PROJECT MANUAL
FOR
NOYES LIBRARY FOR YOUNG CHILDREN REHABILITATION AND RENOVATION
10237 CARROLL PLACE
KENSINGTON
Montgomery County, Maryland

RFP No. 1169193

Volume 1 of 2
Bidding and Contracting Requirements and Division 1 through Division 14

Owner/Manager:
Division of Building Design & Construction
Department of General Services
110 Monroe Street
Rockville, Maryland 20850

Tenant/User Agency
Montgomery County Public Libraries

Architect of Record: Wiedemann Architects, LLC
Consulting Architect: Grimm + Parker
Civil Engineer: Adtek Engineers, Inc.
Structural Engineer: Columbia Engineering, Inc.
MEP Engineer: Gipe Associates, Inc.

May 1, 2024

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SECTION 00 31 01
INFORMATION AVAILABLE TO BIDDERS

PART 1 - General

1.1 REPORTS

A. The following information is included in the Project Manual for bidders' use in preparing bids, but is not part of the Contract Documents, and does not relieve the bidders from doing their own investigation to determine the accuracy of the information:

1. Asbestos and Lead-Based Paint Inspection Report by Apex Companies, LLC; dated December 4, 2014.

B. The above material cannot, by its nature, reveal all conditions that may exist at the Place of the Work. Should conditions be found to vary substantially from the above, advise the Architect accordingly and request direction.

1.2 ATTACHMENT

Asbestos and Lead-Based Paint Inspection Report by Apex Companies, LLC; dated December 4, 2014.

PART 2 - PART 2 PRODUCTS (NOT USED)

PART 3 - PART 3 EXECUTION (NOT USED)

END OF SECTION

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December 4, 2014

Mr. Mike Lowe
Capital Project Manager
Department of General Services
Division of Building Design & Construction
101 Monroe Street, 11th floor
Rockville, MD. 20850

Re: Asbestos and Lead-based Paint Inspection
Noyes Library
Kensington, Maryland
Apex Job No: 12186.007

Dear Mr. Lowe:

Apex Companies, LLC (Apex) is pleased to present the following summary report on the asbestos and lead-based paint inspection of the above-referenced building, located in Kensington, Maryland.

If you have any questions or comments, please contact us.

Sincerely,
Apex Companies, LLC

Daniel Admasu
Project Manager
Maryland Division

ASBESTOS AND LEAD-BASED PAINT INSPECTION

Noyes Library
Kensington, Maryland

Apex Job No.: 12186.007

December 4, 2014

Prepared for:

Mr. Mike Lowe
Capital Project Manager
Department of General Services
Division of Building Design & Construction
101 Monroe Street, 11th floor
Rockville, MD 20850

Prepared by:

Daniel Admasu
Project Manager/EPA-accredited Inspector
Maryland Division

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1.0 EXECUTIVE SUMMARY

Apex Companies, LLC (Apex) conducted asbestos and lead-based paint (LBP) inspection at the Noyes Library, located at 10237 Carroll Place in Kensington, Maryland. The interior and exterior of the building was inspected for the presence of asbestos-containing materials (ACM) and LBP. The inspection services were conducted on November 18, 2014.

Asbestos Survey

Apex conducted asbestos inspection of the building using guidelines set forth by the Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (EPA). Apex identified nine (9) homogeneous materials and collected nineteen (19) bulk samples from building components that were suspected of ACM. The samples were sent to EMSL Analytical Inc., of Beltsville, Maryland for analysis.

ACM is defined by federal and the State of Maryland regulations as a material that contains greater than one (1) percent asbestos. Based on laboratory results the following building materials were determined to be ACM:

- Brown wall and ceiling plaster in the library, bathroom and storage room.
- Joint compound on sheetrock wall in bathroom and storage room.

Lead Inspection

Apex conducted a lead inspection by using a portable X-ray fluorescence (XRF) analyzer. The current definition of LBP established by the State of Maryland is greater than 0.7 milligrams of lead per square centimeter of surface area (mg/cm^2) using XRF analyzer.

The following summarizes information concerning the positive materials tested:

- Yellow and brown pint on exterior wall sidings.
- Brown painted window shutter on exterior walls.
- Red painted window sash on exterior windows.
- Yellow paint on interior walls.

More detailed information LBP is summarized in **Table 1.** The LBP testing is intended to provide testing data to employers, as required by OSHA, so that measures can be taken to prevent lead exposures to workers during renovation and/or demolition activities. This inspection does not include risk

assessment of lead hazard. There is no requirement for paint coatings or lead containing components to be removed prior to demolition. However if surfaces identified in this report that are lead containing will be disturbed (i.e., drilling, sanding, burning, non-intact component removal, etc.) during demolition and/or renovation in order to achieve the project requirements, precautions shall be taken in accordance with the OSHA Lead in Construction Standard (29 CFR 1926.62) and State of Maryland regulations.

2.0 FINDINGS

Asbestos

ACM is defined by federal and the State of Maryland regulations as a material that contains greater than one (1) percent asbestos. Based on laboratory results the following building materials were determined to be ACM:

- Brown wall and ceiling plaster in the library, bathroom and storage room.
- Joint compound on sheetrock wall in bathroom and storage room.

Table 1, Homogeneous Material List, provides a complete list of all identified suspect ACMs. Each suspect material is grouped by size, texture, friability (ability to be reduced to powder by hand pressure when dry), and approximate quantities. Laboratory analytical data are attached in **Appendix A**.

Table 1
Homogeneous Materials List
(All materials suspected of being asbestos-containing)

Noyes Library
Kensington, Maryland

Description of Material	Friable (Yes/No)	Location	Sample Numbers	ACM[a] (Yes/No)	Approx. Quantity	Material Condition	Response Action
Surfacing Materials							
White and brown wall and ceiling plaster	**No**	**Library wall; storage and bathroom ceiling**	**B5, B6, B7**	**Yes**	**700 s. f.**	**Good**	**Manage Under O&M Plan**
Thermal System Insulation (TSI) Materials							
None observed							
Miscellaneous Materials							
White 12"x12" floor tile with gray, blue and red specs and mastic	No	Bathroom and entrance foyer	B1, B2,	No	NA	NA	NA
Yellow mastic behind rubberized baseboard	No	Library	B3, B4	No	NA	NA	NA
Joint compound on walls	**No**	**Storage room, bathroom**	**B8, B9, B10**	**Yes**	**250 s. f.**	**Good**	**Manage Under O&M Plan**
Drywall	No	Storage room, bathroom	B11, B12	No	NA	NA	NA
White 2'x4' ceiling tile	Yes	Library and storage room	B13, B14	No	NA	NA	NA
Black roofing underlayment	No	Attic	B15, B16	No	NA	NA	NA
Gray window caulk	No	On exterior window	B17	No	NA	NA	NA
Yellow carpet mastic	No	Library and storage room	B18, B19	No	NA	NA	NA

[a]ACM: A homogenous material is considered asbestos-containing if any one sample is found to contain greater than one present asbestos.

Lead-Based Paint (LBP)

The purpose of the inspection was to determine if LBP is present on the building components which may be directly affected during the course of construction and/or demolition activities.

Inspection Procedures

The lead inspection was conducted by using a portable XRF analyzer. The current definition of LBP established by the State of Maryland is greater than 0.7 mg/cm^2 of surface area using XRF analyzer.

Findings

The following summarizes information concerning the positive building components found to contain lead above 0.7 mg/cm^2 by XRF:

- Yellow and brown pint on exterior wall sidings.
- Brown painted window shutter on exterior walls.
- Red painted window sash on exterior windows.
- Yellow paint on interior walls.

More detailed information concerning the positive materials tested can be found in **Table 2.** All of the XRF readings are summarized in **Table 3.**

Table 2
Positive XRF Reading Results Summary

Noyes Library
Kensington, Maryland

Reading No.	Room #	Side	Component	Sub Component	Substrate	Color	Condition	Results	Lead Level mg/cm^2	Action Level mg/cm^2
4	Exterior	A	Wall		Wood	Yellow	Good	Positive	8.2	0.7
5	Exterior	A	Wall		Wood	Yellow	Good	Positive	1.9	0.7
6	Exterior	B	Wall		Wood	Yellow	Good	Positive	8.5	0.7
7	Exterior	C	Wall		Wood	Yellow	Good	Positive	2.9	0.7
8	Exterior	C	Wall		Brick	Yellow	Good	Positive	3.2	0.7
9	Exterior	C	Window	Shutter	Wood	brown	Good	Positive	38.9	0.7
10	Exterior	A	Window	Shutter	Wood	brown	Good	Positive	37.6	0.7
11	Exterior	A	Window	Shutter	Wood	brown	Good	Positive	38.2	0.7
13	Exterior	A	Window	Sash	Wood	Red	Good	Positive	0.7	0.7
25	Interior Entrance	A	Wall		Wood	mustard	Good	Positive	1.2	0.7
26	Interior Entrance	B	Wall		Wood	mustard	Good	Positive	0.8	0.7
28	Interior Entrance		Ceiling	2x4 Beam	Wood	mustard	Good	Positive	0.9	0.7
31	Interior Main Room	B	Wall		Plaster	Yellow	Good	Positive	14.1	0.7
34	Interior Main Room	C	Wall		Plaster	Yellow	Good	Positive	12.4	0.7
41	Interior Storage	A	Wall		Plaster	Yellow	Good	Positive	12.5	0.7
53	Interior Attic	D	Window	Sash	Wood	White	Good	Positive	33.1	0.7
56	Bathroom	A	Wall		Plaster	Yellow	Good	Positive	12.5	0.7
64	Main Room	C	Wall		Plaster	Yellow	Good	Positive	10.1	0.7
65	Main Room	B	Wall		Plaster	Yellow	Good	Positive	11.2	0.7

Table 3
All XRF Reading Results Summary

Noyes Library
Kensington, Maryland

Reading No.	Room #	[a]Side	Component	Sub Component	Substrate	Color	Condition	Results	Lead Level mg/cm^2	Action Level mg/cm^2
1	Calibrate							Positive	0.72	0.7
2	Calibrate							Positive	0.71	0.7
3	Calibrate							Positive	0.71	0.7
4	Exterior	A	Wall		Wood	Yellow	Good	Positive	8.2	0.7
5	Exterior	A	Wall		Wood	Yellow	Good	Positive	1.9	0.7
6	Exterior	B	Wall		Wood	Yellow	Good	Positive	8.5	0.7
7	Exterior	C	Wall		Wood	Yellow	Good	Positive	2.9	0.7
8	Exterior	C	Wall		Brick	Yellow	Good	Positive	3.2	0.7
9	Exterior	C	Window	Shutter	Wood	Brown	Good	Positive	38.9	0.7
10	Exterior	A	Window	Shutter	Wood	Brown	Good	Positive	37.6	0.7
11	Exterior	A	Window	Shutter	Wood	Brown	Good	Positive	38.2	0.7
12	Exterior	A	Window	Sash	Wood	Red	Good	Negative	0.5	0.7
13	Exterior	A	Window	Sash	Wood	Red	Good	Positive	0.7	0.7
14	Exterior	A	Window	Sill	Wood	Brown	Good	Negative	0.25	0.7
15	Exterior	A	Window	Sill	Wood	Brown	Good	Negative	0.27	0.7
16	Exterior	A	Window	Casing	Wood	Brown	Good	Negative	0.4	0.7
17	Exterior	A		Hand Rail	Metal	Brown	Good	Negative	0.07	0.7
18	Exterior	A		Hand Rail	Metal	Brown	Good	Negative	0.01	0.7
19	Exterior	A	Door		Wood	Blue	Good	Negative	0	0.7
20	Exterior	A	Door Frame		Wood	Blue	Good	Negative	0	0.7
21	Interior Entrance	A	Window	Sash	Wood	White	Good	Negative	0.19	0.7

Reading No.	Room #	[a]Side	Component	Sub Component	Substrate	Color	Condition	Results	Lead Level mg/cm^2	Action Level mg/cm^2
22	Interior Entrance	A	Window	Sill	Wood	White	Good	Negative	0.26	0.7
23	Interior Entrance	A	Door		Wood	White	Good	Negative	0	0.7
24	Interior Entrance	A	Door Frame		Wood	White	Good	Negative	0.4	0.7
25	Interior Entrance	A	Wall		Wood	Mustard	Good	Positive	1.2	0.7
26	Interior Entrance	B	Wall		Wood	Mustard	Good	Positive	0.8	0.7
27	Interior Entrance		Ceiling		Wood	Mustard	Good	Negative	0.6	0.7
28	Interior Entrance		Ceiling	2x4 Beam	Wood	Mustard	Good	Positive	0.9	0.7
29	Interior Entrance	A	Door		Wood	White	Good	Negative	0.2	0.7
30	Interior Entrance	A	Door Frame		Wood	White	Good	Negative	0.13	0.7
31	Interior Main Room	B	Wall		Plaster	Yellow	Good	Positive	14.1	0.7
32	Interior Main Room	D	Wall		Plaster	Yellow	Good	Negative	0	0.7
33	Interior Main Room	D	Wall		Plaster	Yellow	Good	Negative	0	0.7
34	Interior Main Room	C	Wall		Plaster	Yellow	Good	Positive	12.4	0.7
35	Interior Main Room	C	Window	Sill	Wood	Yellow	Good	Negative	0.18	0.7
36	Interior Main Room	C	Window	Casing	Wood	White	Good	Negative	0.14	0.7
37	Interior Main Room	C	Window	Sash	Wood	White	Good	Negative	0.4	0.7
38	Interior Storage	A	Window	Sash	Wood	White	Good	Negative	0.28	0.7
39	Interior Storage	A	Window	Sill	Wood	White	Good	Negative	0.22	0.7
40	Interior Storage	A	Window	Casing	Wood	White	Good	Negative	0.2	0.7
41	Interior Storage	A	Wall		Plaster	Yellow	Good	Positive	12.5	0.7
42	Interior Storage	B	Wall		Drywall	Yellow	Good	Negative	0.08	0.7
43	Interior Storage	D	Wall		Drywall	Yellow	Good	Negative	0	0.7
44	Interior Storage	D	Wall		Drywall	Yellow	Good	Negative	0.04	0.7
45	Interior Storage	D	Wall		Drywall	Yellow	Good	Negative	0.06	0.7
46	Interior Storage	D	Door Frame		Drywall	White	Good	Negative	0.19	0.7

Reading No.	Room #	[a]Side	Component	Sub Component	Substrate	Color	Condition	Results	Lead Level mg/cm^2	Action Level mg/cm^2
47	Interior Storage	D	Door Frame		Drywall	White	Good	Negative	0.03	0.7
48	Interior Storage	B	Door Frame		Drywall	White	Good	Negative	0.01	0.7
49	Interior Storage	B	Door		Drywall	White	Good	Negative	0.09	0.7
50	Interior Storage	A	Wall		Drywall	White	Good	Negative	0.01	0.7
51	Interior Storage	C	Wall		Drywall	White	Good	Negative	0.01	0.7
52	Interior Storage	B	Bookshelves		Wood	White	Good	Negative	0	0.7
53	Interior Attic	D	Window	Sash	Wood	White	Good	Positive	33.1	0.7
54	Interior Attic	B	Window	Sash	Wood	White	Good	Negative	0.26	0.7
55	Bathroom	B	Window	Casing	Wood	White	Good	Negative	0.26	0.7
56	Bathroom	A	Wall		Plaster	Yellow	Good	Positive	12.5	0.7
57	Bathroom	B	Wall		Plaster	Yellow	Good	Negative	0.01	0.7
58	Bathroom	A	Pipe		Metal	Yellow	Good	Negative	0.09	0.7
59	Bathroom	A	Pipe		Metal	Yellow	Good	Negative	0.17	0.7
60	Bathroom	D	Door Frame		Metal	White	Good	Negative	0.02	0.7
61	Bathroom	D	Door		Metal	White	Good	Negative	0.05	0.7
62	Bathroom		Floor	Tile	Metal	White	Good	Negative	0	0.7
63	Fire Place	C	Wall		Brick	Red	Good	Negative	0.16	0.7
64	Main Room	C	Wall		Plaster	Yellow	Good	Positive	10.1	0.7
65	Main Room	B	Wall		Plaster	Yellow	Good	Positive	11.2	0.7
66	Exit	A	Wall		Brick	BROWN	Good	Negative	0.14	0.7
67	Exit	A	Wall		Brick	BROWN	Good	Negative	0.08	0.7
68	Calibrate	A	Wall		Brick	BROWN	Good	Positive	0.71	0.7
69	Calibrate	A	Wall		Brick	BROWN	Good	Positive	0.71	0.7

[a]= Side A is the wall facing the entry door, then clockwise turn for walls B, C, and D.

3.0 ANALYSIS

Asbestos

To determine whether the materials are asbestos containing (i.e., contain more than one percent asbestos as defined by the EPA), samples were collected using EPA protocols. Samples, collected by Apex were analyzed for asbestos content using polarized light microscopy/dispersion staining (PLM/DS) techniques by EMSL Analytical Inc., of Beltsville, Maryland, a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited laboratory. Sample designations, gross descriptions, and analytical results are provided in Table 1. Laboratory data sheets are included in **Appendix A**.

Lead-Based Paint (LBP)

The XRF LBP inspection was performed utilizing an XRF spectrum analyzer to determine the presence of lead-painted components. XRF technology is well known for accuracy in detecting lead within individual layers of paint. By emitting radiation through each paint layer, Apex was able to determine the presence of lead within painted and glazed components. Building components typically known for posing potential lead exposure were tested during the inspection. The current definition of LBP established by the State of Maryland is greater than 0.7 mg/cm^2 of surface area using XRF analyzer. All of the XRF readings are summarized in Table 3.

4.0 RECOMMENDATIONS

Lead

It is important to note that even low concentrations of LBP (i.e., less than 0.7 mg/cm^2) that fall below the above criteria for LBP, have the potential to result in some lead exposure to workers, particularly construction workers involved with activities such as torch cutting and welding metal structures, abrasive blasting, or sanding painted surfaces. Although low lead concentrations in certain materials may not meet the State of Maryland definition of LBP, work practices involving the disturbance of such lead-containing paints or other materials are covered under the U.S. Occupational Safety and Health Administration's (OSHA's) *Lead in Construction Standard* in Title 29 of the CFR Part 1926.62. As a result, all construction and demolition activities involving lead-containing materials (regardless of the lead content) must comply with this standard, which prescribes requirements for contractor/worker exposure assessment, worker protection, and engineering controls.

The disposal of waste generated during any restoration, renovation, or demolition operations, including items coated with LBP, is regulated by EPA Standard 40 CFR 261, Subpart C. This regulation requires that a Toxicity Characteristic Leaching Procedure (TCLP) test be utilized to determine if the construction debris is considered hazardous waste. A material is considered hazardous if it is ignitable, reactive, corrosive, or toxic.

It is generally recommended that items with relatively high concentrations of lead be segregated from other items and tested separately. The intent should be to assume that any item that is categorized as hazardous waste be identified and kept segregated from other waste materials, while not to bias the sampling results either positively or negatively with regard to TCLP sampling. Depending on the renovation and demolition procedures, TCLP sample should be collected in a manner to represent the entire construction waste stream.

5.0 LIMITATIONS

Every reasonable attempt was made to locate ACM and LBP containing components within the project areas of the buildings. However, areas that are inaccessible can only be addressed through extrapolation of conditions in accessible building space and review of building plans, specifications, or other building documents provided to Apex.

Changes in the condition of the site may occur with time due to either natural processes or human activities. The findings presented in this report are based on sites conditions existing at the time of the assessment. Apex cannot be responsible for any errors or omissions in this assessment resulting from incomplete or inaccurate disclosures.

Other concealed hazardous materials may be present; however, if the materials were not accessible or readily apparent, identification and testing may not have been performed. Future construction activities could expose additional suspect building components. If additional suspect materials are exposed during demolition, stop work and contact the Montgomery County representative for assessment and testing.

6.0 REPORT RELIANCE AND USE

This report documents the findings of the services performed by Apex in accordance with our contractual agreement with Montgomery County. The findings, opinions, and conclusions of this report are for the exclusive use of Montgomery County. This report shall not be provided to any other person, entity, or public or governmental agency (unless otherwise mandated by law) without Montgomery County written consent. Reliance on this report for any use or by parties other than specifically stated herein is prohibited without the expressed written consent of both Apex and Montgomery County. This document is not intended for any purposes other than those expressly set forth herein or as described in Apex's proposal or for use by parties other than for whom it has been prepared.

