unsatisfactory dimensions and conditions have been corrected.

3.02 INSTALLATION: Set each item of non-mobile and non-portable equipment securely in place, leveled and adjusted to correct height. Anchor to supporting substrate where indicated and where required for sustained operation and use without shifting or dislocation. Conceal anchorages where possible.

3.03 ADJUST COUNTERTOPS and other work surfaces to level tolerance of 1/16-inch maximum offset, and maximum variation from level or indicated slope of 1/16-inch per ft.

3.04 FIELD JOINTS: Complete field-assembly joints in work (joints cannot be completed in shop) by welding, bolting-and-gasketing, or similar methods as indicated. Grind welds smooth and restore finish. Set or trim gaskets flush, except for "T" gaskets.

3.05 ENCLOSED SPACES: Treat spaces that are inaccessible after equipment installation by covering horizontal surfaces with powdered borax at rate of 4 oz. per sq. ft.

3.06 CLOSURE PLATES AND STRIPS: Install where required, with joints coordinated with units of equipment.

3.07 CUTOUTS: Provide cutouts in food service equipment where required to run plumbing, electric, gas, or steam lines through equipment items for final connections.

3.08 INSTALL SHUT-OFF VALVES at all water-service points servicing foodservice equipment, and verify that connections are clean. Install all equipment accessories required for proper functioning.

3.09 SEALANTS AND GASKETS: Install all around each unit to make joints airtight, watertight, vermin-proof, and sanitary for cleaning purposes. In general, make sealed joints not less than 1/8-inch wide, and stuff backer rod to shape sealant bead properly, at ¼-inch depth. Shape exposed surfaces of sealant slightly concave, with edges flush with faces of materials at joint. At internal-corner joints, apply sealant or gaskets to form a sanitary cove, of not less than 3/8-inch radius. Provide sealant-filled or gasketed joints up to 3/4-inch joint width; metal closure strips for wider joints, with sealant application each side of strips. Anchor gaskets mechanically or with adhesives to prevent displacement.

3.10 TESTING: Coordinate start-up of food service equipment when service lines have been tested, balanced, and adjusted for pressure, voltage, and similar considerations. Do not operate plumbing lines until they have been cleaned and treated for sanitation. Before testing, lubricate each equipment item in accordance with manufacturer's recommendations.

3.11 TEST EACH ITEM of operational equipment to demonstrate that it is operating properly and that controls and safety devices are functioning. Coordinate with supplier to repair or replace equipment found to be defective in its operation, including units that are below capacity or operating with excessive noise or vibration.

3.12 CLEANING: After completion of installation and other major work in food service areas, remove protective coverings, if any, and clean food service equipment, internally and externally. Restore exposed and semi-exposed finishes to remove

abrasions and other damages; polish exposed-metal surfaces and touch-up painted surfaces. Arrange with supplier for replacement of work that cannot be successfully restored.

3.13 FINAL CLEANING: After testing and start-up, and before time of Substantial Completion, clean and sanitize food service equipment, and leave in condition ready for use.

3.14 OWNER'S DEMONSTRATION AND OPERATING ASSISTANCE: Demonstrate operation and maintenance of all equipment to Owner's personnel. Provide one (1) full day of instruction and operating assistance at start of operations by Owner, at time to be coordinated with Owner's representative.

END OF SECTION 11 40 00

Division 12 – Furnishings

SECTION 12 21 00 – INTERIOR AND EXTERIOR SOLAR SHADES

PART 1 - GENERAL

1.01 PROVIDE window treatment typically at all exterior windows, or as otherwise indicated on the Drawings, and in accordance with requirements specified herein. Provide all accessory components necessary for a complete installation. The Work of this Section includes:

A. Manually-operated roller-type window-shades at exterior glazed windows / storefront (not at doors or vestibules)
B. Motor-operated roller-type exterior solar shades

1.02 RELATED SECTIONS: Division-26 Electrical: for line-voltage electrical power to the motorized shade-control unit(s).

1.03 WORK BY OTHERS: The Owner will provide internet access to the control unit via a network cable, or through a WiFi router for initial system programming and then for remote control by the Owner's authorized personnel.

1.04 SUBMITTALS

A. SUBMIT PRODUCT DATA including standard Manufacturer's data sheets for each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.
B. SUBMIT WIRING DIAGRAMS indicating point-to-point power and control wiring required, with locations and interconnection of system components and complete riser diagrams. Include one-line diagrams, wire counts, coverage patterns, and physical dimensions of each item.
C. SUBMIT WINDOW TREATMENT SCHEDULE of all units being provided. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
D. COLOR / MATERIAL SELECTION SAMPLES: For each finish product specified, submit two (2) sets of shade cloth or drapery material options, and aluminum finish color samples representing manufacturer's full range of available color options and patterns.
E. VERIFICATION SAMPLES: For each window treatment system required, submit one (1) complete set of components, unassembled, demonstrating compliance with specified requirements. Include Shadecloth or drapery samples and aluminum finish samples as selected. Mark face of material to clearly denote the interior, exposed face.
F. SUBMIT MAINTENANCE DATA including methods for maintaining window treatments, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.05 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS: Obtain window treatments through one source from a single manufacturer with a minimum of ten (10) years prior experience in manufacturing products comparable to those specified in this Section.
B. INSTALLER QUALIFICATIONS: Installer trained and certified by the manufacturer with a minimum of five (5) years experience in installing products comparable to those specified in this section.
C. FIRE-TEST-RESPONSE CHARACTERISTICS: Passes NFPA 701 small and large-scale vertical burn. Materials tested must be identical to products proposed for use.
D. ANTI-MICROBIAL CHARACTERISTICS: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.06 DELIVERY, STORAGE, AND HANDLING: Deliver units in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings.