APPENDIX A

Asbestos Bulk Samples Laboratory Results

EMSL Analytical, Inc.
10768 Baltimore Avenue, Beltsville, MD 20705
Phone/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com beltsvillelab@emsl.com

EMSL Order:	191412239
CustomerID:	APEX52
CustomerPO:	
ProjectID:	

Attn: **Daniel Admasu**
Apex Companies, LLC
15850 Crabbs Branch Way
Suite 200
Rockville, MD 20855

Phone:	(301) 417-0200
Fax:	(301) 975-0169
Received:	11/20/14 9:55 AM
Analysis Date:	11/20/2014
Collected:	11/18/2014

Project: **NOYES LIBRARY**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**	**% Type**
11/18/14-NL-B1-Floor Tile *191412239-0001*	12X12 WHT. FT W/GREY/BLUE/RED SPLOTCHES BATHRM N - CORNER	Gray/Red/Blue Non-Fibrous Homogeneous			60% Ca Carbonate 40% Non-fibrous (other)	**None Detected**
11/18/14-NL-B1-Mastic *191412239-0001A*	12X12 WHT. FT W/GREY/BLUE/RED SPLOTCHES BATHRM N - CORNER	Brown/Yellow Fibrous Homogeneous	7% Cellulose 5% Synthetic		88% Non-fibrous (other)	**None Detected**
11/18/14-NL-B2-Floor Tile *191412239-0002*	12X12 WHT. FT W/GREY/BLUE/RED SPLOTCHES ENTRANCE	Gray/Red/Blue Non-Fibrous Homogeneous			60% Ca Carbonate 40% Non-fibrous (other)	**None Detected**
11/18/14-NL-B2-Mastic *191412239-0002A*	12X12 WHT. FT W/GREY/BLUE/RED SPLOTCHES ENTRANCE	Brown/Gray/Yellow Fibrous Homogeneous	5% Cellulose 3% Synthetic		92% Non-fibrous (other)	**None Detected**
11/18/14-NL-B3 *191412239-0003*	YELLOW BASEBOARD MASTIC MAIN RM W. SIDE	Brown/Yellow Fibrous Homogeneous	20% Cellulose 2% Synthetic		78% Non-fibrous (other)	**None Detected**
11/18/14-NL-B4 *191412239-0004*	YELLOW BASEBOARD MASTIC STORAGE RM W. SIDE	Yellow Fibrous Homogeneous	5% Synthetic		95% Non-fibrous (other)	**None Detected**

Analyst(s)

George Malone (21)

Joe Centifonti, Laboratory Manager
or other approved signatory

Initial report from 11/20/2014 17:28:00

EMSL Analytical, Inc.
10768 Baltimore Avenue, Beltsville, MD 20705
Phone/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com beltsvillelab@emsl.com

EMSL Order: 191412239
CustomerID: APEX52
CustomerPO:
ProjectID:

Attn: **Daniel Admasu**
Apex Companies, LLC
15850 Crabbs Branch Way
Suite 200
Rockville, MD 20855

Phone: (301) 417-0200
Fax: (301) 975-0169
Received: 11/20/14 9:55 AM
Analysis Date: 11/20/2014
Collected: 11/18/2014

Project: **NOYES LIBRARY**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
11/18/14-NL-B5 *191412239-0005*	PLASTER N. SIDE MAIN RM BY WINDOW	Brown/White/Yellow Non-Fibrous Heterogeneous		10% Quartz 15% Mica 75% Non-fibrous (other)	**None Detected**
		Skim coat only.			
11/18/14-NL-B6 *191412239-0006*	PLASTER MAIN RM S. SIDE BY WINDOW	Brown/White/Yellow Non-Fibrous Heterogeneous		15% Quartz 5% Mica 80% Non-fibrous (other)	**None Detected**
		Skim coat only.			
11/18/14-NL-B7 *191412239-0007*	PLASTER MAIN RM W. SIDE	White/Yellow/Beige Fibrous Homogeneous	5% Cellulose	5% Quartz 25% Mica 63% Non-fibrous (other)	**2% Chrysotile**
		Inseparable joint compound layer included in analysis - no rough coat plaster. Chyrsotile is in the inseparable layer.			
11/18/14-NL-B8 *191412239-0008*	JOINT COMPOUND STORAGE CLOSET	Yellow/Beige Fibrous Homogeneous	3% Cellulose	35% Mica 56% Non-fibrous (other)	**6% Chrysotile**
11/18/14-NL-B9 *191412239-0009*	JOINT COMPOUND MAIN RM INSIDE WALL	Yellow/Beige Fibrous Homogeneous	3% Cellulose	35% Mica 56% Non-fibrous (other)	**6% Chrysotile**
11/18/14-NL-B10 *191412239-0010*	JOINT COMPOUND BATHRM	White/Yellow/Beige Fibrous Homogeneous	5% Cellulose	35% Mica 56% Non-fibrous (other)	**4% Chrysotile**

Analyst(s)

George Malone (21)

Joe Centifonti, Laboratory Manager
or other approved signatory

Initial report from 11/20/2014 17:28:00

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10768 Baltimore Avenue, Beltsville, MD 20705
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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos				Asbestos
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**%**	**Non-Fibrous**	**% Type**
11/18/14-NL-B11 *191412239-0011*	DRYWALL STORAGE CLOSET FROM LIGHT SWITCH	Brown/White Fibrous Heterogeneous	25%	Cellulose	65% 10%	Gypsum Non-fibrous (other)	**None Detected**
11/18/14-NL-B12 *191412239-0012*	DRYWALL STORAGE RM	Brown/White Fibrous Heterogeneous	35%	Cellulose	55% 10%	Gypsum Non-fibrous (other)	**None Detected**
11/18/14-NL-B13 *191412239-0013*	CEILING TILE WHT. N. SIDE MAIN RM	Brown/Gray/White Fibrous Homogeneous	30% 60%	Glass Cellulose	10%	Non-fibrous (other)	**None Detected**
11/18/14-NL-B14 *191412239-0014*	CEILING ITLE WHT. STORAGE CLOSET	Brown/Gray/White Fibrous Homogeneous	35% 55%	Glass Cellulose	10%	Non-fibrous (other)	**None Detected**
11/18/14-NL-B15 *191412239-0015*	BLK. ROOFING ATTIC N. SIDE	Brown/Black Fibrous Homogeneous	55% 12%	Cellulose Synthetic	33%	Non-fibrous (other)	**None Detected**
11/18/14-NL-B16 *191412239-0016*	BLK. ROOFING ATTIC S. SIDE	Brown/Black Fibrous Homogeneous	45% 15%	Cellulose Synthetic	40%	Non-fibrous (other)	**None Detected**
11/18/14-NL-B17 *191412239-0017*	WINDOW CAULKING MAIN RM S. SIDE	Gray/White Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**
11/18/14-NL-B18 *191412239-0018*	YELLOW CARPET MASTIC STORAGE RM	Brown/Yellow Fibrous Homogeneous	10% 35%	Cellulose Synthetic	55%	Non-fibrous (other)	**None Detected**

Analyst(s)

George Malone (21)

Joe Centifonti, Laboratory Manager
or other approved signatory

Initial report from 11/20/2014 17:28:00

EMSL Analytical, Inc.
10768 Baltimore Avenue, Beltsville, MD 20705
Phone/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com beltsvillelab@emsl.com

EMSL Order:	191412239
CustomerID:	APEX52
CustomerPO:	
ProjectID:	

Attn: **Daniel Admasu**
Apex Companies, LLC
15850 Crabbs Branch Way
Suite 200
Rockville, MD 20855

Phone:	(301) 417-0200
Fax:	(301) 975-0169
Received:	11/20/14 9:55 AM
Analysis Date:	11/20/2014
Collected:	11/18/2014

Project: **NOYES LIBRARY**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos				Asbestos	
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**%**	**Non-Fibrous**	**%**	**Type**
11/18/14-NL-B19 *191412239-0019*	YELLOW CARPET MASTIC MAIN RM N. SIDE	Gray/Yellow Fibrous Homogeneous	80%	Synthetic	20%	Non-fibrous (other)		**None Detected**

Analyst(s)

George Malone (21)

Joe Centifonti, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD NVLAP Lab Code 200293-0

Initial report from 11/20/2014 17:28:00

OrderID: 191412239

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (*Lab Use Only*): 191412239

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Company: APEX	EMSL-Bill to: ☐ Same ☐ Different If Bill to is Different note instructions in Comments**
Street: 15850 CRABBS BRANCH WAY, SUITE 200	*Third Party Billing requires written authorization from third party*
City: ROCKVILLE, MD — State/Province: MD	Zip/Postal Code: 20850 — Country: USA
Report To (Name): DANIEL ADMASU	Telephone #: 301-417-0200
Email Address: DADMASU@APEXCOS.COM	Fax #: — Purchase Order:
Project Name/Number: NOYES LIBRARY	Please Provide Results: ☐ Fax ☐ Email
U.S. State Samples Taken: MARYLAND	CT Samples: ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☑ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

**For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PLM - Bulk (reporting limit)	TEM – Bulk
☑ PLM EPA 600/R-93/116 (<1%)	☐ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
☐ PLM EPA NOB (<1%)	☐ NY ELAP Method 198.4 (TEM)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ Chatfield Protocol (semi-quantitative)
Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
☐ NIOSH 9002 (<1%)	☐ TEM Qualitative via Filtration Prep Technique
☐ NY ELAP Method 198.1 (friable in NY)	☐ TEM Qualitative via Drop Mount Prep Technique
☐ NY ELAP Method 198.6 NOB (non-friable-NY)	**Other**
☐ OSHA ID-191 Modified	☐
☐ Standard Addition Method	

☐ Check For Positive Stop – Clearly Identify Homogenous Group — Date Sampled:

Samplers Name: — Samplers Signature:

Sample #	HA #	Sample Location	Material Description
B1		Bathroom - North corner.	12x12 white floor tile with grey/blue/red splotche
B2		Entrance -	↓ ↓
B3		Main room West sid	Yellow baseboard mastic
B4		Storage room - west side	↓ ↓
B5		North side Main Room by window	Plaster
B6		Main room South side by window	↓
B7		Main room west side by	↓
B8		Storage closet	Joint compound
B9		Main room inside wall.	↓ ↓
B-10		& Bathroom	↓ ↓

11/18/14-NL

Client Sample # (s): - Total # of Samples: 19

Relinquished (Client): Date: Time:

Received (Lab): FedEx Date: 11/20/14 Time: 9:55am

Comments/Special Instructions:

Controlled Document – Asbestos COC – R6 – 11/29/2012

Page 1 of _____ pages

OrderID: 191412239

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

11/18/14-NL

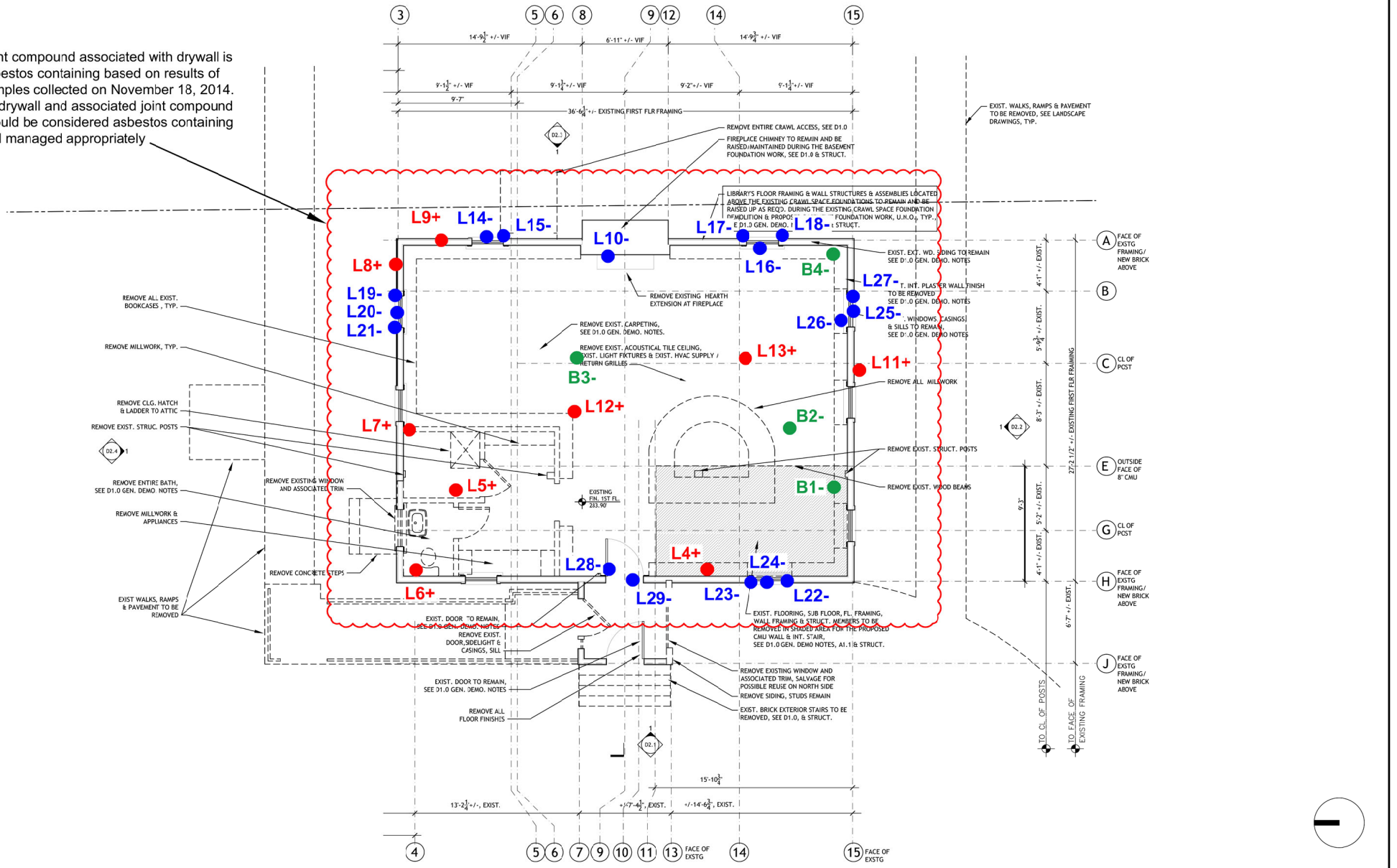
Sample #	HA #	Sample Location	Material Description
B11		Storage closet from lightswitch	Dry wall
B12		Storage room	↓ ↓
B13		Northside main room	Ceiling tile, white
B-14		Storage closet	↓ ↓
B-15		Attic Northside	Black Roofing
B-16		Attic Southside	↓ ↓
B-17		Main room Southside	Window Caulking
B-18		Storage room	Yellow Carpet Mastic
B-19		Main room Northside	↓ ↓

*Comments/Special Instructions:

Page _____ of _____ pages

Controlled Document – Asbestos COC – R6 – 11/29/2012

Joint compound associated with drywall is asbestos containing based on results of samples collected on November 18, 2014. All drywall and associated joint compound should be considered asbestos containing and managed appropriately



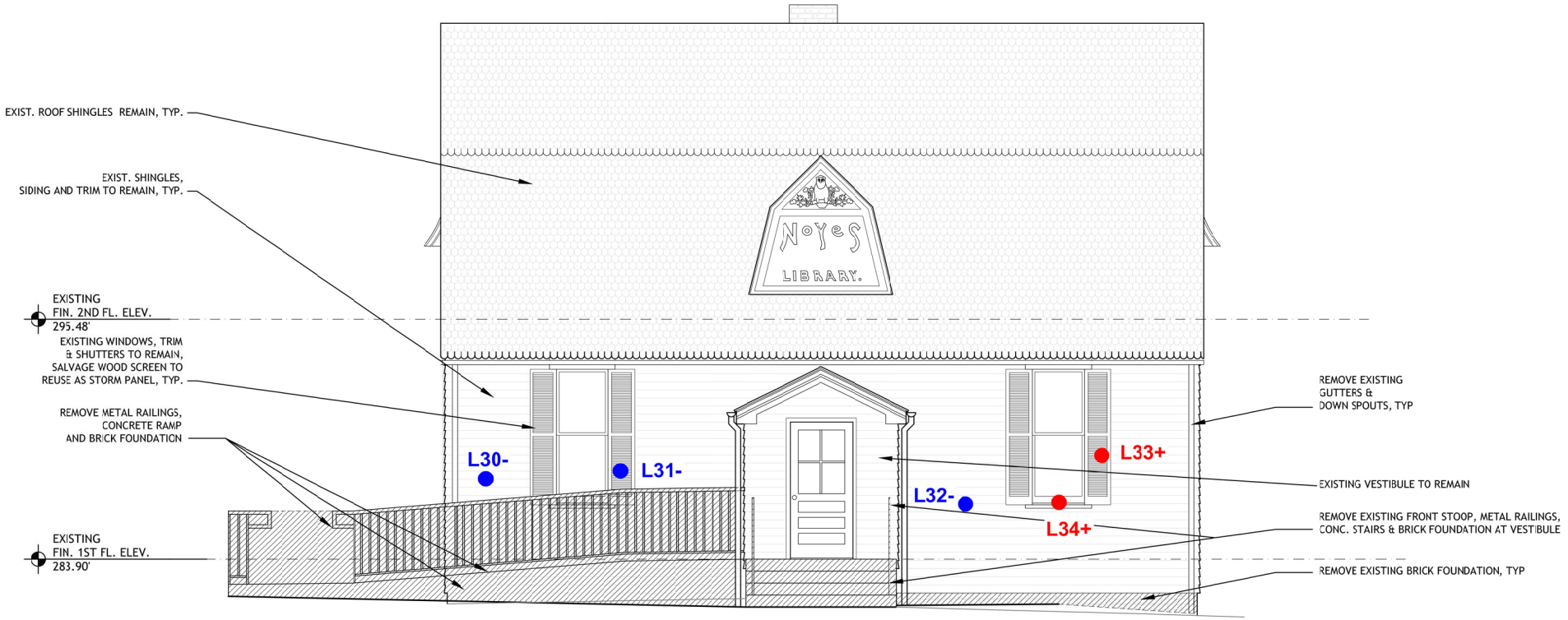
Sample Location Diagram

Site Name: Noyes Library - First Floor		
Address: 10237 Carroll Place, Kensington, MD		
Date: 11-4-22	**RH:**	**Temp:**
Apex Project No.: MCDGS - 160 - 03		

Legend

- Non-ACM Bulk Asbestos Sample (B# -)
- Lead Reading Above MD Action Level (L# +)
- Lead Reading Below MD Action Level (L# -)

* MDE Action Level for lead is 0.7mg/cm. **All lead readings are from exterior on this drawing.



APEX

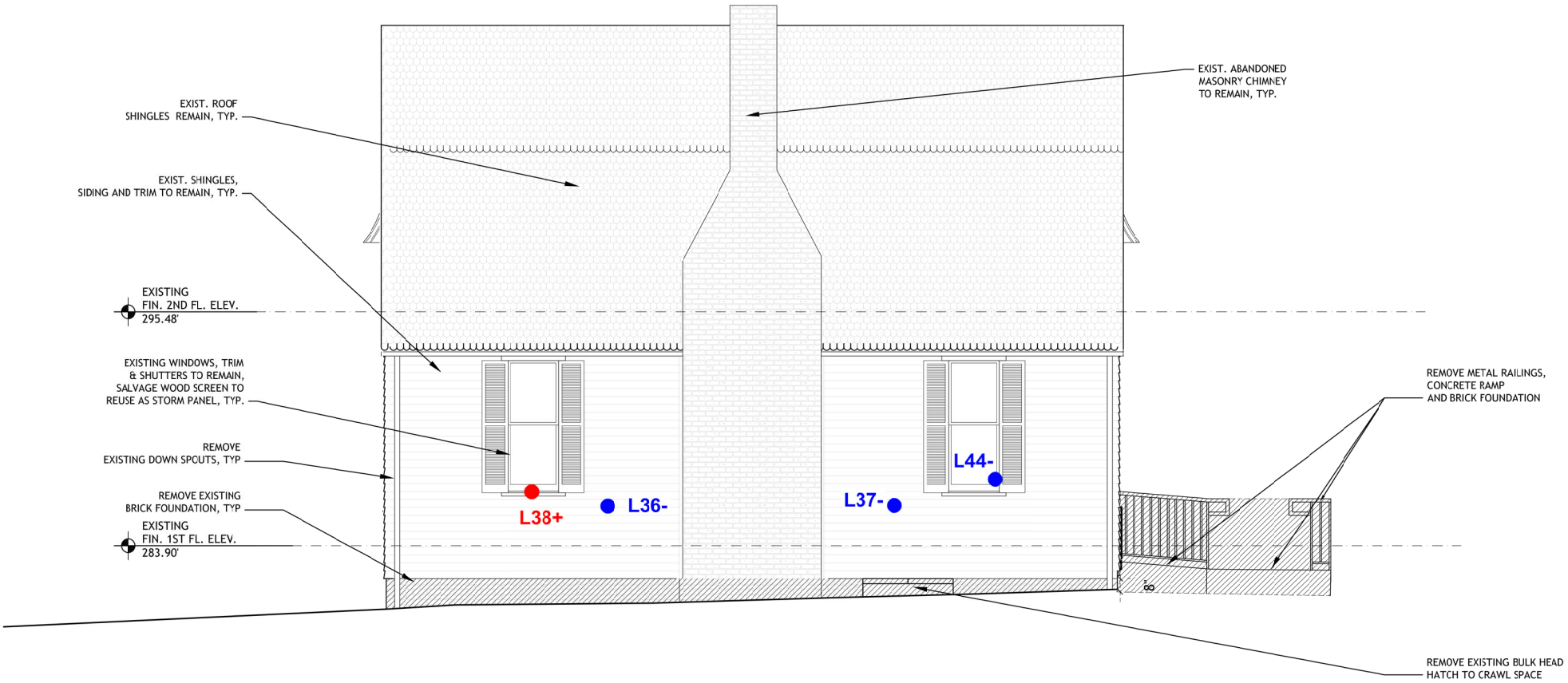
Sample Location Diagram

Site Name: Noyes Library - Side A		
Address: 10237 Carroll Place, Kensington, MD		
Date: 11-4-22	**RH:**	**Temp:**
Apex Project No.: MCDGS - 160 - 03		

Legend

- Lead Reading Above MD Action Level (L# +)
- Lead Reading Below MD Action Level (L# -)

* MDE Action Level for lead is 0.7mg/cm.