1.07 SPECIAL PRODUCT WARRANTY

A. INTERIOR SHADES
   1. ROLLER SHADE HARDWARE AND CHAIN WARRANTY: Manufacturer's standard limited, non-depreciating form:
      a. Period: twenty-five year limited warranty.
   2. STANDARD SHADECLOTH WARRANTY: Manufacturer's standard twenty-five year manufacturing warranty.
B. EXTERIOR SOLAR SHADE
   1. LIMITED LIFETIME WARRANTY
      a. Progressive Screens, the manufacturer, guarantees the material and workmanship of its products to be of excellent quality. All Materials are carefully selected to withstand most weather elements and breakage under normal use. The lifetime material warranty applies to aluminum components only.
   2. 5 YEAR WARRANTY
      a. Progressive Screens warrants the electrical motors for a period of 5 years, commencing from the date of sale from Progressive Screen Systems, against failure under expected normal use.

3. 2 YEAR WARRANTY
    a. Progressive Screens warrants the electronic components such as radio transmitters and receivers for a period of 2 year, commencing from the date of sale from Progressive Screens against failure under expected normal use.
4. SCREEN & VINYL WARRANTY
    a. Progressive Screens warrants fabrics supplied from Twitchell have a 10-year limited warranty from the original date of purchase.

PART 2 - PRODUCTS

2.01 MANUAL ROLLER BLINDS

A. BASIS-OF-DESIGN: Interior shades: “Mecho5” by MecoShade (www.mecoshade.com), or equal product as manufactured by Draper or Lutron.
B. APPROVED SHADING FABRIC: Provide material indicated on Drawings, or as follows if not indicated:
    1. “ThermoVeil 1500 Series”,by MecoSystems, in color indicated on Drawings, or as otherwise selected by Architect from Manufacturer’s full range of available options.
C. OPERATION: Manual, bead-chain located at side of shade – verify placement with shop drawings
D. CLUTCH: Locking unit allowing shade to stop when chain is released, and to stop shade at any position, with preset limit stops to prevent shade from being raised or lowered too far. Fabricate from high-carbon coated-steel and molded fiberglass reinforced polyester or injected molded nylon components to never need adjustment, and provide a stainless-steel control loop at end for connecting bead-chain.
E. CONCEALED COMPONENTS: Noncorrodible or corrosion-resistant-coated materials. Provide operating mechanisms with permanently lubricated moving parts.
F. VALANCE: Manufacturer’s standard aluminum fascia concealing shade roller and hardware extending from jamb to jamb, in “silver” finish.
G. ENDCAPS: Fabricate Endcaps and snap-on endcap covers, when applicable, to match valance, from plated stamped steel.
H. FABRICATE UNITS in sizes to cover storefront and other openings measured at 74 degrees F as follows:
I. INSIDE WINDOW MOUNTING: Provide units mounted between jambs of window framing typically, so that shade band is not closer than two (2) inches to the interior face of glass. Allow proper clearances for window operation hardware, when applicable.

2.02 MOTORIZED EXTERIOR SOLAR BLINDS

A. BASIS-OF-DESIGN:
    1. Commercial Shade by Progressive Screens
        a. Progressive Screens
        5350 Pinkney Ave,
        Sarasota, Florida 34233
        Phone. 866-802-0400
        Email. info@progressivescreens.com
    2. Contact(s):
        a. Corporate:
        Justin Shock
        5330 Pinkney Ave
        Build #6
        Sarasota, Fl 34233
        Office 941-360-0037 ext 106
        Cell 941-468-3263
        Justin Shock justin@progressivescreens.com
        b. Licensed Installer:
        www.screenmobile.com
        Missouri:
        Scott and Jennifer Prentice
        Screenmobile of Lee's Summit
        816-209-1199
        email: leessummit@screenmobile.com
B. APPROVED SHADING FABRIC: Provide samples of 80%, 90% and 95% screen from manufacturers standard options for selection.
C. CONCEALED COMPONENTS: Noncorrodible or corrosion-resistant-coated materials. Provide operating mechanisms with permanently lubricated moving parts.
D. VALANCE: Manufacturer’s standard aluminum fascia concealing shade roller and hardware extending from jamb to jamb, in “white” finish.
E. FABRICATE UNITS in sizes to span as indicated on the drawings.
F. ELECTRONIC DRIVE UNIT (EDU’s): Provide manufacturer’s standard tubular drive motor units with built-in reversible capacitor and as follows:
    1. Conceal EDU’s inside shade roller tube.
    2. Maximum current draw for each shade EDU: 2.0 Amps at 120VAC.

3. Total hanging weight of shade must not exceed 80 percent of the rated lifting capacity of the shade EDU and tube assembly.