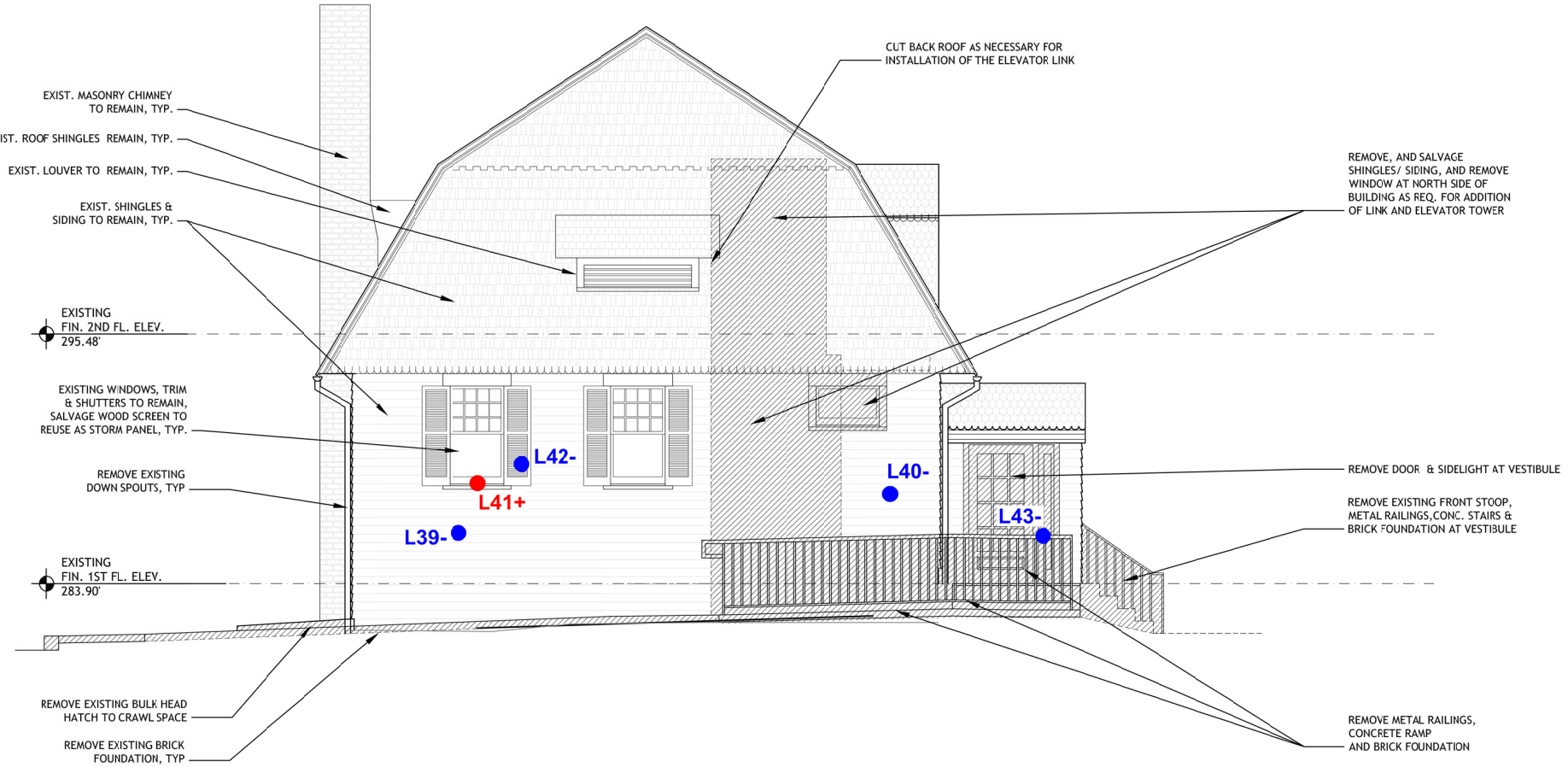
Sample Location Diagram

Site Name: Noyes Library - Side B		
Address: 10237 Carroll Place, Kensington, MD		
Date: 11-4-22	**RH:**	**Temp:**
Apex Project No.: MCDGS - 160 - 03		

Legend

- Lead Reading Above MD Action Level (L# +)
- Lead Reading Below MD Action Level (L# -)

* MDE Action Level for lead is 0.7mg/cm.



APEX

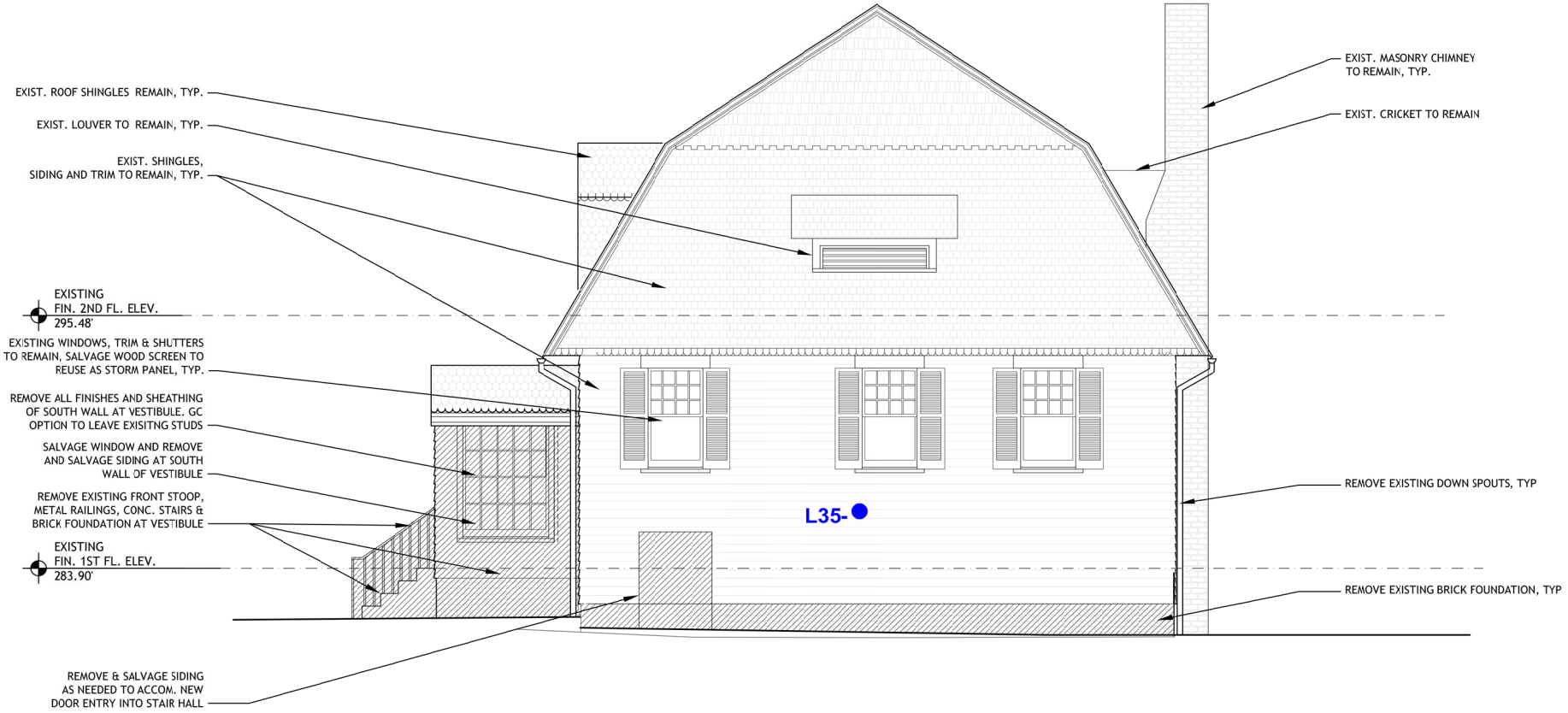
Sample Location Diagram

Site Name: Noyes Library - Side C		
Address: 10237 Carroll Place, Kensington, MD		
Date: 11-4-22	**RH:**	**Temp:**
Apex Project No.: MCDGS - 160 - 03		

Legend

- Lead Reading Above MD Action Level (L# +)
- Lead Reading Below MD Action Level (L# -)

* MDE Action Level for lead is 0.7mg/cm.



APEX

Sample Location Diagram

Site Name: Noyes Library - Side D		
Address: 10237 Carroll Place, Kensington, MD		
Date: 11-4-22	**RH:**	**Temp:**
Apex Project No.: MCDGS - 160 - 03		

Legend

● Lead Reading Below MD Action Level (L# -)

* MDE Action Level for lead is 0.7mg/cm.

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SECTION 02 26 00
RADON CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Slab on grade base course.
2. Under slab vapor retarder.
3. Gas collection pipe.
4. Gas vent pipe.
5. Joint sealants.
6. Electrical junction box for future fan connection.

1.2 SYSTEM DESCRIPTION

A. Radon venting system consists of the following:

1. Permeable basement floor slab base course.
2. Sealing joints, cracks, and other penetrations through basement floor slab and foundation walls.
3. Passive gas collection and venting system.

1.3 SUBMITTALS

A. Shop Drawings: Indicate dimensions, layout of collection and vent piping, roof flashing details, location of electrical junction box.

B. Product Data: Submit data on base course, pipe, vapor retarder, sealants, and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record locations and invert elevations of concealed piping, connections.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum three years' documented experience.

1.6 COORDINATION

A. Coordinate work with foundations, slabs on grade, interior partitions, and roofing to ensure openings capable of permitting radon gas penetration to building interior are sealed.

B. Coordinate work of other sections to conceal work of this section.

PART 2 PRODUCTS

2.1 SLAB ON GRADE BASE COURSE

A. Base Course: Refer to Civil drawings and specifications.

2.2 VAPOR RETARDER

A. Vapor Retarder: Refer to Division 3 specifications.

2.3 PIPE MATERIALS

A. Pipe: ASTM D2729; polyvinyl chloride pipe.

1. Joints: Socket ends for solvent welding.
2. Joint Cement: ASTM D2564, solvent type.
3. Fittings: Polyvinyl chloride.

B. Gas Vent Pipe: Unperforated pipe, 3 inch nominal size.

2.4 JOINT SEALERS

A. Joint Backing: Round foam rod compatible with sealant; oversized 30 to 50 percent larger than joint width.

B. Sealants:

1. Vapor Retarder Joints: Butyl type sealant.
2. Slab on Grade Joints: Polyurethane traffic sealant as specified in Section 07 92 00.
3. Foundation Wall Joints: Silicone sealant as specified in Section 07 92 00.

2.5 ACCESSORIES

A. Penetration Boot: Form using vapor retarder with stainless steel clamping ring.

B. Roof Flashing: Sheet metal; aluminum min. 0.060 inch thickness with Kynar finish.

C. Vent Cap: Plastic with screen to prevent insect intrusion.

D. Joint Filler: Compressible type with recovery rate of minimum 95 percent.

1. Sponge Rubber: ASTM D1752; premolded sponge rubber.

E. Tape: Self-adhering type, minimum 2 inch wide, compatible with vapor retarder.

F. Electrical Junction Box: Refer to Division 26.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify slab on grade subbase is compacted, graded, and ready to receive work.

B. Verify subbase elevations are as indicated on Drawings.

3.2 GAS COLLECTION PIPE INSTALLATION

A. Install gas collection pipe on clean cut subsoil. Lay pipe level.

B. Place pipe with perforations facing down. Mechanically join pipe ends with solvent welded fittings.

C. Connect gas collection pipe to gas vent pipe with solvent welded Tee fitting.

D. Stub gas vent piping minimum 12 inches above top of slab on grade. Temporarily cap pipe stub to prevent material from entering piping.

3.3 GAS VENT PIPE INSTALLATION

A. Install gas vent pipe with solvent welded Tee fitting at base of vent pipe.

B. Stub gas vent pipe minimum 12 inches above top of slab on grade. Temporarily cap pipe stub to prevent material from entering piping.

C. Install gas vent pipe in central location of building unless otherwise indicated on Drawings.

1. Manifold multiple vent pipes from isolated floor areas in basement or attic into single vent through roof.

D. Extend gas vent pipe in concealed location to minimum 12 inches above roof and minimum of 10 feet from fresh air intakes.

1. Make pipe joints gas tight with solvent welded fittings.
2. Support pipe at each floor and attic penetration.

E. Identify gas vent pipe with permanent markings maximum 25 feet on center and within 12 inches of both sides of floor construction and below roof construction. Mark pipe as RADON VENT.

F. Install 90 degree elbow and vent cap at gas vent pipe termination above roof.

G. Firestop gas vent pipe penetrations through fire rated assemblies as specified in Section 07 84 00.

H. Install electrical junction box near gas vent pipe for future connection to in-line fan and system failure alarms.

1. Wire junction box to separate circuit on power panel.
2. Label circuit for intended use.
3. Coordinate electrical installation with work of Division 26.

3.4 SLAB ON GRADE BASE COURSE INSTALLATION

A. Refer to Civil

B. Cover gas collection piping.

C. Cover gas vent pipe Tee fitting.

3.5 VAPOR RETARDER INSTALLATION

A. Refer to Division 3.

3.6 SLAB ON GRADE INSTALLATION

A. Install joint filler around penetrations through slab on grade and slab perimeter.

1. Secure joint filler to prevent displacement when concrete is installed.

B. Install slab on grade as specified in Division 3 and Structural Drawings.

3.7 JOINT SEALANT INSTALLATION

A. Remove joint filler to 1/2 inch depth from top of slabs on grade.

B. Install sealant joints, perimeter, and penetrations of slab on grade and foundation walls as specified in Section 07 92 00 to prevent radon gas from entering building interior.

3.8 FIELD QUALITY CONTROL

A. Request inspection of gas collection pipe before placing aggregate cover over pipe.

END OF SECTION

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SECTION 02 30 00
SUBSURFACE DRILLING AND SAMPLING INFORMATION

PART 1 GENERAL

1.1 The following information is included in the Project Manual for bidders' use in preparing bids, but is not part of the Contract Documents, and does not relieve the bidders from doing their own investigation to determine the accuracy of the information.

A. Geotechnical Evaluation, Noyes Library Expansion, Kensington, Maryland; dated November 22, 2013.

1.2 STATEMENT CONCERNING THE BORING DATA

A. The test borings and samples of the soils encountered were obtained by the Architect to assist the Architect and his consultants in determining the type and design of the foundation systems.

B. The test borings were made by The Robert B. Balter Company, in accordance with their system of soils classification and they, The Robert B. Balter Company, neither the Owner, the Architect, or his consultants guarantee the accuracy or consistency of the information contained within the Geotechnical Report with the actual site conditions.

C. Any radical deviation from the anticipated material, as indicated by the borings, during the excavation for the building should be reported to the Architect immediately and confirmed in writing.

1.3 CONFIRMATION OF BORING DATA

A. Bidders, Contractors, and any others who are concerned with, or are affected by the test borings should make their own borings and tests at the site.

B. No additional compensations will be allowed the Contractor for failure to fully investigate the site or for the neglect of the information contained in the Boring Logs.

1.4 ATTACHMENT

A. Geotechnical Evaluation, Noyes Library Expansion, Kensington, Maryland; dated November 22, 2013.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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THE ROBERT B. BALTER COMPANY®

November 22, 2013

Jan Wilson RA; LEED AP
Senior Architect
Division of Building Design and Construction
Montgomery County Department of General Services
Office: 240.777.6058
Cell: 240.832.6362
Jan.Wilson@montgomerycountymd.gov

RE: Geotechnical Evaluation
Basement Addition
Noyes Children's' Library
Baltimore, Maryland
RBB Project No. 16519-0 MD

Dear Ms. Wilson:

The Robert B. Balter Company is pleased to submit this geotechnical evaluation report for the subject project. The purpose was to assess subsurface conditions for the construction of a new basement at the Noyes Children's Library. The condition of the existing footings was also evaluated to provide underpinning recommendations.

Project information provided to us by various parties helped form the basis for our recommendations. If any of the project information discussed in this report differs from the actual proposed construction, we should be contacted to re-evaluate the recommendations provided herein and provide revisions if necessary.

We have appreciated this opportunity to be of service. If you have any questions regarding this report, or if we can assist you in any way, please do not hesitate to call our office.

Sincerely,

THE ROBERT B. BALTER COMPANY

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 23281, Expiration Date: 6/25/2014

11/22/2013

Matthew J. Leone, E.I.T
Geotechnical Engineer

Joseph F. Whittle, Jr., P.E., P.G.
Chief Engineer

11/22/2013

STATE OF MARYLAND
JOSEPH F. WHITTLE, JR.
No. 23281
PROFESSIONAL ENGINEER

GEOTECHNICAL EVALUATION
NOYES LIBRARY EXPANSION
KENSINGTON, MARYLAND
RBB Project No. 16519-0 MD

TABLE OF CONTENTS

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LIST OF FIGURES

LIST OF PLATES

APPENDICES

1.0 INTRODUCTION

1.1 General

The proposed project generally consists of the construction of a new basement addition below the existing structure. A new elevator pit will also be constructed to provide access to the new basement. The purpose of our work was to perform a geotechnical evaluation of the subsurface conditions, and to provide certain geotechnical related recommendations for design and construction of the proposed basement and associated facilities.

1.2 Authorization

The geotechnical evaluation was authorized by the Montgomery County Department of General Services based on our proposal dated September 19, 2013, titled "*Proposal for Geotechnical Evaluation*".

1.3 Scope

The scope of the geotechnical evaluation included the following: site reconnaissance, subsurface sampling and testing, geotechnical laboratory testing, engineering evaluation and report preparation.

2.0 PROJECT DESCRIPTION

2.1 Site Location

The subject property is located at the Noyes Children's Library in Kensington, Maryland. It is bordered by Montgomery Ave to the east and Carroll Place to the North and South. A **Vicinity Map** is shown on **Plate 1**, attached.

2.2 Project Information

This project consists of a new basement level at the Noyes Children's Library on Carroll Place in Kensington, Maryland. The basement addition will also include the construction of a new elevator pit to access the basement. We have assumed that the existing structure will be underpinned and the crawl space under the existing structure will be excavated to construct the basement.

The basement will be excavated to bear at a depth of approximately 11 feet below existing grade. An associated elevator pit will also be excavated to a depth of approximately 14 feet below the existing grade.

The existing structure will be left in place above the new basement addition. The existing structure is an historic building which was established as a library in 1893. The existing foundation of the structure was exposed at one location to assess its condition. However, no plans were available to confirm that this condition was typical for the entire structure.

The site is generally flat and is triangular in shape. However, Carroll Place is at a slighty higher elevation on the north side of the library than it is on the south side. There are also several large trees and overhead utilities located in close proximity to the building. The approximate locations of the existing trees are shown on the **Boring Location Plan.**

2.3 Site Geology

According to the Geologic Map of the Montgomery County and the District of Columbia (1953), the subject site is underlain by rock of the Wissahickon formation. The Wissahickon formation is of the Late Precambrian period. This formation generally consists of dium- to coarse-grained biotite-oligoclase-muscovite-quartz schist with garnet, staurolite, and kyanite; fine- to medium-grained semipelitic schist; and fine-grained granular to weakly schistose psammitic granulite.

According to the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Soil Survey, soils at the subject property and local vicinity generally consists of the Channery Silt Loam Complex. The Channery Silt Loams are somewhat excessively drained shallow upland soils that developed in residuum weathered from hard schist. They have a generally low shrink-swell potential.

3.0 EVALUATION PROGRAM

3.1 Subsurface Explorations

The subsurface exploration program for this study included a total of 2 new Standard Penetration Test (SPT) borings, including B-1 and B-2. The borings were selected and roughly staked in the field by Balter. Prior to the start of the drilling operations, the borings were cleared for utilities by Miss Utility. The attached **Plate 2, Boring Location Plan,** indicates the locations of the borings.

The borings were advanced to depths of 25.0 feet each using a truck-mounted CME 45 drill rig equipped with conventional hollow stem augers. Standard Penetration Testing (SPT) and sampling were performed continuously through the auger stems at 2-foot intervals to a depth of 10 feet, and then at 5-foot intervals thereafter. The testing and sampling procedures were performed in general accordance with ASTM D-1586 procedures, using a standard 2-inch O.D. sampling spoon, driven by a 140 pound hammer freely falling 30 inches. During the drilling operations, bulk samples of representative soils from the upper regions of some borings were recovered for laboratory evaluation.

The drill rig was equipped with an automatic hammer which requires an approximate correction factor of x1.3 to the recorded N-Values. This allows comparison to "standard" N-values for a less-efficient manual hammer (N_{60} values, for 60 % energy efficiency). Corrected values (N_{60}) are not shown on the boring logs or profiles, but were used in any analyses.

Additionally, 1 test pit was hand dug next to the existing footing to a depth of 4 feet in order to evaluate its condition. At the approximate bearing surface dynamic cone penetrometer (DCP) was used in accordance with ASTM STP 399 to estimate the subsurface conditions. The DCP test consists of a hand-held falling weight striking on a specially designed pointed penetration rod and advancing it in increments of 1-$^3/_4$ inches. The penetration resistance can be interpreted to estimate the bearing capacity of a footing subgrade soil. The test pit was backfilled after DCO testing was completed.

The subsurface data obtained from the recent explorations are presented in log form in **Appendix A**. Ground surface elevations were not available at the time this report was prepared. The numeric values (N-values) shown within the individual boring columns on the Boring Logs and Profiles indicate the standard penetration resistances, in blows per foot, or as otherwise noted. The depths at which water was observed in the uncased holes were recorded upon completion (i.e., after the augers were withdrawn), and one day after completion. Once the final water readings were collected, the borings were backfilled with the drill spoils. The method of classification used in preparing the strata descriptions is based on our interpretation of the Unified Soils Classification System (USCS).

Boring and Test Pit logs show the estimated general soil classifications and the assumed boundaries between soil types. The actual boundaries in the field could vary significantly from those assumed for the logs.

It is noted that the subsurface data shown on the figures are an integral portion of this report. Separation of the figures from the remainder of the report may lead to misinterpretation of the data by others.

3.2 Laboratory Testing Program

Selected samples were subjected to laboratory analyses to estimate their classifications according to the Unified Soils Classification System. This testing included sieve gradation analyses and Atterberg limits determinations. Pocket penetrometers were also performed on the collected fine-grained samples. One of the bulk samples was selected for evaluation of its compaction properties by ASTM D-1557 (Standard Proctor) Finally, tests for natural moisture contents of selected SPT and bulk samples from the upper regions of the borings were performed.

The results of our laboratory testing are presented in **Appendix B** and are summarized in **Table 1** of Section 4.2 Subsurface Materials. Pocket penetrometer, -#200 sieve, moisture and Atterberg limits testing results are included on the boring logs.

4.0 SUBSURFACE CONDITIONS

4.1 General

This section provides a description of the estimated subsurface conditions encountered at the borings at the time of drilling. Natural residual soils were encountered below the fill soils. The transition between the existing site fills and the natural soils at the boring locations may

be more gradual than indicated on the logs, and significant variations may occur outside specific boring locations or sampled intervals.

4.2 Subsurface Materials

4.2.1 Surficial Materials

Topsoil - Topsoil was encountered in each of the borings and the test pit to depths ranging from 0.25 feet (3 inches) to 0.3 feet (4.0 inches). The term "topsoil," as used in this report refers to surface soils having an apparently significant organic content, based only on visual estimates in the field. It does not imply that the subject materials meet the requirements or specifications for topsoil set by any particular organization or agency.

4.2.2 Fill

Fill was identified in the borings and test pit to depths ranging from 2.0 feet to at least 4.0 feet below the existing ground surface. Generally, if the soils displayed typical characteristics of engineered fill (i.e., no soil structure, "jumbled" appearance, trash and debris) then the soils were labeled as fill. If; however, the surficial soils did not have the "typical" appearance of fills, but appear to have different characteristics (color, texture, etc) than the natural soils, then they are referred to as "possible fills." It should also be noted that fill soils can be difficult to identify, and detection may not be possible in the field during construction.

The fills and possible fills generally consisted of Sandy Elastic Silt (MH) with traces of rock fragments. The fills exhibited SPT N-values of 6 blows per foot (bpf) to 8 bpf, with an average N-value of 7 bpf. One pocket penetrometer value in the fine-grained fill soils had a value of 2.5 tsf. DCP values in the test pit were in the order of 4 to 5, at the existing brick footing bearing level.

4.2.4 Natural Residual Soils

Natural residual soils were encountered underlying the fill soils in each of the borings to depths of 25.0 feet below the existing ground surface. Note that the residual soils are most likely encountered below the fill soils across the entire site. Residual soils are formed from the in-place weathering of the underlying "parent" bedrock.

These soils generally consisted of Sand (SM) with varying amounts of Mica. SPT N-values ranged from 5 bpf to 21 bpf, with an average N-value of 10 bpf. Pocket penetrometer values in the fine-grained soils ranged from 0.3 tsf to 1.6 tsf, averaging 0.8 tsf.

4.2.7 Results of Laboratory Testing

The completed laboratory index tests performed on samples of the subsurface materials are summarized on the following Table 2 - Laboratory Test Results. The laboratory results are presented in graphic form in **Appendix B**.

Table 1 – Laboratory Test Results

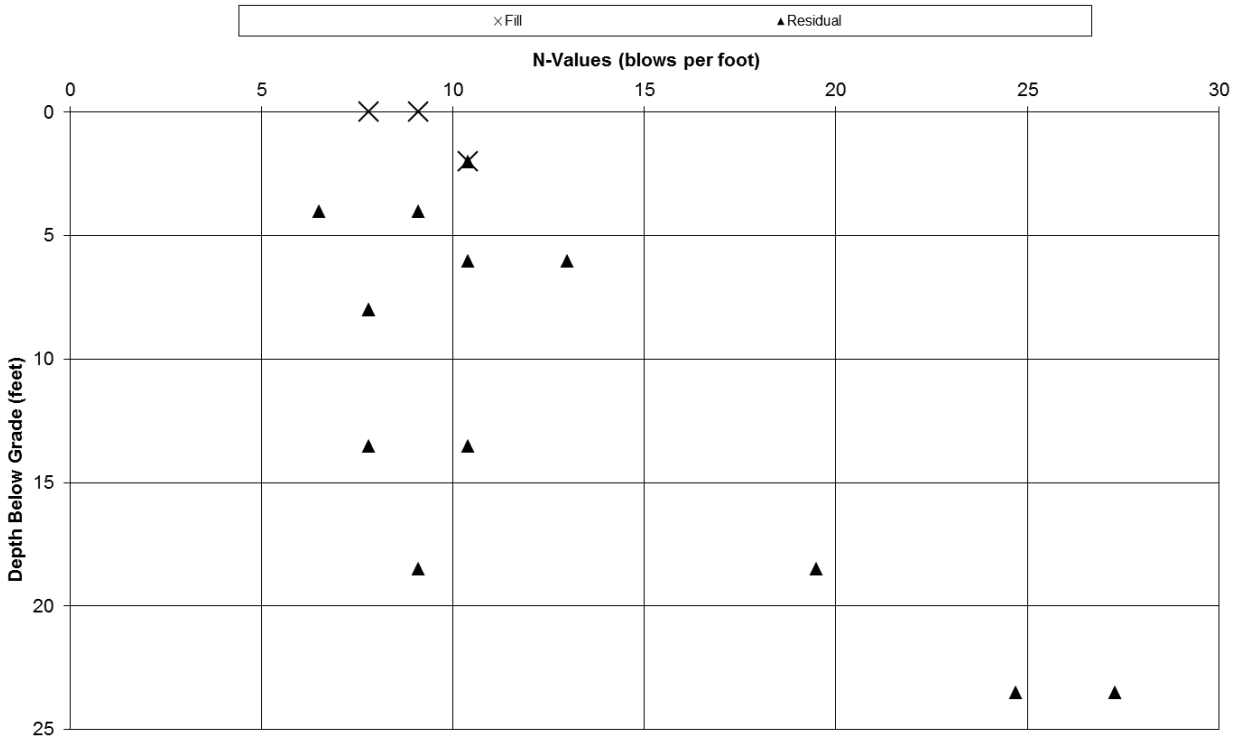
Boring	*Depth (ft)*	*USCS[1]*	*In-Place Moisture (%)*	*Atterberg Limits*			*-#200 Sieve (%)*		*Standard Proctor[2]*	
				LL	*PL*	*PI*	*% Silt*	*% Clay*	*MDD (pcf)*	*OMC (%)*
B-1	0-5	MH (F)	24.8	50	33	17	57.2		105.5	17.4
B-2	13.5-15	SM(R)	24.7	33	24	9	27.6		---	---

Notes: (1) F= Fill; R = Residual
(2) Standard Proctor performed in accordance with ASTM D-698; MDD = Maximum Dry Density, OMC = Optimum Moisture Content

4.2.8 Standard Penetration Resistances

Figure 1 below shows the distribution of the collected N-values, of all soil types, versus elevation across the site. The corrected N-values (N_{60}) are shown on Figure 1.

Figure 1 - Standard Penetration Resistances



4.2.9 Ground Water Conditions

Ground water observations were made immediately after the augers were withdrawn and after 24 hours. Based on the measured long-term ground water readings, water was encountered in each of the 2 borings at depths ranging from 15.0 feet to 16.0 feet below the existing ground surface.

Table 2 outlines the recorded stabilized ground water levels in the open boring. It should be noted that groundwater may be encountered during construction at depths much shallower than we encountered water at.

Table 2 – Measured Ground Water Levels (24-hours or longer)

Boring	*Measured Depth to GW (ft)*
B-1	16.0
B-2	15.0

Groundwater should be expected to be an issue during construction, particularly in the elevator pit. If encountered during construction, the contractor should be prepared to dewater any open excavation with well points, to avoid a "quick" condition in the saturated sands. Water levels will fluctuate with changes in rainfall and runoff, construction and development activities, and other causes. Future groundwater levels across the site should be expected to vary from those noted during the recent exploration program.

5.0 EVALUATION AND RECOMMENDATIONS

5.1 Underpinning and Basement Excavation

5.1.1 General

It is our understanding that the existing crawl space will be excavated in order to construct the proposed basement level. In order to accomplish this, significant underpinning of the existing structure will be required. As part of our subsurface exploration, a test pit was excavated in order to expose the existing footing and adjacent column.

5.1.2 Existing Condition

One exterior test pit was excavated adjacent to the existing footing in order to expose the footing and a portion of an existing column. When exposed, both the footing and the column were bearing approximately 1 foot below existing grade. The footing consisted of a brick wall in a running bond pattern resting on a single layer of header (cross-wise) bricks that protruded approximately 2.0 inches out from the edge of the wall. Based on this observation, it was assumed that typical bricks were used in the footing construction and that the footing is approximately 16 inches wide, supporting a wall about 12 inches wide. The column was only partially exposed and it appeared to protrude out an additional 1 to inches. However, due to the extremely poor condition of the footing and the column, the excavation was ceased so that the column was not undermined.

The bricks in the footing appeared to have little to no mortar in-between them. The bricks appeared to be "parged" or had concrete or mortar poured over the top of them in order to keep moisture out or hold them in place. The column appeared to be constructed in a similar manner and it can be assumed that the condition of the column closely matches that of the footing. The bricks appeared "loose" in nature and poorly bonded or even unbonded, and several appeared to be missing. Because of this condition we were unable to excavate below the footing to confirm its width.

A DCP test was performed at a depth of about 9 inches below existing grade and it was terminated approximately 18 inches below grade. The DCP values ranged from 2 to 5 blows per increment (4 to 5 at the bearing level), indicating relatively soft or loose soil conditions. These values correlate well with the soft or loose conditions in the upper regions of our SPT borings. Based on this investigation, a very conservative approach is recommended in the underpinning of the existing structure.

5.1.3 Underpinning Options

There are several options available for supporting the existing building during the excavation of the new basement. However, as our test pit identified, the existing footing may not be in adequate condition to support typical concrete underpinning. In light of this, a more conservative underpinning method is warranted. This would involve initially supporting the existing footing with a reinforced concrete beam or footing and then underpinning this beam in order to construct the new basement. This would ensure that the existing footing is adequately supported during the underpinning and basement excavation. Even this initial approach may require special stabilization and reinforcement of the existing footing and wall. Based on the condition of the existing footing, this method or some similar method that reinforces the existing footing before deeper underpinning and excavation is strongly recommended.

There are many underpinning options available, and a specialty underpinning contractor should be engaged for a design-build approach to the underpinning. One option is traditional mass concrete or "pit" underpinning. This method is typically applicable in cases where the existing footing is shallow. This method involves excavating pits or panels under the existing footing and backfilling with concrete around the entire structure in a predetermined sequence. The backfilled concrete could essentially serve as both a basement wall and a deepened footing.

Other more sophisticated methods are applicable as well. Such methods would include the installation of helical piers, jacked piles or micropiles. All of these deep foundation elements would involve installing foundation elements into deep, denser soil and "jacking" the existing structure up to temporarily support it. Again, the condition of the existing footing may not be adequate to support the stresses generated by the jacking processes. The footing and columns should be reinforced to ensure that they can support these stresses. Using a deep foundation system would provide complete support of the structure during excavation of the new basement. This method could also assist in allowing the structure to be supported during dewatering process, if necessary.

Generally, the condition of the existing footings and column footings will control the design of the underpinning process. It is essential that a specialty contractor be contacted in order to develop a final design of the underpinning system to be used. The condition of the existing foundations may vary significantly away from where our test pit was performed. The specialty contractor should thoroughly examine all of the columns and footings to ensure that the proper method is selected. It is essential that we be contacted to review the underpinning plans to confirm they are consistent with the parameters recommended in our report.

5.2 Foundation Design

5.2.1 General

As described above, the proposed project consists of a new basement level beneath an existing library. According to plans provided to us by Wiedemann Architects, LLC, the basement level will bear approximately 11 feet below finished grade and the elevator will bear about 14 feet below finished grade. We have assumed that the proposed finished grade will not differ significantly from the existing grade. No structural loads have been provided to us at this time.

5.2.2 Building Foundations

Based on the collected data and preparation of the soil surfaces as recommended; typical square and continuous footings can be designed for an allowable soil bearing capacity of 2,000 PSF for the new structures. It is absolutely essential that the new footings be placed on acceptable bearing strata, verified by Balter personnel in the field by inspection and testing.

Foundations which will be subject to the effects of weather (i.e., freezing/thawing) both during and following construction must bear at a minimum of 30 inches below the surrounding grades to mitigate the possibility of detrimental frost action. Continuous footings and square footings should have a minimum width of 16 inches and 24 inches, respectively. Also, any minimum footing widths, sizes, and reinforcing required by applicable codes must be maintained.

With earthwork preparation and foundation installation as recommended herein, maximum total settlements within the building footprint are estimated to be less than $^{3}/_{4}$- inch, and differential settlements are not expected to exceed ½-inch.

5.2.3 General Foundation Requirements

It is recommended that our geotechnical engineer or qualified engineering technician, familiar with this report, perform an inspection of the installation and bearing conditions at the time of construction. If weaker or less competent founding materials are encountered, adjustments to the foundation design or the installation process could be required.

Proper construction procedures must be employed to prevent the loss of supporting capacity of the soil bearing surface once footings have been excavated. Such measures include exercising care while setting reinforcing steel, placing concrete as soon as possible after excavation, and providing protection from the weather. During cold weather, the exposed bearing surface must be protected from freezing, and in no case may concrete be placed over materials which are frozen or have been degraded by freezing.

As described above, ground water should be expected to affect construction operations. It is important to prevent surface water or seepage from collecting in open excavations prior to concrete placement. If water does inadvertently collect in foundation excavations, it will be

necessary to bail the water from the hole, remove the saturated soils, and re-test the adequacy of the bearing surface to confirm the design pressure prior to placing concrete.

5.3 Basement and Elevator Pit Slabs

Slabs must be provided with a minimum 6-inch layer of freely draining granular gravel subbase. The subbase gradation shall be in accordance with AASHTO M43, size 57 or a similar open-graded aggregate. An under-drain system and a sump pump must be installed under the slab. In addition, a vapor or moisture barrier (such as plastic sheeting) must be installed between the subbase material and the concrete slab.

Based on the recommended site work and a 6 inch granular subbase, a modulus of subgrade reaction (k) of 100 pci may be used for design of the concrete slab. This recommendation is reserved for moderately-loaded slabs, and does not include slabs subjected to heavy loads or dynamic machine loading.

Since pouring of slabs-on-grade typically occurs after the subgrades have been subjected to considerable disturbance due to other activities (construction of foundations and walls, etc.), prior to final slab-on-grade preparation, it is essential that the subgrades be evaluated to detect any soft, yielding or otherwise unsuitable areas. Any locations deemed unacceptable shall be re-compacted to a dense, stable condition or cut out and replaced with controlled compacted fill.

5.4 Lateral Earth Pressures

Below Grade Walls – Below grade elevator pit walls and new basement walls must be designed to resist permanent lateral earth pressures. We have assumed that no movement is allowed in the proposed walls. Therefore, at-rest earth pressure coefficents have been provided in the table below and should be used in the preliminary design of all below grade walls. Note that wall friction is ignored.

Table 3 – Estimated Earth Pressure Parameters

Soil Property	***Residual Soil***
Internal Angle of Friction	$\Phi = 30^o$
Moist Unit Weight	$\gamma = 120$ pcf
Buoyant Unit Weight	$\gamma' = 60$ pcf
At-rest Pressure Coefficient (restrained)	$K_o = 0.5$
Coefficient of Base Sliding Friction	0.35

All walls should be damp-proofed prior to backfilling operations, and should incorporate appropriate wall drainage. The parameters in Table 6 are recommended for static wall design.

Temporary Earth Support - Temporary shoring may also be necessary to support the excavation of the new basement. The sheeting system will be subject to lateral earth pressures, which will vary depending on the shoring type, water conditions, and backfill materials utilized. The soil parameters recommended in the above **Table 3** apply to temporary shoring design as well as permanent applications. Hydrostatic pressures and any surcharge loads must also be included in the shoring design. *Note that the contractor must be responsible for the final design of such systems.*

5.5 Seismic Design

Seismic design of the building was estimated using the requirements of the 2012 International Building Code (IBC), Section 1613. The IBC determines the seismic coefficients based on the SPT N-values to a depth of 100 feet, obtained during field investigations. Fills, natural alluvial soils of the Patuxent Formation, residual soils, decomposed rock, highly weathered rock, and rock were encountered at varying depths across the site. Based on the depths of rock found in field investigations it was assumed that bedrock is present from a depth of 20 feet to 100 feet. Based on the collected N-values, it was assumed that the typical onsite soils have an average N-Value between 15 and 50 blows per foot in the top 100 feet. Based on this averaged blow count, the site classification for seismic design is class D. This may also warrant stabilization and reinforcement of the existing structure and foundations.

6 CONSTRUCTION CONSIDERATIONS

6.1 General Earthwork Requirements

Site Grading - All vegetation, topsoil, pavement materials, and any organic, or otherwise unsuitable surface materials, should be stripped completely to expose clean suitable soils. The stripped area shall encompass the building footprint and extend outward from the exterior edges of the footings a minimum of 10 feet plus 1 additional foot horizontally for every foot of new fill to be placed or cut to be excavated, where possible.

Prior to the placement of new structural fill, the stripped soil surface, or area to receive new fill, should be evaluated by an experienced geotechnical engineer or highly qualified senior level soils technician, to verify and establish a uniform, dense and stable condition. Any soft, yielding, organic, contaminated or otherwise unacceptable spots detected shall be cut out and replaced with controlled compacted fill.

Fill Placement and Compaction - All fill placed for the building pads, slabs, utility backfill, slopes or any other location requiring stable support or minimal settlement shall be constructed as controlled compacted fill. Compacted fill should be placed in relatively horizontal 6-inch loose lifts. Each lift should be uniformly and evenly bladed and mixed during spreading to ensure uniformity of the material in each layer. Each layer should be compacted to a minimum of 95 percent of the Standard Proctor maximum dry density as determined by ASTM D-698 (AASHTO T-99). The moisture content of the materials shall be maintained such that the required degree of compaction can be obtained. Soils shall comply with the following requirements:

1. Liquid limit not to exceed 30.
2. Plasticity Index not to exceed 9.
3. Exhibit a maximum dry density of at least 105 PCF.

Where fills are to be placed on slopes, the original ground should be deeply scarified, or where slopes are steeper than 5 horizontal to 1 vertical, the slope should be stepped or benched, when considered necessary by the Geotechnical Engineer, in order that the placement of compacted fill may be accomplished in horizontal lifts.

Review of the compaction results indicates that the tested fill sample, classified as MH soils. The MH soil had ASTM D-698 a maximum dry density of 105.5 pcf and at 17.4% optimum moisture. The on-site natural soils, which classified as sands and silts should be acceptable for use as controlled fill, provided that these materials meet the above requirements and are placed and compacted as specified in the previous requirements.