G. ACCESSORY COMPONENTS: Provide all necessary controllers, connectors, power wiring from system control panel, interfaces, splitters, couplers, sensors and other components required, mounted in an accessible location as approved by the Architect.

H. SYSTEM DESCRIPTION

1. 7.5" extruded aluminum housing, powder coated White (standard color)
2. Bottom weight bar. Finish to match housing.
3. 80%-90% screen. Black, standard colors available for Owner's selection.
4. Under header install with 'L' channels not needed; housing will span without additional support brackets
5. Side-rail tracks mount to columns. 2 5/8" x 1.15" wide. Finish to match housing
6. Power: connect into motor on either end, left or right; 1.7 amps per motor. Hard wired or plugged in. line voltage. Standard 8' cord provided, longer cords are available
7. Junction box near one end of housing provided by others (electrician).
8. 1 motor: Gaposa preferred
9. Wireless remote with up to 75 foot range and/or timer options for control. Switch to be located inside with view of shade system to watch during operation.

PART 3 - EXECUTION

3.01 INSTALL WINDOW TREATMENTS level and plumb and aligned with adjacent units according to manufacturer's written instructions. Install intermediate supports as required to prevent deflection in the headrail. Allow clearances between adjacent shades and for operating glazed openings' operation hardware, as applicable.

3.02 INSTALLATION OF WINDOW DRAPERIES: Set tracks straight and level, and rigidly anchor to surfaces with fastenings, as required by building construction and per manufacturer's written instructions. Install wall mounted tracks with two brackets one (1) foot apart on each track end. Space intermediate supports not over four (4) feet apart. Leave sufficient ceiling clearance to allow for drapery heads. Attach draperies to tracks.

A. Where draperies abut overhead construction, hang draperies so that clearance between headings and overhead construction is 1/4 inch.
B. Where draperies extend to floor, install so that bottom hems clear finished floor by not more than 1 inch and not less than 1/2 inch.
C. Where draperies extend to windowsill, install so that bottom hems hang above sill line and clear sill line by not more than 1/2 inch.

3.03 STEAM AND DRESS DOWN DRAPERIES as required to produce crease- and wrinkle-free installation.

3.04 DRAPERY TRAVERSE ROD: Install in direction of travel on wall or ceiling as indicated in the Drawings. Install tension pulleys for each rod at eighteen (18) inches above the floor, and locate them so that they are not visible when drapes are hung. Anchor wall pulleys to window sills or walls as required by track location and length of drapes. Space intermediate supports at maximum of 48 inch centers.

3.05 ADJUST WINDOW TREATMENTS to operate smoothly, easily, safely, and free from binding or malfunctions throughout entire operational range. Replace damaged units that cannot be repaired.

3.06 CLEAN shade materials after installation, according to manufacturer's written instructions. Provide final protection and maintain conditions to ensure that units are without damage or deterioration at time of Substantial Completion.

3.07 TRAIN OWNER'S MAINTENANCE PERSONNEL to adjust, operate and maintain window treatment systems.

END OF SECTION 12 21 00

Division 22 – Plumbing Systems

REFER TO DRAWINGS FOR ALL PLUMBING SYSTEM SPECIFICATIONS

Division-23 – Heating Ventilating & Air-Conditioning (HVAC)

REFER TO DRAWINGS FOR ALL HVAC SYSTEM SPECIFICATIONS

Division-26 – Electrical

REFER TO DRAWINGS FOR ALL ELECTRICAL SYSTEM SPECIFICATIONS

Division-28 – Electronic Safety And Security

REFER TO DRAWINGS FOR ALL ELECTRONIC SAFETY AND SECURITY SPECIFICATIONS

Division 31 – Earthwork

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.01 WORK INCLUDED: Clear the site of all surface vegetation, rubbish and miscellaneous manmade objects objectionable to future site development.

1.02 SITE CONDITIONS: Clear the site with minimum interference of the surrounding properties, streets, walks, etc. Existing streets must be cleaned of any refuse from this operation. Damage to existing curbs, streets or utilities must be repaired at no additional cost to the Owner.

1.03 REMOVE trees, shrubs, and plants, including stumps and roots. Remove manmade objects such as concrete, metal fence posts, fences, utility lines, asphalt, and other materials not intended to be incorporated into the completed construction.

1.04 DO NOT REMOVE TOPSOIL from the site. Stockpile for later distribution on site.

1.05 REMOVE ALL DEBRIS from this operation to a suitable, legal disposal site.

END OF SECTION 31 10 00

SECTION 31 20 00 – EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED: Excavate, backfill, and compact the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents. Earthwork includes but is not limited to the following:

A. DEMOLISH AND REMOVE from the site all earthwork materials not utilized in the new construction
B. ENGINEERED-FILLS including remediated existing soil materials below new construction elements
C. PROVIDE ADDITIONAL SOIL MATERIALS for topsoil at lawn and planter areas, if necessary.
D. ROUGH and FINISH GRADING of the site to provide positive slope away from the buildings and to attain indicated finished grades.

1.02 A GEOTECHNICAL REPORT MAY BE PREPARED for the Owner. Comply with its recommendations when available. Base earthwork on the following, until report is available.