6.2 Compaction Moisture Contents

It was noted that many of the measured natural moisture contents were higher than the optimum moisture values for most efficient compaction. Drying of these soils by special manipulation (aerating, discing, etc.) will probably be required in order to achieve the specified degree of compaction. Wet weather could exacerbate the potential compaction difficulties. Cement or lime modification, or mixing with drier or more granular soils, or other methods, could also be used to improve wet or unstable soils at the time of compaction. On the other hand, soils that are too dry must be wetted to achieve compaction.

6.3 Weather Conditions

Weather (rainfall and freezing) has a huge influence on site earthwork, foundations, and concrete placement. Average monthly weather data reported by the nearest National Oceanic and Atmospheric Administration (NOAA) station, located within Baltimore provide an insight to the local temperature and precipitation conditions.

Table 4 – Baltimore NOAA station:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Precipitation[1] (in.)	3.47	3.02	3.93	3.00	3.89	3.43	3.85	3.74	3.98	3.16	3.12	3.35	41.94
Below Freezing Days	25	21	14	3	*	0	0	0	0	2	11	21	97

Source: National Oceanic and Atmospheric Administration, minimum 30-year reporting period
[1]Adjusted precipitation to reflect rainfall only (excludes frozen precipitation- pellets, sleet and hail).
*Not reported

According to NOAA, the typical monthly precipitation for the reporting station averages from 3.00 inches in April to 3.98 inches in September. The number of days experiencing freezing temperatures varied from 2 days in October to 25 days in January.

6.4 Excavation Characteristics

At this site, the borings indicate that conventional excavation methods are likely to be feasible for all excavations of soil onsite. It is our experience that the degree of difficulty in excavation can, in a general sense, be correlated to the SPT values, the physical characteristics of the materials and the material's resistance to our drilling equipment. Typically, mass excavation of strata exhibiting SPT results up to 50 bpf can generally be accomplished using conventional earthwork techniques, in our experience. N-values less than 50 bpf were encountered onsite.

7 GEOTECHNICAL OBSERVATION AND TESTING

As variations in soil conditions can be expected to some degree on any project, it is important that The Robert B. Balter Company, as project geotechnical engineer, provide full time, on-site observation and testing of all soil related aspects of construction. This is to assure compliance with design concepts and recommendations, and to verify that the subsurface conditions are consistent with those anticipated prior to construction. The services shall include observation and testing of all stripping, proof rolling, undercutting, mass grading, foundation excavation, backfill of footings, utility lines and other buried structures, and any other soil related activities.

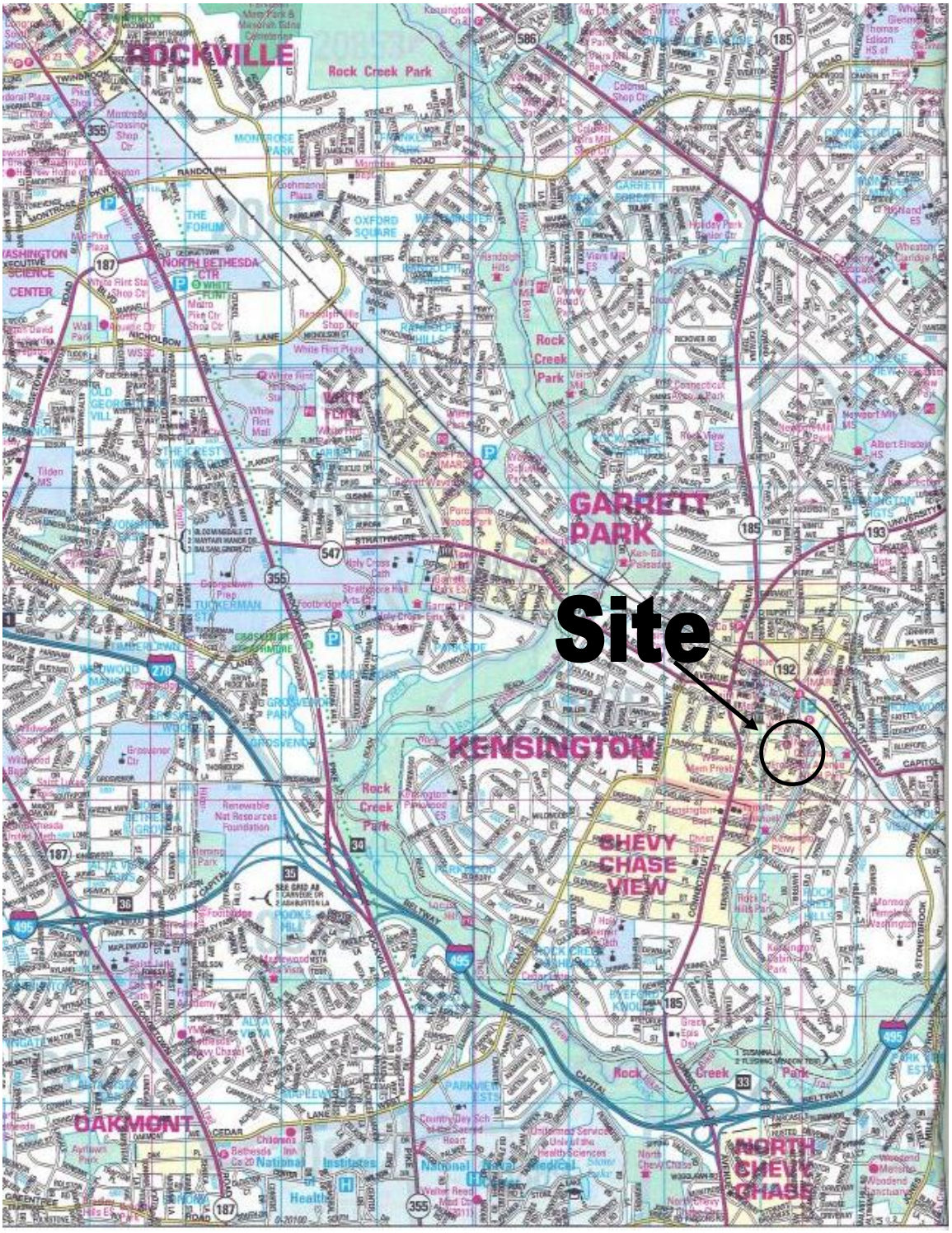
Additionally, in accordance with good construction practice and continuity of inspection, it is recommended that on-site construction monitoring encompass the structural aspects of the project, such as concrete placement, placement of reinforcing steel, and CMU/mortar/grout testing.

8 GENERAL COMMENTS

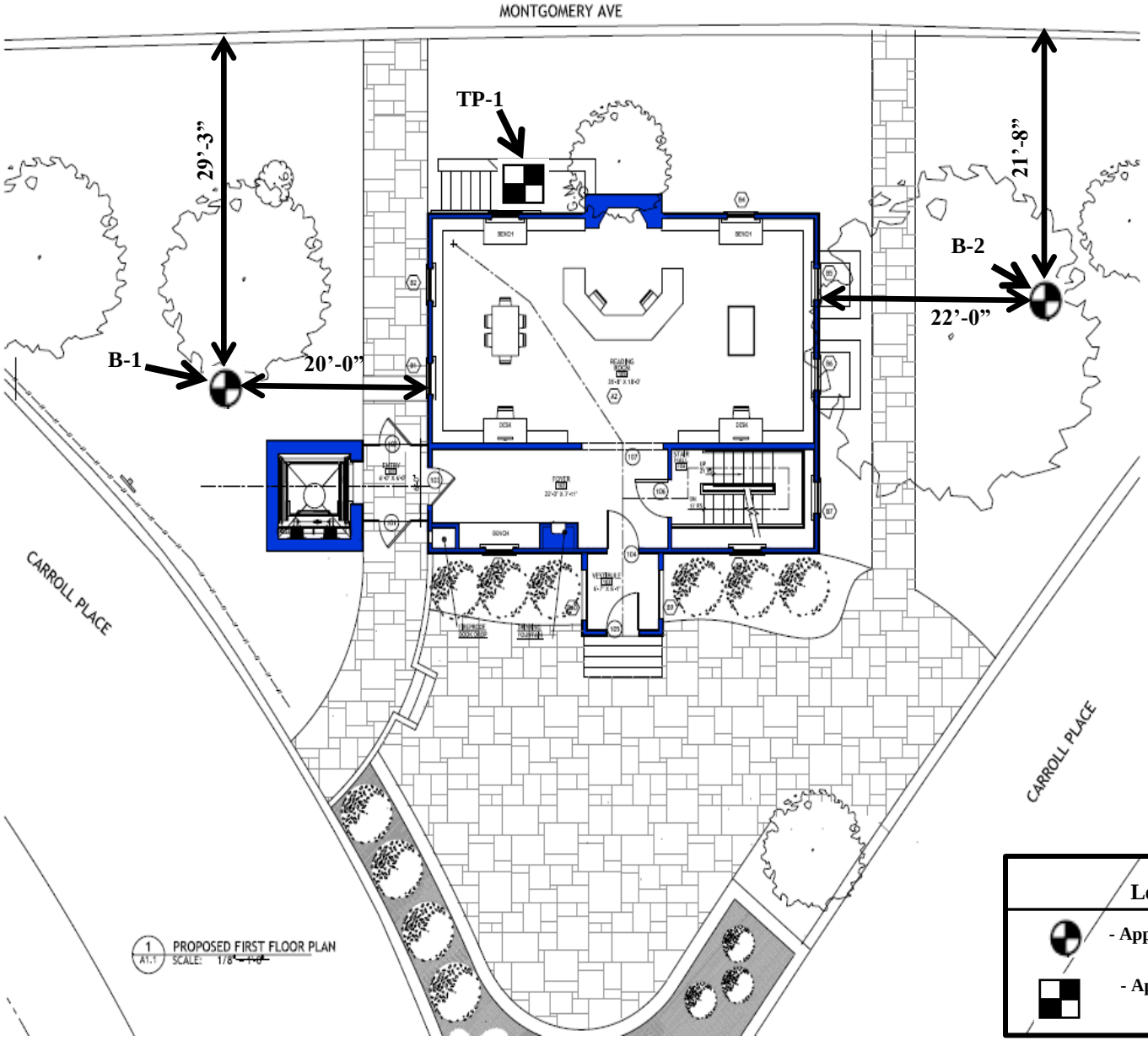
The evaluations and recommendations contained in this report were based upon the finite data obtained from the borings which are presented within this report. Although we have described typical variations which may affect the project, there is the possibility that significant unanticipated conditions may be present outside the specific boring locations. The nature and extent of differing subsurface conditions, as well as their impact on the proposed construction, will most likely not be evident until the time of construction. If significant differences are discovered in the field during construction, it may be necessary for us to re-evaluate and revise the contents of this report.

Our recommendations and conclusions are based upon the limited project parameters provided to us at the time of this report. The contents of this report should not be considered final until the final project parameters (grades, locations, elevations, depths, loads, etc.) are provided to us for review and evaluation. We reserve the right to modify our conclusions and recommendations if substantial changes are incorporated into the project. Further, it is essential that we be provided the opportunity to review appropriate sections of the plans and specifications for the project before they are finalized to assure that our recommendations have been appropriately applied to the design.

Also, this report specifically excludes exploration, sampling, testing, evaluation and recommendations relating to the presence of hazardous materials or other environmental concerns which could affect future development of the site



Noyes Library Expansion **Kensington,MD** **THE ROBERT B. BALTER COMPANY®** **Geotechnical and Geo-environmental Engineers**	**Site Vicinity Map**		**Project No.** **16519-0 MD**
		Date: November 2013	**PLATE 1**



THE ROBERT B. BALTER COMPANY®
Geotechnical and Geo-environmental Engineers

Noyes Library Expansion
Kensington, MD

BORING LOCATION PLAN

Project No. 16519-0

Date: November 2013

Plate 2

APPENDIX A

BORING AND TEST PIT LOGS

The Robert B. Balter Company
Geotechnical and Environmental Engineers
Materials and Construction Inspection and Testing
Telephone No. (410) 363-1555
www.balterco.com

BORING LOG

BORING B-1

CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0 **DATE TESTED**

RIG Truck CME 45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 11/4/13 **COMPLETED** 11/4/13

DRILLER Dennis Strawderman **HELPER** Andre Wills

REVIEWED BY Matt Leone **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)
11/4/13		0 ▽		23.3	22.8	
11/5/13		24 ▼		16.3	16.0	

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = Unknown							
	S1	1-3-4-2	7	0.3		MH		Topsoil = 3" Moist, Medium Stiff, Brown Sandy Elastic SILT (Fill)		25	57	33	50	17	
	S2	2-4-4-4	8	2.0		MH		Moist, Medium Stiff Brown Sandy ELASTIC SILT	1.60						
5	S3	2-2-3-3	5	4.0				Moist, Loose to Medium Dense, Light Brown and Gray Silty SAND trace Mica (residual)							
	S4	4-4-4-4	8							26					
10	S5	3-3-3-4	6												
15	S6	3-3-5	8			SM	▼		0.30	22					
20	S7	6-8-7	15							16					(1)
25	S8	8-9-10	19				▽			13					
				25.0				Terminated at 25.0 feet							

REMARKS: (1)Water on sampler at 18.5 feet.

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BORING LOG

BORING B-2

CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0 **DATE TESTED**

RIG Truck CME 45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 11/4/13 **COMPLETED** 11/4/13

DRILLER Dennis Strawderman **HELPER** Andre Wills

REVIEWED BY Matt Leone **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)
11/4/13		0 ▽		21.5	18.2	
11/5/13		24 ▼		15.3	15.0	

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = Unknown							
	S1	2-3-3-3	6	0.3		MH		Topsoil = 4" Moist, Medium Stiff, Brown Sandy ELASTIC SILT (Fill)	2.50						
	S2	3-3-5-5	8							20					
5	S3	3-3-4-3	7	4.0				Moist, Loose to Medium Dense Light Brown and Gray Silty SAND trace Mica (Residual)							
	S4	4-5-5-5	10							18					
10	S5	2-3-3-4	6												
15	S6	2-2-4	6			SM	▼			25	28	24	33	9	
							▽								
20	S7	3-3-4	7						0.40	29					
25	S8	6-9-12	21	25.0				Terminated at 25.0 feet		13					

REMARKS:

TP -1. Estimated Subsurface Conditions

Test Pit Number	Existing Footing Depth Below Ex. Grade (inches)	Depth (feet)	Soil Conditions	Dynamic Cone Penetrometer (DCP) Values
TP-1	12	0-0.33	Topsoil = 4”	
		0.33-4	Moist, brown, soft Silty SAND, (SM) (Fill)	DCP @ 0.75’ 2-3-5-4-5
		4	Test Pit Terminated at 4 feet.	

No groundwater encountered in the test pit

APPENDIX B

LABORATORY TEST RESULTS

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SUMMARY OF LABORATORY RESULTS

CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	0.0	50	33	17	19	57	MH	24.8			
B-1	6.0							26.2			
B-1	13.5							22.3			
B-1	18.5							15.8			
B-1	23.5							13.0			
B-2	2.0							19.9			
B-2	6.0							18.4			
B-2	13.5	33	24	9	4.75	28	SM	24.7			
B-2	18.5							28.9			
B-2	23.5							13.0			

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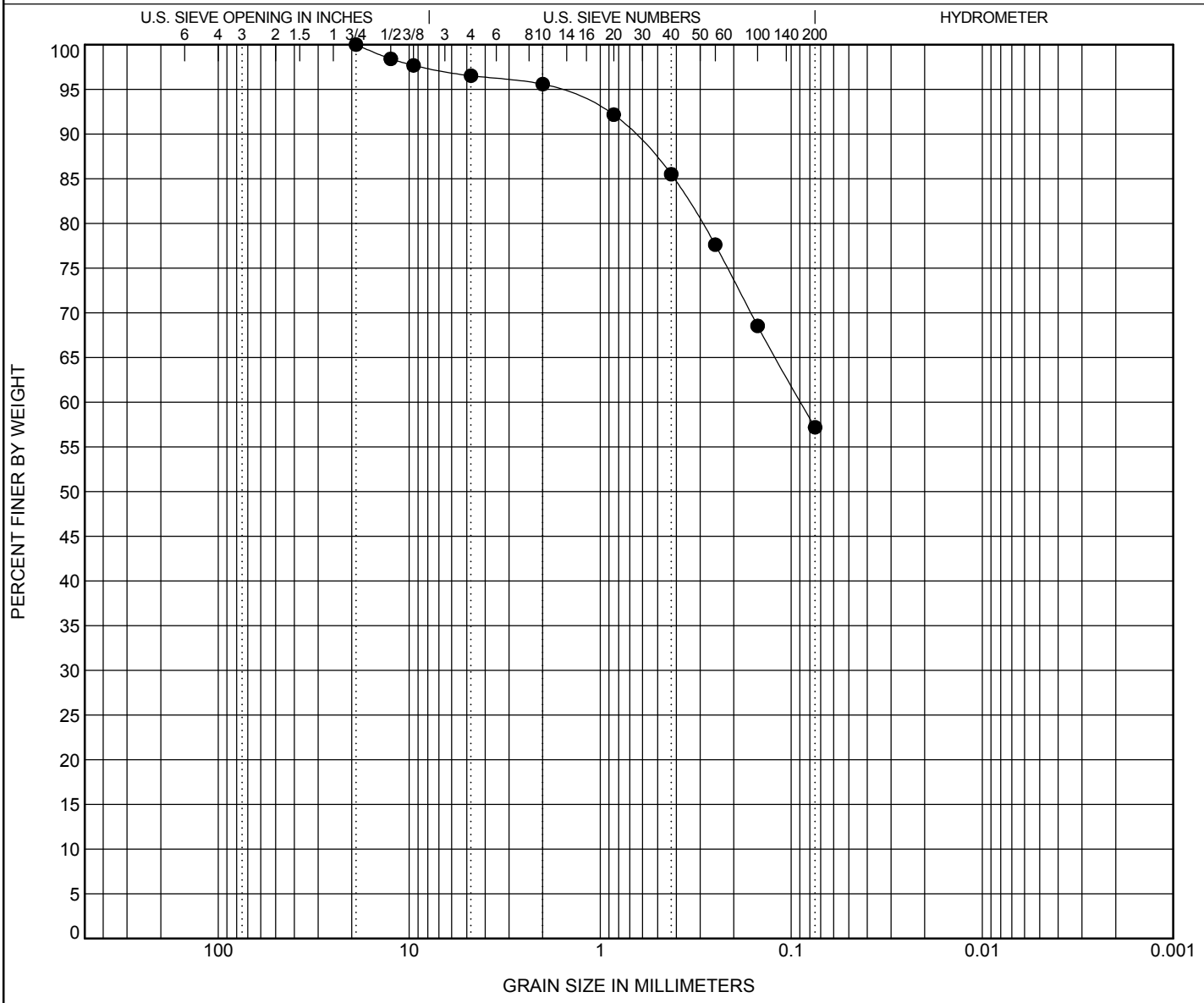
GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-1, Bulk @ 0.0' - 5.0',	Yellowish Red SANDY ELASTIC SILT(MH)	50	33	17		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1, Bulk @ 0.0' - 5.0',	19	0.089			3.5	39.3	57.2	

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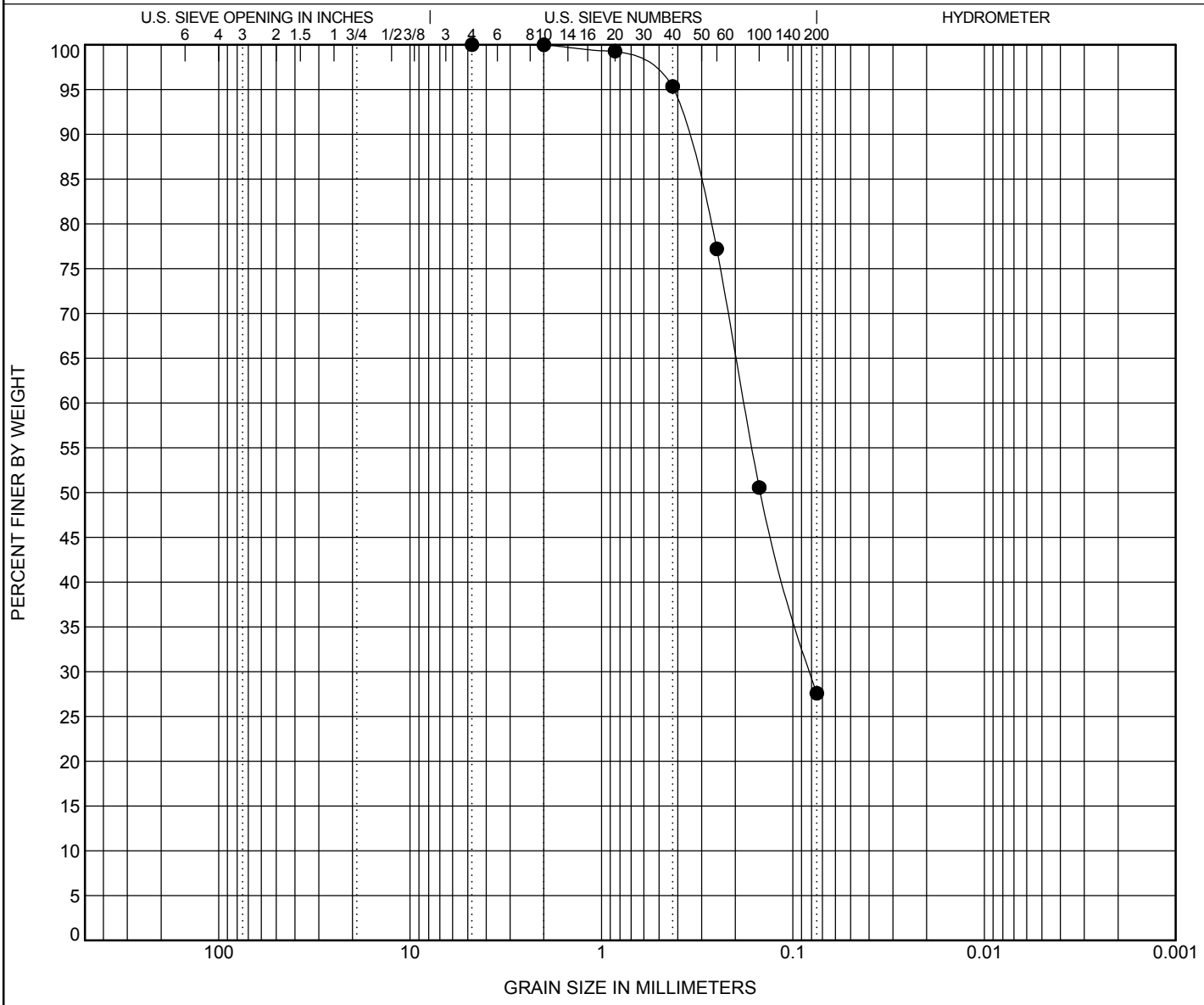
CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-2, S-6 @ 13.5' - 15.0',	**Brownish Yellow SILTY SAND(SM)**	**33**	**24**	**9**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2, S-6 @ 13.5' - 15.0',	**4.75**	**0.18**	**0.081**		**0.0**	**72.4**	**27.6**	

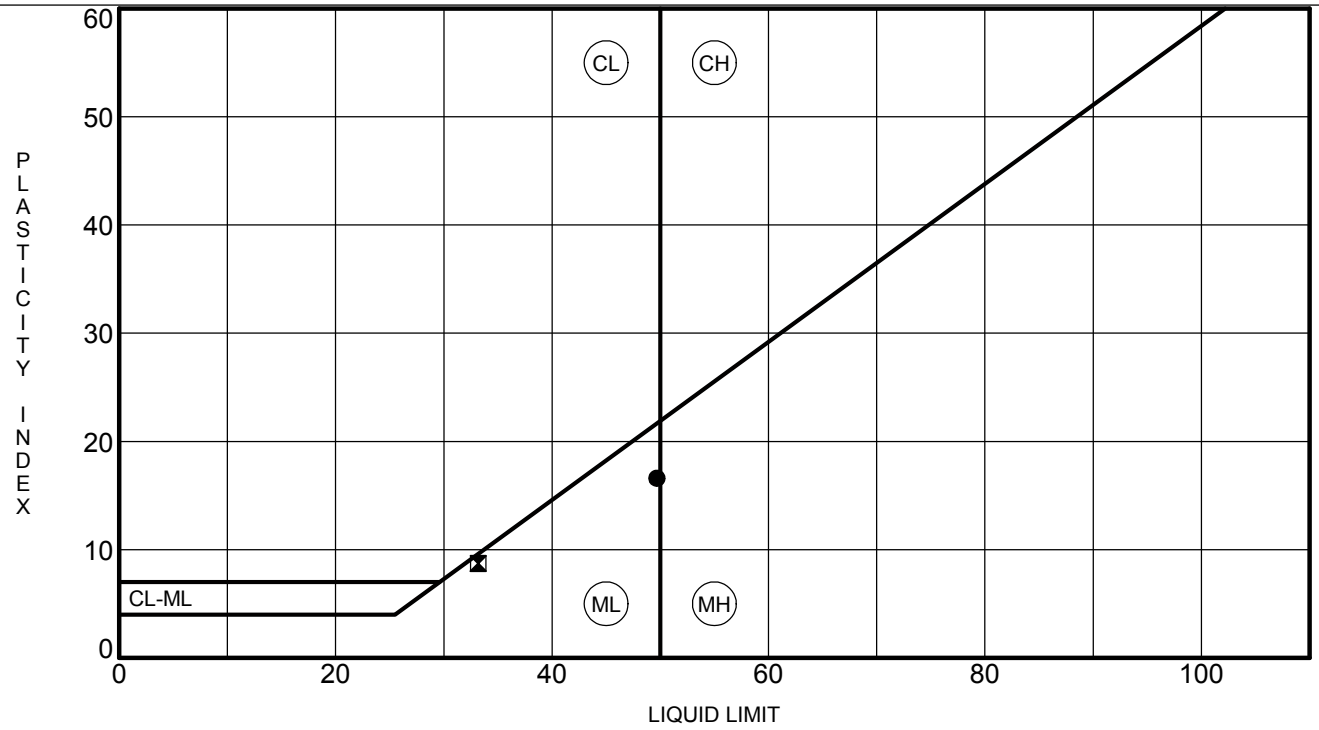
The Robert B. Balter Company
Geotechnical and Environmental Engineers
Materials and Construction Inspection and Testing
Telephone No. (410) 363-1555
www.balterco.com

ATTERBERG LIMITS' RESULTS

TEST METHOD ASTM D4318

CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0



	Specimen Identification	LL	PL	PI	Fines	Classification
●	B-1, Bulk @ 0.0' - 5.0',	50	33	17	57	Yellowish Red SANDY ELASTIC SILT(MH)
⊠	B-2, S-6 @ 13.5' - 15.0',	33	24	9	28	Brownish Yellow SILTY SAND(SM)

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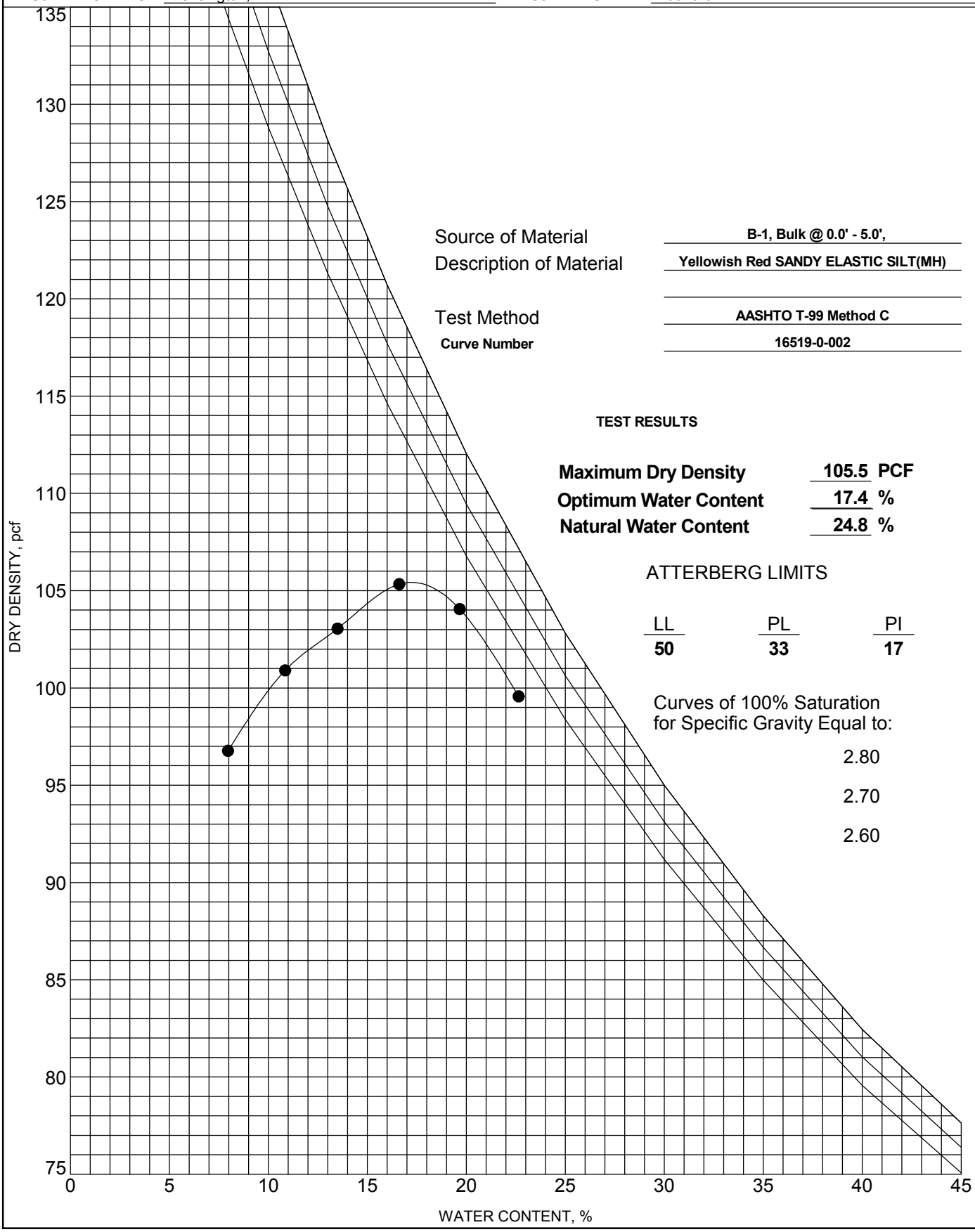
MOISTURE-DENSITY RELATIONSHIP

CLIENT Montgomery County DGS **PROJECT NAME** Noyes Library Expansion

PROJECT LOCATION Kensington, MD **PROJECT NUMBER** 16519-0



Source of Material: **B-1, Bulk @ 0.0' - 5.0',**

Description of Material: **Yellowish Red SANDY ELASTIC SILT(MH)**

Test Method: **AASHTO T-99 Method C**

Curve Number **16519-0-002**

TEST RESULTS

Maximum Dry Density	**105.5**	**PCF**
Optimum Water Content	**17.4**	**%**
Natural Water Content	**24.8**	**%**

ATTERBERG LIMITS

LL	PL	PI
50	**33**	**17**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 16519-0 NOYES LIBRARY EXPANSION.GPJ ROBERT B BALTER.GDT 11/18/13

General Project Requirements - GPR

A. General

1. About General Project Requirements

- Contractor must be familiar with this document.
- Compliance with this document is part of the contract requirements.
- No deviation or exception from General Project Requirements (GPR) is allowed without written approval of the Contract Administrator.
- If any part of these requirements is not clear to the contractor, contractor must request verification and explanation prior to signing the contract.
- Contractor must also be familiar with the companion document "Specific Project Requirements" in this specification and all deviation or exemption also must be with the written permission of the Contract Administrator.

2. Construction Management Software

- Montgomery County uses construction management software during the design and construction of projects.
- The software used is BIM 360 from Autodesk that has capability to link to BIM-Revit models and sheets.
- The contractor must obtain seat licenses for the number of seats indicated in the contract from the authorized vendor to the name of the Montgomery County
- Contractor must coordinate this effort (purchasing of seats) with the County Project Manager to assure correct licensing.
- Contractor must also pay for required number of personnel either the general contractor or subcontractors for 1- or 2-days training of the software.
- During construction, contractor must use BIM 360 to store documents, reports, RFI, PCO, and all other communication documents.

3. Schedule of Values

a. Definitions

Schedule of Values is a statement furnished by Contractor, and approved by the Owner, allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing and processing Contractor's Applications for Payment and progress of the work.

b. Coordination

- Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
- Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
  - Application for Payment forms with Continuation Sheets.
  - Submittals Schedule.
- Submit the Schedule of Values to Owner and Architect/Engineer for approval within 15 calendar days after issuance of the first Notice to Proceed.
- The Schedule of Values must be approved prior to approval of contractor's initial requisition for payment.

c. Sub schedules

- Where the Work is separated into phases requiring separately phased payments, provide sub schedules within the document showing values correlated with each phase of payment.

d. Format and Content

- The breakdown values in the Schedule of Values must be true and accurate and consistent with actual project costs and time.
- All items in the schedule of values must be correlated with the Schedule of Time CPM Schedule to verify percent of completion.
- Provide at least one-line item for each Specification Section.

e. Identification

Per owner instructions, contractor must use either AIA forms or a form provided to the contractor. Such forms must include the following information:

- Project Name
- Project Address
- County Project Number.
- Contractor's name and address.
- Date of submittal.
- Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    - Related Specification Section or Division.
    - Description of the Work.
    - Dollar value (rounded); and percentage of the Contract Sum to nearest one-hundredth percent (0.00%) adjusted to total 100 percent. total shall equal the Contract Sum.
    - Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - Differentiate between items stored on-site and items stored off-site.
- General Conditions must be divided in two categories:
    - Major Upfront costs:
        - Insurance and Bonds
        - Site security fence
        - Site office installation but not monthly rents
        - Security and construction camera(s) cost
    - Remaining General Requirements costs associated with other general requirements such as home office costs, trailers and other monthly rented facilities, staff costs and all other costs that are not in the major Upfront costs.
    - **Important**: County pays for the Major Upfront costs with the first application of payment when they are completed.
    - **Important:** County Pays for the Remaining General Requirements costs as a percent of total Remaining General Requirements cost with applying the same percentage as overall constriction completion indicated in the application for payment. For example, if total Construction Contract is $10,200,000 and the General Condition Requirements is $200,000, when contractor pays the Major Upfront cost of $30,000, the Remaining General Requirements would be ($200,000 - $30,000 = $170,000). At certain point regardless of time, when construction is 20% overall completed, the Remaining general Requirements payable to the contractor as of that date will be 20% of $170,000 or $34,000. County will not pay the

Remaining General Requirements costs as total such costs divided by total construction period since construction cost is a lump sum and such cost like other costs must remain lump sum and endure until construction is completed.

f. Allowances

- Provide a separate line item in the Schedule of Values for each allowance.
- Show line-item value details same as all other items in the schedule of values.
- Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

g. Schedule Updating

- Update the Schedule of Values before each Application for Payment when Change Orders and/or Contract Amendments result in a change in the Contract Sum.
- Field Orders do not change the Contract Sum and should not be listed in the Schedule of Values.

h. Off-Site Storage

- Payment for the materials stored on or off site will be in accordance with the Contract and the General Conditions of the Contract.

4. Schedule of Time

Schedule of Time is a statement furnished by Contractor, and approved by the Owner, allocating the entire construction process in detail indicating start and end of each task and the relationship between construction activities and used as the basis for reviewing and processing Applications for Payment and progress of the work.
Schedule of for construction is a Critical Path Method (CPM) Schedule using standard software such as Primavera or Microsoft Project.

a. Coordination

- Refer to the General Conditions of Contract for more details.
- Submit the CPM Schedule to Owner and Architect/Engineer for approval within 15 calendar days after issuance of the first Notice to Proceed.
- The CPM Schedule must be approved by Owner prior to approval of contractor's initial requisition for payment and if revised before any subsequent application for payments.

b. Format and Content

- CPM Schedule must include all major construction activities with all sub-activities included.
- The activities in the CPM Schedule must be true and accurate and consistent with actual project process.
- All items in the schedule of values must be correlated with the Schedule of Time CPM Schedule to verify percent of completion.

c. CPM Schedule Updating

- CPM Schedule's logic must not be changed without Owner's approval.
- Contractor must setup a review meeting with the Owner or Owner's representative to review changes in the construction process.

- Contractor must first input the correct period of activities in the CPM Schedule as "Status of the Schedule" showing delays if any and save that file for the record, then attempt with the owner's consent to change the logic or approved time frames. All updated CPM Schedules must be saved as Versions for the record.
- Update the CPM Schedule before each Application for Payment when Change Orders and/or Contract Amendments result in a change in the Contract Sum or time.

5. Schedule of Submittals

Contractor must submit a schedule of Submittals before start of the construction and during the Pre-Construction period.

6. Schedule of Long Lead Items

Contractor must submit a schedule of Long Lead Items before start of the construction and during the Pre-Construction period.

7. Request For Information – RFI

If some portion of the Contract Documents requires clarification or interpretation by the owner, Architect/Engineer, submit a written "Request for Information (RFI)" on a form approved by the Owner. Requests for Information may only be submitted by the Contractor only and not subcontractors and shall be submitted to the Architect/Engineer and the Owner simultaneously. Clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response by the Architect/Engineer and/or Owner is needed; completely provide all required information on the RFI form. Indicate an interpretation or understanding of the Contract requirement and reasons why such an understanding has been reached.

The Architect/Engineer will review all Requests for Information to determine whether they are requests for information within the meaning of the term. If Architect/Engineer determines that the document is not a Request for Information, the request will be returned to Contractor through Owner, unreviewed as to content. Any Request for Information to which the Architect/Engineer's response is a readily available Contract Document reference must be noted as such in the RFI Log. A pattern of submitting unreasonable, unnecessary RFIs and information that is already in the contract documents may result in a claim by the Owner against the Contractor for delay of the Project and compensation for review time.

Responses from Architect/Engineer Through Owner to RFIs do not change the requirements of the Contract Documents. If the Contractor believes that a response to a Request for Information represents a change in the requirements of the Contract Documents, the Contractor shall immediately indicate this by submitting written notice to Architect/Engineer and Owner per the requirements of the General Conditions. Failure to submit written notice immediately shall waive Contractor's right to seek additional time or cost under the General Conditions of the Contract.

All submitted RFIs shall bear the signature of the Contractor. For expediency, a RFI may be e-mailed as a Word attachment simultaneously to the Architect/Engineer and Owner; in that case, a "Digitally Signed" RFI shall be submitted. Scan copies of RFI without signature of the responsible party is not acceptable.

Contractor shall maintain a current log of all RFI requests and answers in the BIM 360 and at the Contractor's Field Office and accessible to the Architect/Engineer or Owner upon request.

8. Field Orders

- Field Order (FO) is a construction directive to the contractor to perform certain tasks that would either prevents project delay, additional project cost and there is a sense of urgency in the performance of the task that a normal process of change order will cause delay or cost overrun.
- Contractor must immediately engage in performing the task provided in the Field Order.
- Filed Orders must be signed by the Contract Administrator.
- All field orders will be paid through Change Orders.
- Field Order invoices/application for payment must be separate from the normal application for payments.
- Contractor must submit a formal PCO as soon as cost and schedule for Field Order are known.

9. Purposed Change Order – PCO

- Change Order is the only contractual mechanism that can change the contract amount or the time.
- Contractor must submit a Proposed Change Order (PCO) to the Owner as soon as such change is apparent in order to avoid delays.
- Refer to the General Conditions of the Contract for detailed information on Change Orders.
- No additional work above and beyond contract scope of work can be executed by the contractor without Written approval of the County submitted by a Purchase Order (PO) and a Notice To Procced (NTP) by the county.
- If any additional work/PCO is performed by the contractor, it may render such work as non-payable and will result in such PCO become a Claim that will take a long time to resolve. Owner will not be responsible for contractors' negligence in performing any additional work without an approve PO and NTP.

10. Applications For Payment

Each Application for Payment shall be consistent with previous applications and payments as certified by Architect/Engineer and paid for by the Owner. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

a. Payment Application Times

Unless noted otherwise, applications for payment shall be made monthly, near the end of each month. The period of construction work covered by each Application for Payment will usually be the preceding month. In order to expedite the review and approval of each application for payment, submit to and review with the Architect/Engineer and the Owner a draft copy of each application for payment prior to submitting a formal copy.

b. Application Preparation & Submittal

Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect/Engineer will return incomplete applications without action.

- Use County provided Forms for Applications for Payment.
- Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
- Include amounts of Change Orders issued before the last day of construction period covered by application.

c. Transmittal

- Submit electronic signed and notarized Application for Payment by email to the County Project Manager and the Architect/Engineer simultaneously. Upon Owner request, each application shall include Subcontractors' and Material Suppliers' waivers of liens.
- Provide required quality-control documentation and similar required documentation such as an updated Progress Schedule.
- Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

I. Waivers of Mechanic's Lien

- Upon Owner request, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

II. Initial Application for Payment

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

- List of subcontractors and suppliers.
- Approved Schedule of Values. Schedule of Values to be submitted to and approved by Architect/Engineer and Owner prior to submission of first application for payment.
- Contractor's CPM Construction Schedule.
- Products list.
- Submittals Schedule (preliminary if not final).
- List of Contractor's staff assignments and principal consultants.
- Copies of trade permits, authorizations and licenses from authorities having jurisdiction for performance of the Work.
- Initial progress report.
- Data needed to acquire Owner's insurance.
- Include CQC report and any supporting documentation for Monthly payment. Such as Quality Control report, Safety Report, Approved progress schedule and related report, MFD and LSB contribution of payment request,
- Contractor's Quality Control Plan.