1.03 MECHANICAL / ELECTRICAL EARTHWORK: Excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical components must comply with specified requirements of this Section, but is not included as a part of the Work of this Section.

1.04 QUALITY ASSURANCES

A. A TESTING LABORATORY will be retained to: (1) classify proposed on-site and borrow soils to verify that soil materials comply with specified requirements for quality control testing, (2) approve earthwork materials, and (3) to provide continuous observation during placement of all fill materials.
B. COMPACTION DENSITY: Any reference to compaction or density is hereby defined as the density obtained in accordance with ASTM Specification D-698 Standard Proctor Density, unless otherwise indicated.

1.05 JOB CONDITIONS:

A. EXISTING UTILITIES: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
B. DEMOLISH AND COMPLETELY REMOVE from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.
C. IF BLASTING IS USED FOR ROCK REMOVAL, engauge an entity experienced with demonstrable successful prior rock-blasting operations similar to the Work of this Project. Limit peak velocities at the property lines to less than 2 inches per second, unless local ordinances require more stringent limitations. Prior to blasting, perform a pre-blast survey of adjacent structures; and provide vibration monitoring during all blasting operations. Blast with smaller amounts of explosives over a number of delays to reduce potential blasting damage.

1.06 PROTECTION

A. PROTECT STRUCTURES, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
B. PROTECT PERSONS AND PROPERTY at open excavations occurring as part of this work with barricades posted with warning lights. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.07 EARTHWORK SYSTEMS (subject to verification and confirmation with the Geotechnical report):

A. OVER-EXCAVATION & ENGINEERED FILL AT HIGH-PLASTIC SOILS:
   1. OVER-EXCAVATE FLOOR SLAB AREAS to a minimum depth of two (2) feet below the bottom of floor slabs.
   2. EXTEND OVER-EXCAVATION to not less than five feet beyond the perimeter outside edge of the building foundations to facilitate uniform compaction of the replacement materials, and wider at building corners to facilitate access and operation of compaction equipment.
   3. BUILDING FOOTINGS may be placed directly on existing soil materials.
B. ENGINEERED-FILLS: Backfill over-excavations and fill other areas with one of the following fill systems:
   1. LOW-PLASTIC APPROVED, IMPORTED SOIL materials.
   2. CRUSHED LIMESTONE consisting of one (1)-inch minus material, drained to daylight or to a sump pump, or
   3. LEAN-CONCRETE FILL (if used, widening of the footing excavation is not required), or.
   4. CHEMICALLY STABILIZED EXISTING SOIL material, stabilized by the addition of lime at a rate of seven percent (7%) or approx. eight (8) pounds of lime per cubic foot of soil. Use pulverizing and tilling equipment such as “gators” for mixing the lime into the soil.
   5. COMPACT approved soil material in multiple lifts and mechanically compact to not less than 95% of its maximum dry density, to the approval of the Owner’s Soils Engineer.
C. FOOTINGS ON BEDROCK: If bedrock is encountered within a footing excavations, extend the foundation down through the natural soil so that all footings bear on similar approved bedrock material, to the approval of the Owner’s Soil Engineer. At the Contractor’s option, excavate rock not less than one (1) foot below the footing bearing elevation, and backfill with engineered-fill, so that the foundations will bear on materials of similar subgrade characteristics.
D. EARTHWORK UNDER BUILDING FOOTINGS:

1. Insecticide treatment for termites over
2. Approved existing, undisturbed soil materials

E. EARTHWORK UNDER BUILDING SLAB-ON-GRADE:

1. Insecticide treatment for termites over
2. 4" thick drainage fill course – compacted to at least 98% of its maximum dry density, over
3. Approved Engineered-fill in multiple layers, over
4. Approved existing soil material, with the top 6 inches scarified and uniformly moisture conditioned and compacted to not less than 95% of maximum dry density

F. EARTHWORK UNDER FLEXIBLE ASPHALT PAVEMENT:

1. Herbicide treatment over
2. Crushed stone base: six (6) inch thick at parking areas or eight (8) inch thick at drive lanes, over
3. Approved existing soil materials or compacted fill materials until required subgrade is obtained, with the top 6 inches of of approved existing materials scarified and uniformly moisture conditioned and compacted to not less than 95% of maximum dry density

G. EARTHWORK UNDER LIGHT-DUTY RIGID CONCRETE PAVEMENT (including walks):

1. Herbicide treatment over
2. Approved existing soil materials or compacted fill materials until required subgrade is obtained, with the top 6 inches scarified and uniformly moisture conditioned and compacted to not less than 95% of maximum dry density

1.08 SOIL MATERIALS:

A. PROVIDE SATISFACTORY BORROW SOIL MATERIALS from off-site when sufficient approved soil materials are not available at the existing site. All fill and backfill materials are subject to the approval of the Testing Laboratory.
B. SATISFACTORY FILL MATERIALS are soil or soil-rock mixture free from clay, debris, waste, vegetable and other deleterious matter, complying with ASTM D 2487 Soil Classification Groups CL, ML, CL-ML, SP, GP AND GW, with 100% passing a 3-inch sieve, no more than 60% passing a 200 sieve and “Fine fraction” (passing the 40 sieve) characteristics of:

1. liquid limit: < 45 and
2. plasticity index: < 25

1.09 UNSATISFACTORY SOIL MATERIALS contain clay, rock or gravel larger than 3” in any dimension, debris, waste or frozen materials, vegetable and other deleterious matter, and are further defined as those complying with ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CH, OL, OH and PT.