III. Application for Payment at Substantial Completion

- Shall be in accordance with the Contract.

IV. Final Payment Application

- Shall be in accordance with the Contract.

11. Construction Quality Control Plan

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Documents. The quality control system shall consist of plans, procedures, staff, and organization necessary to produce an end product which complies with the Contract Documents. The system shall cover all construction operations, both on-site and off-site, and must be keyed to the proposed construction sequence.

The intent of Contractor Quality Control (CQC) is to positively control the quality of Work, including the work of subcontractors and suppliers, through preparatory, initial and follow-up activities to assure delivery of Work that meets requirements of the Contract Documents for performance, quality and timeliness.

The Contractor shall execute a Contractor Quality Control Plan that meets the intent of CQC, using whatever manpower, time and resources are required, even where the quantity needed may exceed requirements of this Section or the approved CQC plan, at no additional cost to the Owner.

This Section provides minimum requirements for documentation of the CQC Plan, such that the Owner may assure itself of quality and timely Work. Contractor's Quality Control includes the entire building and site work.

a. CQC Coordination Meeting

Before start of construction, the Contractor shall submit a preliminary Contractor's Quality Control Plan (CQC Plan). Subsequently, the Contractor shall meet with the Owner's Project Manager, with its Quality Control staff, and other team members, to discuss the Contractor's Quality Control System. Any submittals required for this meeting shall be submitted to the Owner at least one week in advance. During this coordination meeting, a mutual understanding of the system details for the Quality Control Plan shall be developed, including the forms for recording the CQC operations, definable features of the work, control activities, testing, administration of the Quality Control Plan for both on-site and off-site work, and the interrelationship of Contractor's and Owner's quality goals. After the meeting, the Contractor shall submit a formal Quality Control Plan, consistent with the results of the meeting, to the Owner for approval. The Contractor and its Quality Control staff shall also attend all construction progress meetings to address deficiencies in the CQC system.

b. Content of the CQC Plan

The CQC plan prepared by the Contractor must include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by the Contractor, subcontractors, fabricators, suppliers and purchasing agents:

I. CQC Organization Description

A description of the quality control organization, including a chart showing lines of authority and acknowledgement that the CQC staff must implement the CQC Plan for all aspects of the Work specified.

II. Letter of Authorization

A copy of the letter to the CQC Systems Manager signed by the principal which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager including authority to stop work which is not in compliance with the Contract.

III. Plan for Test Requirements

For all required testing provide a list including Control, verification and acceptance testing procedures the test name, Specification Section paragraph requiring test, feature of the work to be tested, test frequency, and person responsible for each test.

IV. Tracking Plan

provide a system and procedure for tracking CQC requirements including deficiencies.

V. Daily CQC reports

Contractor must maintain record of CQC report on a daily basis to include quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall include, including but not limited to the following:

- Report must be placed in the Field Management directory in BIM360 folder for CQC reports.
- Factual evidence that required quality control activities and/or tests were performed.
- Daily briefing of the Owner's Construction Representative on CQC status, actions and plans.
- Monthly summary reports to be submitted with Application for Payment, including summary of all Daily CQC reports, actions and resolutions.

VI. Acceptance of CQC Plan

Acceptance (approval) of the Contractor's CQC Plan or interim plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Owner reserves the right to require the Contractor to make changes in the CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

VII. Notification of Changes

After acceptance by the Owner of the CQC plan, the Contractor must notify the Owner's Project Manager in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Owner's Project Manager.

c. Contractor's Quality Control Organization

I. CQC System Manager

The Contractor shall identify a qualified individual within his organization to be the CQC System Manager. The CQC System Manager shall be located at the site, will develop the CQC System, and will be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall have no other duties, and shall be employed by the Contractor, except as noted in the following. An alternate CQC System Manager shall be identified in the plan to not exceed 2 weeks at any one time, and not more than 30 workdays during a calendar year. The requirements for the alternate CQC System Manager are the same as for the designated CQC System Manager. -CQC System manager must be part of all punch list reviews in all phases of the project.

II. Organizational Changes

The Contractor shall obtain the Owner's Project Manager's acceptance before replacing any member of the CQC staff. Requests for changing personnel shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

III. CQC Personnel Qualifications

Expertise	Education	Related Experience	License	Responsibilities
CQC System Manager	graduate in construction management with an Associate degree or higher is preferred	10 years' experience in construction management; 5 years of which must be in CQC		
HVAC Quality Control:	Associate degree or higher in mechanical engineering	5 years HVAC supervision experience		HVAC review for compliance with Contract Documents, quality, and applicable codes.
Electrical Quality Control	Associate degree or higher in electrical engineering	5 years electrical supervision experience		Electrical review for compliance with Contract Documents, quality, and applicable codes.

d. Quality Control Meetings

If needed a special CQC meeting may be requested by the owner and must be organized by the contractor to cover CQC matters.

e. Owner's Rights

The Owner retains the right to the following actions in the event that the CQC fails to function in controlling the Work or fails to provide the visible quality control activities and documentation required:

I. Changes to Staff and CQC Plan

The Owner reserves the right to require the Contractor to make changes in its CQC plan and operations including removal and replacement of personnel, including but not limited to the CQC Manager, the Superintendent, the Project Manager, as necessary to obtain the quality specified.

II. Contract Monitoring Report

The Owner may issue an unsatisfactory Contract Monitoring Report when the CQC documentation is inadequate or late and the Contractor has failed to correct the deficiency within 10 days of the original due date.

III. Notification of Noncompliance

The Owner's Project Manager or Construction Representative may notify the Contractor of any detected noncompliance with the Contractor Quality Control requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor, will be deemed sufficient for the purpose of notification.

IV. Withholding of Payments and Completion

Failure to meet CQC requirements and failure to correct noncompliance issues by the contractor may result in withholding, reduction or rejection of payments related to CQC verified deficiencies and other related activities.

V. Stop Work

If the Contractor fails or refuses to remedy construction deficiencies promptly such that the quality of ongoing Work cannot be assured, the Owner's Contract Administrator may issue an order stopping all or part of the Work until satisfactory corrective action has been implemented by the contractor. No part or whole of the time lost due to such stop of work orders for corrective action shall be the basis for a request for an extension of time or for an increase in contract sum due to costs or damages incurred by the Contractor.

12. Product Requirements

a. Summary

This Section includes administrative and procedural requirements for Project products including product delivery, storage, protection, and handling; warranties; product options, comparable products and substitutions; and quality of workmanship. Refer to individual Specification Sections for products' technical requirements.

The Contract is based on the products and standards specified in the Contract Documents without consideration of proposed substitutions or Comparable Products. Owner may reject proposed substitutions or Comparable Products at its discretion.

b. Definitions

I. Products

Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

II. 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 that is current as of date of the Contract Documents.

III. New Products

Items that have not previously been incorporated into another project or facility, except that product consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.

IV. Comparable Product

Contractor proposed product that is demonstrated and approved through submittal 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 specified product. Comparable products are allowed when “or equal” is indicated in the individual product specification. The terms "Comparable Product" and "Or Equal Product" are considered interchangeable and of the same definition.

V. Substitution

Contractor proposed change to a product required by the Contract Documents where the original product does not allow “or equal” products, the proposed changed product does not qualify as an “or equal” product, or the product submission by the contractor is not one of the named/allowed manufacturers contained in the specification.

VI. Basis-of-Design Product

A specific manufacturer's product named and accompanied by the words "basis-of-design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

c. Product Substitution Requests

Any proposed substitution must maintain the quality standards established by the Contract Documents for the specified product without any detrimental effect to the Owner. Justification for Request Owner will not consider requests for substitution after Contract Award, except for extenuating circumstances as follows,

- The product is no longer manufactured.
- The product is not available due to a strike, lockout or bankruptcy.
- The product is not available due to major catastrophes such as earthquake.
- The specified product is identified as incompatible or inappropriate for the project.
- The specified item fails to comply with building code requirements.
- The manufacturer or fabricator declares a specified product to be unsuitable for the use intended and refuses to warrant its installation.
- The requested substitution will provide the Owner with a cost savings without affecting the desired effect of the specified product.

Requests may be considered or rejected at the sole discretion of the Owner.

I. Substitution Request Procedures

If the substitution request is justified per the preceding article, submit each substitution request per the following procedures. Limit each request to one proposed substitution.

II. Substitution Request Form

Below is describing what in the form is. Complete all lines. If a line is not applicable, indicate "N/A.". Identify the product to be replaced and the product to be substituted. Include Specification Section number, title and paragraph and Drawing numbers and titles.

III. Documentation

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

- Statement indicating why specified material or product cannot be provided.
- Coordination information including a list of any changes or modifications needed to other parts of the Work to be performed by the Contractor, a list of any changes or modifications needed to construction to be performed by the Owner (if applicable), and any separate additional contractors that will be necessary for the Contractor to accommodate the proposed substitution.
- Detailed comparison of significant qualities of proposed substitution with those of the product specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
- Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- Samples, where applicable or requested.
- List of similar installations for completed projects with project names and addresses and names and addresses of Architect/Engineers and Owners.
- Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- Detailed comparison of Contractor's 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.
- Accurate cost information, including a proposal of change, if any, to the Contract Sum demonstrating a credit to the Owner.
- Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- 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.
- Other information as necessary to assist evaluation.

IV. Architect/Engineer/Owner Review

Architect/Engineer/Owner will review Contractor's written request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect/Engineer will return request through Owner to Contractor, to record noncompliance with these requirements:

- Written explanation stating one of the above reasons for justification of the substitution.
- Requested substitution does not require unacceptable revisions to the Contract Documents.
- Requested substitution is consistent with the Contract Documents and will produce desired results.
- Substitution request is fully documented and properly submitted.
- Requested substitution will not unnecessarily adversely affect Contractor's Construction Schedule.

- Requested substitution has received necessary approvals of authorities having jurisdiction.
- Requested substitution has been coordinated, and is compatible, with other portions of the Work.
- Requested substitution provides specified warranty.
- If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

V. Architect/Engineer/Owner Action

- If necessary, Architect/Engineer/Owner will request additional information or documentation for evaluation within one week of receipt of a substitution request.
- The rejection of any proposed substitution by the Owner will be final and without further recourse by the Contractor. In making such determinations, the Owner may, but will not be required to, rely upon the recommendations of the Architect/Engineer. If the event of Owner rejection, the specified product shall be provided.
- Submission of a Shop Drawing, Sample or Product Data indicating a proposed variance from the Contract Documents is not a proper submission and does not constitute a Substitution Request. Approval of a Shop Drawing, Sample or Product Data indicating a proposed variance from the Contract Documents does not constitute approval of a Substitution.

d. Quality Assurance

I. Source Limitations

- To the fullest extent possible, provide products of the same kind from a single source. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect/Engineer and Owner to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. After a determination has been made, provide products from sources producing products that possess these qualities, to the fullest extent possible.
- Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
- Whenever the Contract Documents require that a product complies with ASTM Designations, ANSI Specifications or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. Where requested or specified, submit supporting test data to substantiate compliance.

II. Nameplates and labels

Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

e. Product Delivery, Storage, And Handling

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

I. Delivery and Handling

- Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

- 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.
- Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- Provide appropriate equipment and qualified personnel to move products on-site without damage.
- Each product shall be marked with unique identifiers including the project name, specifications reference and any other information needed to identify the product's specific use on the Project.

II. Storage

- Comply with product manufacturer's written instructions and recommendations for temperature, humidity, ventilation, and weather-protection requirements for storage.
- Store products to allow for inspection and measurement of quantity or counting of units.
- Prevent product contact with materials that may cause corrosion, discoloration or staining.
- Store materials in a manner that will not endanger Project or temporary structures.
- Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- Provide off-site storage when site does not permit adequate on-site storage or protection.
- Store cementitious products and materials on elevated platforms.
- Store foam plastic from exposure to sunlight and moisture, on raised surface/platform, with appropriate weatherproof tarpaulin covers, except to extent necessary for period of installation and concealment.
- Protect stored products from damage and liquids from freezing.

f. Product Selection and Provision Procedure

I. General Product Requirements

Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete system/installation and indicated use and effect.

Products required to be supplied in quantity within a Specification Section shall be of the same manufacture, shall be interchangeable, and shall be the same about function, texture, pattern and color. To the greatest extent possible, provide products from a single source.

II. Standard Products

If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

Materials specified on the Contract Documents by reference to title, symbol, or number of a Commercial or Industry Standard, Federal Specification, ASTM designation, ANSI designation, Manufacturer's data, or other similar reference standard are identified hereby as the minimum requirement for the quality of materials required hereunder. References are to the latest editions of same, except as indicated otherwise. If not in contradiction to the building code or regulations of other governmental agencies as may have jurisdiction, such reference documents shall be considered as an integral part of these specifications as if repeated word for word herein.

In case of conflict between differing specifications for a product, the most stringent specification (or the most stringent combination of specifications) shall apply. Contact the Architect/Engineer regarding interpretation of specifications as required.
Do not use products salvaged from existing premises, except as specifically specified on the Contract Documents.
Where products are accompanied by the term "as selected," Architect/Engineer will make selection.
Where products are accompanied by the term "match sample," sample to be matched is Architect/Engineer's.
Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

III. Product Selection Procedures

- Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
- Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
- Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
- Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
- Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "comparable products" to obtain approval for use of an unnamed product
- Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 1 "Product Substitutions" Article for consideration of an unnamed product or system.
- Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 1 "Other than Basis-of-Design Products" Article for consideration of an unnamed product by the other named manufacturers.
- Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified. Provide an affidavit from the manufacturer certifying that the product complies with standards, codes, or regulations and submit supporting test data to substantiate compliance, if requested by Owner.
- Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect/Engineer's sample. Architect/Engineer will recommend to the Owner for acceptance or rejection of the sample.
- If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 1 "Product Substitutions" Article for proposal of product.
- Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, and textures" or a similar phrase, select a product that complies with other specified requirements.
- Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect/Engineer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.

- Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect/Engineer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

g. Installation Of Products

- Products shall be applied, installed, connected, erected, used, adjusted, cleaned and conditioned in accordance with the respective manufacturer's instructions and recommendations unless more stringent requirements are specified.
- Verify and coordinate clearances, dimensions and installation of adjoining construction, equipment, piping, ducts, conduits, or other mechanical or electrical items or apparatus.
- Prior to fabrication, field measure actual existing conditions as applicable to ensure proper fit.
- Inspect each item of material or equipment immediately prior to installation. Reject damaged and defective items.
- Recheck measurements and dimensions of Work, as an integral step of starting each installation. Whenever stock manufactured products are specified, verify actual space requirements for setting or placing into allotted space.
- Anchor each product securely in place with positive anchorage devices designed and sized to withstand expected loads. Anchors shall be accurately located and aligned with other Work.
- Allow for expansion of materials and building movement.

h. Protection Of Installed Work

- Clean, protect, adjust and perform maintenance on installed Work as necessary to ensure freedom from damage and deterioration at time of Substantial Completion. Remove protective devices when no longer needed.
- Provide special protection where specified in individual Specification Sections.
- Provide temporary and removable materials for protection of installed products. Control activity in immediate work area to minimize damage.
- Protect finished Work from damage, defacements, stains, scratches, and wear.
- Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- Protect finished floors, stairs, and other surfaces from traffic dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- Prohibit traffic from lawn and landscaped areas

i. Quality Standards

- Workmanship specified or indicated on the Drawings by reference to title, symbol, or number of a Commercial or Industry Standard, ASTM designation, ANSI designation, Manufacturer's data, or other similar reference standard is identified hereby as the minimum requirement for the quality of workmanship required hereunder. References are to the current issues of same, except as indicated otherwise. If not in contradiction to the building code or regulations of other governmental agencies as may have jurisdiction, such referenced documents shall be considered as an integral part of these specifications as if repeated word for word herein.
- Architect/Engineer may require that copies of certain reference specifications be kept at the job site.
- Damaged products shall be not installed as part of the Work. At the Owner's sole discretion, the Owner may approve the use of repaired items in the Work. The Contractor shall bear all costs related to replacing or repairing and refurbishing damaged products.

j. Workmanship

- Note that the quality required for certain workmanship specified in respective Specification sections may be better than that established by the identified reference standards.
- Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- Perform work by persons qualified to produce workmanship of specified quality.

k. Manufacturers' Instructions

When work is specified to comply with manufacturers' instructions, submit copies as specified in the Submittal Procedure Section, distribute copies to persons involved, and maintain one set in field office. We need to look at the Submittal Procedures

13. Payment Process

At the end of each month contractor should submit application for payment provided by the owner for approval and payment following is the brief process:

1- Contractor to provide draft application for payment to the Owner for walkthrough and verification of work completed,
2- Contractor correct/update the draft according to Owner's comments, sign, notarize and submit the application for the Architect's signature of approval,
3- Contractor submits the signed application for Payment with all required documents such as updated CPM construction schedule, release of lean for previous payment, etc. to the Owner,
4- If all documents are provided in compliance with the contract requirements, Owner will process the application and within 30 days after approval of final Application for Payment provide the contractor with the actual payment either direct deposit or other specified methods.

14. Requirement for Product Data

Contractor must maintain copies of product data to be included in the O&M manual for closing.

15. Submittal Process

This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals required for performance of the Work. Contractor shall submit and receive final written Architect/Engineer approval for submittals required by the Contract Documents including as specified herein prior to proceeding with any work affected by the products, components or assemblies to be submitted.

a. Definitions

Submittals: Written and graphic information that requires Architect/Engineer's responsive action.
Informational Submittals: Written information that does not require Architect/Engineer's responsive action.
Submittals may be rejected for not complying with requirements.

b. Submittal Procedures

I. Coordination

- Coordinate preparation and processing of submittals with performance of construction activities.
- Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

- Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination and/or color selection. Architect/Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- Do not submit any submittals for permit unless submittal has been approved by Architect/Engineer.
- Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation". We need to review to better understand the content.

II. Processing Time

Make submittals promptly in accordance with construction schedules, and in such sequence as to cause no delay. Make submittals far enough in advance to allow enough time for Contract and Architect/Engineer submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect/Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals (or resubmittals) enough in advance of the Work to permit processing.

III. Initial Review

Allow 30 days for initial review of each submittal by Architect/Engineer. Allow additional time if coordination with subsequent submittals is required. Architect/Engineer will advise Contractor when a submittal being processed must be delayed for coordination.

IV. Intermediate Review

If an intermediate submittal is necessary, process it in same manner as initial submittal.

V. Resubmittal Review

Allow 30 days for review of each resubmittal.

- Concurrent Consultant Review: Where concurrent review of submittals by Architect/Engineer's consultants, Owner, or other parties is required, allow 30 days for each initial and resubmittal review. Transmit submittals required in the following Sections simultaneously to the Architect/Engineer and the indicated Architect/Engineer's consultant. Final review comments on each submittal (and resubmittal) will be issued by the Architect/Engineer through owner to Contractor.
- Submittal Requirements
    - Identification: Place a permanent label or title block on each submittal for identification.
    - Indicate name of firm or entity that prepared each submittal on label or title block.
    - Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review, CQC review, and markings and action taken by Architect/Engineer.
    - Include the following information on label for processing and recording action taken:
    - Project name.
    - Date.
    - Name and address of Architect/Engineer.
    - Name and address of Contractor.
    - Name and address of subcontractor.
    - Name and address of supplier.
    - Name of manufacturer.
    - Submittal number and other unique identifier, including revision identifier.
    - Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
    - Number and title of appropriate Specification Section.
    - Drawing number and detail references, as appropriate.
    - Location(s) where product is to be installed, by drawing number as appropriate.

- Other necessary identification.
- Submittals shall include information as necessary to indicate its compliance with Contract Documents, relationship to other work, and other information as specified, including:
- Identification of product or materials
- Relation to adjacent structures or materials
- Field dimensions, clearly identified as such
- Applicable standards, such as ASTM number
- Clear identification of submittal material previously submitted and its status.

VI. Deviations

Encircle and specifically identify deviations from the Contract Documents on submittals. Substitutions and "or equal" products may not be processed through the submittal review process. Architect's Engineer's action on shop drawings cannot change the Work in the Contract Documents.

VII. Contractor Review

Contractor shall review and approve all submittals for compliance with Contract Documents and field dimensions prior to submission to Architect/Engineer. Contractor's approval shall be noted on the label or title block. The Architect/Engineer will return, unreviewed, any submittal (or resubmittal) not bearing notation of the Contractor's approval.

VIII. Transmittal

Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect/Engineer will return, or discard submittals received from sources other than Contractor.

IX. Transmittal Form

- Use CSI Form 12.1A, or Owner approved equal.
- On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect/Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

X. Resubmittals

- Make resubmittals in same form and number of copies as initial submittal.
- Note date and content of previous submittal.
- Note date and content of revision in label or title block and clearly indicate extent of revision including any changes which were other than those requested by Architect/Engineer.
- Resubmit submittals until they are marked "No Exceptions Taken" or "Note Markings."
- Distribution: Reproduce and furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Note Markings" taken by Architect/Engineer.