1.10 STRUCTURAL BACKFILL, GRAVEL SURFACING, or SUBBASE MATERIAL (under floor slabs): Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, and natural or crushed sand, with not more than 5% passing a No. 200 sieve. (tunnel rock and crushed concrete will not be permitted).

1.11 DRAINAGE FILL: washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2" sieve, not more than 5% passing a No. 4 sieve, and not more than 1% passing a No. 200 sieve. (tunnel rock and crushed concrete will not be permitted).

1.12 FILTERING MATERIAL: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 50 sieve.

1.13 IMPERVIOUS FILL: Clayey gravel and sand mixture capable of compacting to a dense state.

1.14 TOPSOIL

A. STRIP TOPSOIL and stockpile it for re-use on site.
B. PROVIDE ADDITIONAL TOPSOIL if quantity is insufficient, from local sources having similar soil characteristics as that at the project site.

1.15 TRENCH BACKFILL:

A. TRENCH BACKFILL AT PAVEMENT: Under and within 5 feet of paved areas, provide a uniformly graded mixture of natural or crushed gravel, crushed stone, or crushed slag, with 100% passing a No. 4 sieve and not more than 5% passing a No. 200 sieve (tunnel rock and crushed concrete will not be permitted).
B. PIPE BEDDING: Provide a uniformly graded mixture of natural or crushed gravel, crushed stone, or crushed slag, 1/4" to 3/4" size, meeting ASTM C-33 for soundness and ASTM C-67 for Gradation. Blocking for grade not permitted.

1.16 SOIL TREATMENTS:

A. TERMITE TREATMENT: commercial chemical or combination of chemical toxicants intended as a soil poisoning to control subterranean termites, approved for use by governmental authorities, in maximum strength allowed.
B. HERBICIDE TREATMENT: Commercial chemical compound for weed control, registered by the Environmental Protection Agency, in granular, liquid, or wettable powder form.
C. LIME - CHEMICAL STABILIZATION ADDITIVE: "Code L" type Lime (locally available calcium oxide by-product also known as lime kiln dust). Add water to allow for proper hydration of the lime.
D. FLY-ASH - CHEMICAL STABILIZATION ADDITIVE: ASTM C 618 Class-C fly ash – between 12 to 16 percent on a dry-weight basis, per approval of Testing Laboratory.

PART 2 - EXECUTION

2.01 FAMILIARIZATION: Prior to all work of this Section, become familiar with the Site, the Site conditions, and all portions of work falling within this Section.

2.02 PROTECT STRUCTURES, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

2.03 PROTECT SUBGRADES AND FOUNDATION SOILS against freezing temperatures or frost. Provide protective insulating materials as necessary.

2.04 PROVIDE EROSION CONTROL MEASURES to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

2.05 DEWATERING

A. PROTECT SUBGRADES AND FOUNDATION SOILS from softening and damage by rain or water accumulation.
B. PROVIDE DRAINAGE DITCHES and/or pumping equipment necessary to remove promptly and dispose of all water entering the excavations. Dewater by means which will ensure dry excavations and the preservation of final lines and grades of bottoms of excavations.
C. REMOVE SOFTENED SUB-GRADE: Where soil has been softened or eroded by flooding or placement during unfavorable weather, remove all damaged areas and recompact at no additional cost to the Owner.

2.06 EXCAVATION:

2.07 EXCAVATION IS UNCLASSIFIED, and includes excavation of subgrade elevations indicated, regardless of the character of materials and obstructions encountered.

2.08 CLASSIFIED EXCAVATION:

A. EXCAVATE to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and verified. The Contract Sum will be adjusted for rock excavation according to Unit Prices included in the Contract Documents. Changes in the Contract time may be authorized for rock excavation.
B. ROCK EXCAVATION INCLUDES removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
    1. 24 inches outside of concrete forms other than at footings.
    2. 12 inches outside of concrete forms at footings.
    3. 6 inches outside of minimum required dimensions of concrete cast against grade.
    4. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    5. 6 inches beneath bottom of concrete slabs on grade.
    6. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
    7. 12 inches below footings.
C. EXCAVATE ROCK BELOW FOOTINGS and over-excavate at soft soils to a minimum of one (1) foot below the footing bottom, to allow for more consistent bearing conditions, in accordance with requirements of the Geotechnical Report. Do not excavate rock until it has been classified and cross sectioned by the Owner's Testing and Inspection agency.

2.09 UNAUTHORIZED EXCAVATION consists of removal of materials beyond required subgrade elevations or dimensions without specific direction. Unauthorized excavation, as well as remedial work, must be at the Contractor's expense.

2.10 STABILITY OF EXCAVATIONS: Slope sides of excavations to comply with local codes and ordinances, OSHA and requirements of the Testing Laboratory. Step and bank all slopes exceeding five (5) horizontal to one (1) vertical, with benches spaced so that the height of the cut at the up-slope end of the bench is less than 5 feet. Shore and brace where sloping is not possible because of space restrictions or stability of the material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

2.11 EXCAVATION FOR STRUCTURES

A. CONFORM TO ELEVATIONS AND DIMENSIONS SHOWN within a tolerance of plus or minus 0.10 foot. Extend excavation to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
B. PROTECT EXCAVATION BOTTOMS AGAINST FREEZING when atmospheric temperature is less than 35 degrees F.
C. EXCAVATE FOR FOOTING & FOUNDATIONS only after general site excavation filling and grading are complete. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
D. EXCAVATION FOR WALKS AND PAVEMENTS: Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

2.12 EXCAVATION FOR UTILITY TRENCHES:

A. EXCAVATE TRENCHES to uniform widths to provide a working clearance of 12 inches on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
B. TRENCH BOTTOMS: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.
C. FOR PIPES OR CONDUIT LESS THAN 6 INCHES in nominal diameter and for flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
D. FOR PIPES AND CONDUIT 6 INCHES OR LARGER in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches below invert elevation to receive bedding course.

2.13 APPROVAL OF SUBGRADE

A. NOTIFY TESTING LABORATORY when excavations have reached required subgrade.
B. UNFORSEEN ADDITIONAL EXCAVATION: If Testing Laboratory determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed. Unforeseen additional excavation and replacement material will be paid for in accordance with the Construction Contract's provisions for changes in Work.
C. RECONSTRUCT SUBGRADES damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect, at no additional cost to the Owner.

2.14 UNAUTHORIZED EXCAVATION

A. FILL UNAUTHORIZED EXCAVATION UNDER FOUNDATIONS or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect.
B. FILL UNAUTHORIZED EXCAVATIONS UNDER OTHER CONSTRUCTION as directed by the Architect. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Architect.

2.15 STORAGE OF SOIL MATERIALS

A. STOCKPILE EXCAVATED MATERIALS acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.
B. STOCKPILE SOIL MATERIALS away from edge of excavations. Do not store within drip line of remaining trees.

2.16 BACKFILL

A. BACKFILL EXCAVATIONS PROMPTLY, but not before completing the following:
    1. ACCEPTANCE OF CONSTRUCTION BELOW FINISH GRADE including, where applicable, dampproofing, waterproofing, and perimeter insulation.
    2. SURVEYING LOCATIONS of underground utilities for record documents.
    3. TESTING, INSPECTING, AND APPROVAL of underground utilities.
    4. REMOVAL OF CONCRETE FORMWORK.
    5. REMOVAL OF TRASH and debris from excavation.
    6. REMOVAL OF TEMPORARY SHORING and bracing, and sheeting.
    7. INSTALLING PERMANENT or temporary horizontal bracing on horizontally supported walls.
B. PLACE MATERIALS evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around the structure, piping or conduit to approximately same elevation in each lift.

2.17 TERMITE AND HERBICIDE TREATMENT: Install termite treatment in subsoil below building pad and 5'-0" outside exterior perimeter of pad. Install herbicide treatment below all pavements. Comply with manufacturer's strict written instructions for installation procedures.

2.18 UTILITY TRENCH BACKFILL

A. PLACE AND COMPACT BEDDING COURSE on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
B. CONCRETE BACKFILL TRENCHES that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.
C. PROVIDE 4 INCH THICK CONCRETE BASE SLAB support for piping or conduit less than 30 inches below surface of roadways, streets, parking areas, or driveways (anywhere where vehicular traffic occurs). After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
D. PLACE AND COMPACT INITIAL BACKFILL of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
E. CAREFULLY COMPACT material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system. Coordinate backfilling with utilities testing. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed. Place and compact final backfill of satisfactory soil material to final subgrade. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

2.19 FILL

A. PREPARATION: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.
B. WHEN SUBGRADE or existing ground surface to receive fill has a density less than that required for the fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.
C. PLACE FILL MATERIAL IN LAYERS to required elevations for each location as indicated above.

2.20 MOISTURE CONTROL

A. UNIFORMLY MOISTEN OR AERATE subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content, preventing free water from appearing on the surface during or subsequent to compaction operations.
B. DO NOT PLACE BACKFILL or fill material on surfaces that are muddy, frozen, or contain frost or ice.

C. REMOVE AND REPLACE, OR SCARIFY and air-dry all satisfactory soil material that is too wet to compact to specified density. Stockpile or spread and dry removed wet satisfactory soil material. Maintain moisture content until floor slab, pavement, or next layer of fill is constructed. If drying has occurred, scarify, re-moisten and recompact subgrade to 9" minimum depth or remove affected material.

2.21 COMPACTION

A. COMPACTION EQUIPMENT: Utilize sheepsfoot rollers, multiple-wheel pneumatic-tired rollers or other type of suitable compaction equipment, able to compact fill to specified density while material is at specified moisture content.
B. COMPACTION MUST BE CONTINUOUS over area and equipment must make sufficient trips to insure that required density has been obtained.
C. PLACE BACKFILL AND FILL MATERIALS in layers not more than eight (8) inches in loose depth for material compacted by heavy compaction equipment, and not more than four (4) inches in loose depth for material compacted by hand-operated tampers.
D. PLACE BACKFILL AND FILL MATERIALS EVENLY on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
E. PLACE AND COMPACT SOIL MATERIAL in layers to required subgrade elevations, and to provide minimum density (or range of percentage of maximum density) specified above in accordance with ASTM D 1557, for each area, to the approval of the Owner's testing agency.
F. PROOF-ROLL SUBGRADES at floor slab and pavements with a loaded tandem axle dump truck or a scraper when excavation has reached required sub-grade elevations.

2.22 GRADING

A. UNIFORMLY GRADE AREAS to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
B. PROVIDE A SMOOTH TRANSITION between existing adjacent grades and new grades.
C. CUT OUT SOFT SPOTS, fill low spots, and trim high spots to conform to required surface tolerances.
D. SLOPE GRADES to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
    1. Lawn or Unpaved Areas: Plus or minus 1/2 inches
    2. Walks: Plus or minus 1/2 inches
    3. Pavements: Plus or minus 1/2 inch.
    4. Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10 foot straightedge.

2.23 SUBBASE AND BASE COURSES

A. UNDER PAVEMENTS AND WALKS, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.
B. COMPACT SUBBASE AND BASE COURSES at optimum moisture content to required grades, lines, cross sections and thickness to not less than 95 percent of ASTM D 4254 relative density.
C. SHAPE SUBBASE AND BASE to required crown elevations and cross-slope grades.
D. WHEN THICKNESS OF COMPACTED SUBBASE OR BASE COURSE IS 6 INCHES OR LESS, place materials in a single layer.
E. WHEN THICKNESS OF COMPACTED SUBBASE OR BASE COURSE EXCEEDS 6 INCHES, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
F. PAVEMENT SHOULDERS (when applicable): Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12 inches wide of acceptable soil materials and compact simultaneously with each subbase and base layer.

2.24 DRAINAGE FILL

A. UNDER SLABS-ON-GRADE, place drainage fill course on prepared subgrade.
B. COMPACT DRAINAGE FILL to required cross sections and thickness. When compacted thickness of drainage fill is 6 inches or less, place materials in a single layer. When compacted thickness of drainage fill exceeds 6 inches thick place materials in equal layers, with no layer more than 6 inches thick nor less than 3 inches thick when compacted.
C. APPLY SOIL TREATMENTS in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry subbase.

2.25 FIELD QUALITY CONTROL

A. TESTING AGENCY SERVICES: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
B. PERFORM FIELD IN-PLACE DENSITY TESTS according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gauges according to ASTM D 3017.
    1. FOOTING SUBGRADE: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Testing Laboratory.
    2. PAVED AND BUILDING SLAB AREAS: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

3. FOUNDATION WALL BACKFILL: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
4. TRENCH BACKFILL: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.

C. SCARIFY AND MOISTEN OR AERATE, OR REMOVE AND REPLACE SOIL to the depth required, recompact and retest until required density is obtained, if testing agency reports that subgrades, fills, or backfills are below specified density,

2.26 PROTECTION

A. PROTECT NEWLY GRADED AREAS from traffic, freezing, and erosion. Keep free of trash and debris.
B. REPAIR AND RE-ESTABLISH GRADES to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.
C. WHERE SETTLING OCCURS during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
D. RESTORE APPEARANCE, QUALITY, AND CONDITION of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

2.27 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. REMOVE SURPLUS SATISFACTORY SOIL AND WASTE MATERIAL, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 31 20 00

SECTION 31 31 16 – TERMITE CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Soil treatment.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood preservative treatment by pressure process.
2. Section 076200 "Sheet Metal Flashing and Trim" for custom-fabricated, metal termite shields.

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.
2. Include the EPA-Registered Label for termiticide products.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Product Certificates: For each type of termite control product.
C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

D. Research/Evaluation Reports: For metal mesh barrier system, from <**Insert applicable model code organization**>.
E. Sample Warranties: For special warranties.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located **and who employs workers trained and approved by manufacturer to install manufacturer's products**.

1.07 FIELD CONDITIONS

A. Soil Treatment:

1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.08 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites**, including Formosan termites (Coptotermes formosanus)**. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain termite control products from single source **manufacturer**.

2.02 SOIL TREATMENT

A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.

1. Service Life of Treatment: Soil treatment termiticide that is effective for not less than [**three**] [**five**] <**Insert number**> years against infestation of subterranean termites.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
B. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
    1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.03 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.
    1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
    2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
    3. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
    4. Masonry: Treat voids.
    5. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.
B. Post warning signs in areas of application.
C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.04 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

3.05 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include **12** months' full maintenance by **skilled employees of termite-control-treatment Installer or manufacturer's authorized service representative**. Include periodic maintenance as required for proper performance according to the product's EPA-Registered Label and manufacturer's written instructions. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
B. Continuing Maintenance Proposal: Provide from termite-control-treatment Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
    1. Include periodic inspection for termite activity and effectiveness of termite treatment according to manufacturer's written instructions.

END OF SECTION 31 31 16

END OF DIVISION 31

END OF ARCHITECTURAL SPECIFICATIONS

Division 32 – Exterior Improvements & Landscape

REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE SPECIFICATIONS

SECTION 32 31 19 – DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.01 WORK INCLUDED: Provide fencing and gates as a complete system, including necessary erection accessories, fittings, and fastenings, as specified herein and as required by the project conditions. The Work of this Section includes:

A. Concrete foundation for posts and center drop section at gates, per requirements of other Sections.
B. Colored finished fencing and gates, where indicated on the Drawings

1.02 PROVIDE TEMPORARY FENCING and gates as required to accommodate construction operations at the Project site. Coordinate with Division-01 requirements.

1.03 SINGLE-SOURCE RESPONSIBILITY: Obtain fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

1.04 REFERENCES

A. AMERICAN FENCE ASSOCIATION (AFA): Installation Standards
B. AMERICAN SOCIETY FOR TESTING MATERIALS INTERNATIONAL (ASTM):

1. ASTM A123 - Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
2. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
3. ASTM A501- Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
4. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
5. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
6. ASTM B 117 - Salt Spray (Fog) Testing.

1.05 SUBMITTALS:

A. PROVIDE PRODUCT DATA including manufacturer's technical data, and installation instructions for metal fencing, fabric, gates and operators.
B. PROVIDE SHOP DRAWINGS showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

PART 2 - MATERIALS

2.01 ALUMINUM PRE-MANUFACTURED FENCE SYSTEM

A. Basis of Design:

1. Manufacturer: Ameristar
2. Type / Model: Echelon Plus
3. Style: Majestic
4. Pickets: .75"sq x .045" wall
5. ForeRunner™ Rails: 1.4375" x 1.25" x(.090" side / .060" top)
6. Posts w/ reinforced internal web: 2.5"sq x .060"
7. Height: 4 feet.
8. Color: Black

2.02 FENCING DESIGN & DESIGN OPTIONS: Picket, rail, post, and column sizes may vary depending on standard and stock members utilized by the manufacturer. Alternate sizes and spacing of picket members must provide equivalent structural characteristics of the in-place fence structure and must provide, in each member, equivalent Moment of Inertia, I, about the principal axis of the component member as that of the specified sizes.

A. Post and Column Caps: Square caps firmly affixed on extending end.
B. Fasteners: Self-drilling steel hex head, zinc-plated and coated to match fencing system.

2.03 POWDER-COATED COLORED COATING MATERIAL (where indicated on the Drawings): Posts, Post Caps, Rails and fabric mesh must be a factory electrostatically applied TGIC polyester powder coating of the “Super Durable TGIC” class. Powder coated finish must meet or exceed the following:

A. ASTM B117 Salt Spray Resistance, 5% salt spray at 95° F and 95% relative humidity, 2,000 hour test without loss of adhesion.
B. ASTM D3359, Measuring Adhesion by Tape Test, Method B, coating retention of not less than 95%.
C. ASTM D2794, Impact Resistance, minimum resistance to impact not less than 120 in. /lb.
D. South Florida Weatherability testing, no film failure and 65% gloss retention as measured by ASTM D523, Standard Test Method for Specular Gloss, after 60 months of 45 degree South Florida Exposure Testing.
E. ASTM D3363, Film Hardness by Pencil Test, minimum hardness: 2H.
F. THICKNESS: Minimum film thickness of 2-3 mils as measured by manufacturer’s standard powder coat measurement and inspection procedures.
G. PRETREATMENT: The fence framework must be prepared using a pre-treatment cleaning system to remove foreign material and to properly prepare the surface to achieve the coating system requirements specified above.

H. ZINC COATING: Wire fabric must be zinc coated with a “regular coating” classification in accordance with ASTM A 641 prior to powder coating.
I. CURING: Heat cure in accordance with powder manufacturer’s prescribed cure schedule to bond finish to metal substrate.

PART 3 - EXECUTION

3.01 EXAMINATION & INSPECTION: Examine areas and conditions under which the Work of this Section will be performed. Do not proceed if conditions exist that are detrimental to proper and timely completion. Commencement of this Work will be construed as acceptance of existing conditions or prior work by others, and assumption of responsibility for satisfactory installation.

3.02 SETTING POSTS:

A. IN GROUND EMBED:

1. Center and align posts in holes 3 inches above bottom of excavation.
2. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
3. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

B. SURFACE MOUNTED:

1. Install per manufacturers recommendation and anchor details.

3.03 INSTALL FENCE framework, fencing, gates and accessories in accordance with manufacturer's published instructions and installation drawings.

3.04 INSTALL GATES plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.05 INSTALL SLIDING GATE by attaching bolt-on hardware supplied by manufacturer. Mount bottom roller guide assembly on anchors set into concrete each side of gate. Attach brush sweep along bottom rail of gate with stainless steel fasteners at 4 inches on center. Adjust sweep to make contact with pavement surface.

3.06 SET POSTS as close to building walls as practical., when applicable.

3.07 INSTALL FENCING and accessories in accordance with installation instructions and in accordance with American Fence Association (AFA) Standards.

3.08 FIELD QUALITY CONTROL

A. Inspect fencing system installation and attachment to building structure when applicable.
B. Inspect gate operation and hardware installation.
C. Correct deficiencies in Work which inspection indicates are not in compliance with Contract Documents.

END OF SECTION 32 31 19

Division 33 – Utilities

REFER TO CIVIL DRAWINGS FOR UTILITY SPECIFICATIONS