B. Pre-Construction Phase

1. Pre-Construction Meeting

The Owner will schedule a pre-construction meeting before starting construction, at a time convenient to Contractor, but no later than 10 days after Notice-to-Proceed. The Architect/Engineer will preside at the meeting, record minutes of significant proceedings and decisions, and distribute minutes to participants within

7 days after the meeting. The meeting will be held virtually on Teams, Zoom or at location proposed by the owner. The meeting will be conducted to review the Contract, Procedures, Protocols, and Requirements.

a. Attendees

Authorized representatives of Owner, Architect/Engineer, and their consultants; Contractor and its project manager, superintendent, and Quality Control Manager; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

b. Agenda

Discuss items of significance that could affect progress, including the following:

- Review of General Project Requirements (This document)
- Project director to include name, email, telephone, responsibility and role of all parties involved in the construction.
- Designation of responsible personnel.
- Establishment of Construction Progress Meetings
- Review of Construction Site Management Plan
- Review of Construction Project Management software (BIM 360)
- Procedures for Project correspondence and communications
- Procedures for processing RFIs
- Procedures for processing Changes to the scope of work and schedule
- Procedures for processing Applications for Payment
- Submittal procedures
- Procedures for creation and updating of CPM Schedule
- Critical work sequencing
- Long lead time items.
- Contractor's Quality Control Plan
- Commissioning requirements
- Use of the premises by Contractor and others
- Parking arrangement on or off site
- Working hours
- Project Phasing (as applicable)
- Temporary construction facilities and controls
- Temporary utilities
- Office, work, and storage areas
- Equipment deliveries and priorities.
- Security plan
- Safety (including first aid)
- Coordination with Testing and Inspection Agencies
- Housekeeping (cleaning) procedures
- List of Subcontractors
- Contract Completion and Closeout Requirements
- Procedures for Record Documents
- Review of closing document to remind the contractor to be prepared to submit all required materials before final completion

- Any other subject that must be reviewed and process established prior to start of construction normally starting with the second Notice To Proceed to Construction

2. Construction Site Management Plan

Contractor must provide a Construction Site management Plan to include the following. Plan must be submitted to the owner no later than 10 calendar days after the first Notice To Proceed. Plan must be approved by the Owner prior to mobilization:

- Construction entrance(s)
- Mud and dust prevention equipment at the construction entrance
- Parking
- Truck and other vehicular equipment circulation
- Traffic plan for delivery and haul aways
- Materials stockpile location/storage
- Waste materials stockpile location
- Crane plan if applicable
- On-site offices and equipment
- Temporary utilities plan
- Fencing
- Security plan
- Other elements that create constraints on the site

3. Special Inspection Pre-Construction Meeting

In accordance with the Building Permit, and the requirements of the County's Department of Permitting Services and/or Authority Having Jurisdiction, a pre-construction conference(s) will be conducted by the County to review the procedures and work required under the Special Inspections Program.

a. Attendance

The following shall attend the pre-construction conference:

- Architects and Engineers of Records.
- Owner's Representative.
- General Contractor.
- Special Inspector.
- Professional in charge of Architectural Inspections.
- Geotechnical Inspector; Professional in charge of Geotechnical Services.
- Professional in charge of Structural Inspections (if different from Special Inspector).
- Professional in charge of Materials Testing Laboratory (if different from Special Inspector).
- County DPS Representative for Special Inspections.

b. Agenda

- Discuss the County's requirements for Special Inspections.
- Review proposed Inspection Plan.
- Examine credentials of proposed inspection professionals and testing laboratories.
- Reach an agreement on the Statement and the Schedule of Special Inspections.
- Discuss detection and reporting of critical problems.

- Discuss notification to the County of changes in critical services.
- Review requirements for testing, inspection, observation, reports and certification by the different entities involved.

4. Fencing and Security

a. Fencing

Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide concrete bases for supporting posts, fence must be braced to prevent deflection from wind. Fencing shall be provided with chain link infill slats. Color shall be brown or green. Slat must be maintained continuously during construction. Missing slats shall be replaced immediately.

b. Construction Video Camera

- Provide video camera to provide 24/7 coverage of site to be available for view on the internet.
- Location to be determined at the site or per project Specific Requirements.

I. Location Key Plan

- Submit key plan of project site and building with location of camera and range of camera to show coverage. If single camera is not able to provide total coverage and second camera may be required. Provide wiring diagram to show connections.

5. Temporary Facilities – On-Site Offices

a. General

Maintain all temporary facilities and controls necessary for the performance of the Work. Comply with all applicable codes and regulations of authorities having jurisdiction; obtain permits as required. Locate and install all facilities and controls where acceptable to the local authorities having jurisdiction, utility, and Owner and remove same and terminate, in a manner suitable to the utility owner, at completion of the Work or when otherwise directed. Pay all costs associated with the provision and maintenance of temporary facilities and controls including power, water, and fuel (if any) consumed until Substantial Completion.
Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with applicable NFPA codes Check and read
Maintain support facilities until near Substantial Completion. Remove before Substantial Completion after approval by Owner. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions approved by Owner.

b. Field Offices for Contractor

- Provide prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading; of sufficient size to accommodate needs of construction personnel. Provide at time of project mobilization. Keep office clean and orderly. Field office shall include the following:
- Conference room or area of sufficient size to accommodate meetings of 10 individuals. Furnish room with conference table, chairs, and 4-foot- square tack board.
- Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
- Lighting fixtures capable of maintaining average illumination of 20 foot-candles at desk height.

c. Field Offices for the Owner (Not Required)

Provide prefabricated or mobile unit with serviceable finishes, weather-tightness, ventilation, temperature controls, and foundations adequate for normal loading; of sufficient size to accommodate needs of Owner personnel. Provide at time of project mobilization.
Keep Owner's office clean and orderly; provide for weekly trash removal and cleaning. Provide security for trailer.
Owner's Field office shall include the following:

I. General Office Requirements

- Two personnel stations each with: office desk, reference table, chair, 4-foot square tack board, personal computer, and 4-drawer filing cabinet.
- One drafting table and drafting chair.
- Drawing "hanger" system of sufficient size to hold all Contract Drawings and Shop Drawings.
- Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
- Lighting fixtures capable of maintaining average illumination of 20 foot-candles at desk height.
- Provide temporary toilets, wash facilities, and drinking water for use of Owner personnel.
- Provide temporary telephone service. Install one telephone line for each personnel station and an additional dedicated telephone line for a facsimile machine. Provide dedicated high-speed (Gigabyte) Internet Services for the facility.
- Sufficient electrical outlets.
- Move stored products that interfere with construction of the Work, or operations of the Owner or separate contractors.
- Obtain and pay for use of additional storage or staging areas as needed for the Work.
- Provide storage areas sized to storage requirements for products of individual Sections, allowing for access and orderly maintenance and inspection of products.

II. EQUIPMENT

- Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- Heating Equipment: Unless Owner authorizes use of permanent heating system, provide UL Listed and FM approved vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
- Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
- Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- If Owner authorizes use of permanent heating system, protect indoor air quality in accordance with Division 1 "Indoor Air Quality Management", including but not limited to the following measures:
- Filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999, and all HVAC systems, equipment and pathways shall be dust and particulate free at the time of substantial completion of that phase of construction, in accordance with SMACNA "IAQ Guidelines for Occupied Buildings Under Construction."
- Replace filters during construction as necessary to protect equipment and indoor air quality.
- HVAC supply and return ductwork, registers and equipment shall be kept clean, free of dust, debris, moisture, gaseous and microbial contamination during storage, handling installation and punch-out.
- During the progress of construction, install new filtration media throughout the HVAC system. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8 or better, dependent upon equipment and designed static pressure limitations, as determined by ASHRAE 52.2-1999.

III. Location. Installation

- Locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- Location of Contractor's and/or Owner's field trailers shall be approved by Owner prior to installation.

d. Traffic Controls

- Comply with requirements of authorities having jurisdiction prior to any work affecting public roads, sidewalks, or other public Right-Of-Ways.
- Maintain traffic on all streets adjacent to or leading to the site. Where construction operations interfere with the free movement of traffic, provide approved traffic controls, flagmen or similar devices to efficiently control traffic movement. With prior approval, provide detours as necessary for unimpeded traffic flow. Comply with approved traffic management plans when provided.
- New construction: Contractor must provide adequate parking for the site users. Where parking is limited, the contractor must provide a parking plan and must provide ride share and other methods for limiting onsite parking needs.
- Contractor must provide adequate parking for the County, designer, testing agencies, and all inspectors. Contractor must not use street parking in adjoining neighborhoods or areas.
- Where available, contractor must use available paid parking to impact limited site parking.
- Protect existing site improvements including curbs, pavement, sidewalks and utilities. Keep streets, drives, and walks adjacent to site and haul routes clean and free of dirt, debris, and litter caused by construction operations.
- Provide means of removing mud and debris from vehicle wheels before entering public streets. Clean mud and debris from public streets and sidewalks as required.
- Track-equipped vehicles are not allowed on paved areas.
- Maintain access for fire-fighting equipment and access to fire hydrants at all times.
- Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

e. Haul Routes

- Consult with authorities having jurisdiction to establish public thoroughfares allowed to be used for haul routes and site access.
- Confine construction traffic to approved haul routes at approved hours.
- As required, provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

f. Maintenance of Access

- Contractor shall provide and maintain until Substantial Completion, means of safe access to, around and within the site, for vehicular and personnel traffic.
- Provide and maintain means of access (including access roads, construction personnel parking area and walkways) constructed to sustain the weight and easy movement of construction personnel and equipment used in construction of the Work.

- Provide and maintain means of access constructed to sustain the weight and easy movement of any Emergency vehicle required by governing authority. Provide and maintain access to site fire hydrants, free of obstructions, at all times.
- Contractor shall, without additional compensation from Owner, furnish labor and materials necessary to repair and maintain the means of access in an acceptable condition to meet performance requirements.
- Remove all snow and ice in an expeditious manner to protect and prosecute the Work.

g. Temporary Signs

- Provide temporary signs where needed to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
- Provide temporary, directional signs for construction personnel and visitors.
- Maintain and touchup signs so they are legible at all times.

h. Project Identification Sign

- Contractor shall furnish and install one project sign as indicated below and as approved by Owner within thirty days of commencement of construction:
- Owner will provide *(See attached for)* sample layout for project identification sign.
- Sign shall be installed near the project entrance at a location of high visibility approved by Architect/Engineer and Owner.
- Sign shall be installed and maintained plumb and level.
- Sign shall be fabricated from one-inch-thick medium density overlaid exterior plywood laminated with waterproof glue. All edges of sign shall be banded with 1 inch by ½-inch pine banding. All nails, nuts, bolts and other connecting hardware shall be galvanized.
- Sign shall be supported by two 4" by 4" structural wood post supports set in 12-inch diameter concrete footings to a depth of four feet and so that sign is raised a minimum of four feet above grade.
- Sign shall be lettered by a professional sign painter with use of graphics in accordance with the general layout indicated. Submit shop drawing indicating sign construction and lettering.
- Letter style shall be Helvetica Medium. Letter color shall be gloss white. All surfaces of sign shall receive one coat exterior primer followed by two coats of exterior gloss enamel. Surface color shall be Dark Blue --Sherwin Williams 33-24 or equal.
- Contractor shall repair any deterioration or damage to the sign during the construction.
- At completion of the project, Contractor is responsible to remove and dispose of the sign, supports and foundations and to restore area.
- No other free-standing signs will be allowed except those required by law. All other contractor signage shall be trailed mounted, subject to Owner's approval. Subcontractor trade signs are not permitted. Refer to standard Construction sign drawing.

I. Dewatering Facilities and Drains

- Comply with requirements of authorities having jurisdiction and the requirements of other Sections. Maintain and protect the Project site, excavations, and the construction site free of water from rain or snow, spring or ground water, backing up of drains, and other water sources. Remedy for damaged unprotected or poorly protected soil that is unsuitable for use is the full responsibility of the contractor with no cost to the Owner.
- Dispose of water in a lawful manner that will not result in flooding Project site or adjoining properties nor endanger permanent Work or temporary facilities.

i. Snow Removal

- Remove snow and ice as required to minimize accumulations and to protect the Work.
- As necessary, provide and operate sufficient dewatering and pumping equipment to maintain the site and the Work free of standing water to protect the ground/soil or replace the saturated soil with usable soil imported to the site with no cost to the owner.

j. Waste Disposal Facilities

- Comply with requirements specified in Division 1 Section "Construction Waste Management."
- Lifts and Hoists: Furnish and maintain hoists, staging, rigging, scaffolding, and runways required in the execution of the work. Erect, equip, and maintain such temporary work in accordance with statutes, laws, ordinances, rules, and regulations of the governing authorities and insurance companies having jurisdiction.
- Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

k. Temporary Elevator Use

- The elevators constructed under the requirements of Division 14 shall only be used for construction purposes, or during the construction period, with written permission from the Owner, in which case such use shall be limited to a single car. Elevators may be used by the Contractor as necessary for testing and inspection only without Owner approval. Temporary enclosures or hoist way opening protection, cab finish protection (protective padding), protection of damage to car, door and door frames, hoisting machine, platforms, etc. shall be provided by the Contractor. Any repairs, or replacements, required to restore the elevator equipment to its original, like new, condition shall be made by the Contractor at his own expense prior to Substantial Completion. Owner is not responsible for providing telephone service for elevator use during construction.

l. Temporary Stairs

- Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- Temporary Use of Permanent Stairs: Cover finished permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of Substantial Completion.

m. Design of Temporary Structures

- The structural design of all items used in the construction of the building and not a permanent part thereof, including but not necessarily limited to hoisting towers, shoring for concrete and masonry work, the temporary bracing for structural steel, and the shoring of cut earth banks, is the sole responsibility of the Contractor.

n. Contractor Parking – Contractor will be responsible for his employees and subcontractors.

- Collocate with the same
- Consult with authorities having jurisdiction to establish allowable contractor parking locations. Contractor shall pay for all parking spaces required to complete the work.
- Contractor shall prepare a parking plan within 30 days of NTP.
- Contractor shall not use existing parking spaces without written consent from the County.

6. Temporary Utilities

a. Temporary Utility Installation

I. General

- Provide and pay for all temporary utility service and systems as needed for the efficient construction of the facility until Substantial Completion.
- Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- Contractor is solely responsible for cost of, the coordination with the utilities for, and the timeliness of, the installation of temporary utilities until Substantial Completion. The Owner does not guarantee the availability of temporary utilities at the site and does not guarantee the timing of permanent utility installation. The Contractor shall verify the availability of temporary permanent utilities prior to bid and shall arrange for, and pay for, all utility permits, inspections, connections, etc. necessary for provision of temporary utilities. No time extension will be granted based on the Contractor's failure to obtain temporary utilities in time to support completion of the project.

II. Sewers and Drainage

- Provide temporary utilities to remove effluent lawfully.
- Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- Water Service: Install temporary water service and distribution piping in sizes and pressures adequate for construction.
- Provide potable water approved by local health officials.

III. Wash Facilities

- Supply with potable water for personnel to wash-up for sanitary condition. Dispose of drainage properly. Provide cleaning compounds appropriate for each condition.
- Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation as required to prevent freezing.
- connections after use are no longer required. Restore source of supply to its pre-construction condition.
- Sanitary Facilities: Provide temporary self-ventilated portable toilets for use by all construction personnel throughout the construction period. Keep toilet facilities clean, sanitary, provided with all appurtenances and in compliance with applicable codes and regulations. Service as often as necessary to prevent accumulation of wastes and creation of unsanitary conditions. Remove at Substantial Completion.
- Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- Part of NTP#1, Submittal requirements of the Contract. After the building or portion thereof is completely enclosed by either permanent construction or substantial temporary materials, and before installation of finishes, Contractor shall pay for and provide heat therein of not less than 55 degrees F., or more than 75 degrees F., which shall be continuously maintained in the enclosed area until the project is accepted.
- Contractor shall provide one accurate recording Fahrenheit thermometer at a place designated by Owner's Construction Representative, and one additional accurate thermometer for every 2,000 square feet of floor space, located as directed by Owner's Construction Representative in order to determine if the specified temperatures are maintained. Contractor shall furnish daily to the Owner's Construction Representative three copies of a signed statement of temperatures recorded every three hours.

- Contractor, with the written approval of the Owner, may use the permanent heating system as specified for the project once it has been tested, flushed out and chemically treated, and is ready to operate. Contractor shall pay all energy costs for heating during construction and provide meters if required. Contractor shall coordinate the work so that the permanent heating system for the building will be available and ready to provide heat as soon as the building is closed in.
- Contractor shall arrange and pay for operation of the heating system including all costs to put in first-class condition all portions of the permanent heating system used for heating during construction prior to turnover and acceptance by Owner.
- The installation and operation of heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection. Heating devices, which may cause damage to finish surfaces, shall not be used.
- Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

IV. Temporary Ventilation

- Provide adequate ventilation in enclosed areas throughout construction period required to: facilitate progress of Work; to protect Work and products against excessive dampness and heat; to prevent moisture condensation on surfaces; to provide suitable environmental conditions for installation and curing of finish materials; to provide adequate ventilating to meet health regulations for safe working environment; and, to prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction. Provide local exhaust ventilating to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons or property. Provide ventilating operations at all times personnel occupy an area subject to hazardous accumulations of harmful elements. Continue operation of ventilating system for as long as required after cessation of construction activities to assure removal of harmful elements.

V. Electric Power Service

- Provide electric power service and distribution system (meeting NEC requirements) of sufficient size, capacity, and power characteristics required for efficient construction operations.
- Equip service with meter, main disconnect, and over current protection.
- Provide branch distribution system from temporary power source with distribution boxes and outlets located so that power is available throughout active work areas.
- Permanent receptacles may be utilized during construction. Replace any receptacle plates and wiring devices damaged during construction.
- Remove all temporary wiring after it use is no longer required. Restore source of power to its pre-construction condition.

VI. Lighting

- Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, safety and traffic conditions.
- Install and operate temporary lighting that fulfills security and protection requirements.
- Provide branch distribution system from temporary power source with distribution boxes and outlets located so that lighting is available throughout active work areas.
- Provide 1 watt per sq. ft. lighting to exterior staging and storage areas after dark for security purposes. Provide 0.25 watt per sq. ft. lighting to interior work areas after dark for security purposes. Provide a lighting level of 150 foot-candles per sq. ft. minimum on surfaces receiving finishes.

- Permanent lighting system may be utilized during construction with Owner approval. Restore permanent lighting systems used during construction to original condition. Maintain lighting and provide routine repairs.

VII. Telecommunications Service

- Provide and pay for all costs (including installation, maintenance and monthly service costs) for telecommunications systems for the performance of the Work and for the Owner's trailer.
- Provide temporary telephone service in the field offices for use by construction and Owner personnel. Install one telephone line for each field office.
- Provide additional telephone lines for the following:
- Provide a dedicated telephone line for each facsimile machine and computer in each field office.
- Provide a telephone line at each first-aid station.
- Provide Contractor superintendent with a cellular telephone for use when away from field office.
- Provide dedicated high speed (DSL or T-1) lines in Contractor's and Owner's field offices for computer (e-mail and internet) use.

VIII. Electronic Communication Service

- Provide temporary electronic communication service, including electronic mail, in common-use facilities.

b. Security And Protection of Facilities Installation

I. Environmental Protection

Comply with permit requirements and authorities having jurisdiction. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that prevent air, water, and soil contamination or pollution or other undesirable effects.
Tree and Plant Protection: Comply with contract requirements, permit requirements and authorities having jurisdiction. As a minimum:

- Preserve and protect existing trees and plants designated to remain.
- Provide 6-foot-high barriers around drip line, with access for maintenance.
- Consult with Architect/Engineer; remove agreed-on roots and branches which interfere with construction.
- Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
- Replace trees and plants damaged by construction operations.
- Temporary Erosion and Sedimentation Control: Comply with permit requirements and authorities having jurisdiction. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- Inspect, repair, and maintain erosion-control and sedimentation-control measures during construction until site is permanently stabilized.
- Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow, and from waste disposal areas. Prevent erosion and sedimentation.
- Minimize amount of bare soil exposed at one time.
- Provide temporary measures such as berms, dikes, silt fences, drains, and other soil and erosion control devices required by authorities having jurisdiction.
- Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

II. Stormwater Control

- Comply with permit requirements and authorities having jurisdiction. Provide methods to control surface water to prevent damage to site or adjoining properties. Maintain excavations free of water; provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater. Grade site to drain; protect site from ponding water. Where required, provide, operate, and maintain pumping and dewatering equipment. Provide water barriers required to protect site from soil erosion.
- Provide complete and full system cleaning and restoration prior to final permit closeout.
- Dust Control: Execute Work by methods that minimize raising dust from construction operations. Provide positive and effective means of dust control both within the building and on the surrounding site. Contractor shall apply water and/or use other methods acceptable to Owner to minimize dust in the air. Comply with requirements of governing agencies.

III. Noise Control

- Perform all work within the time limits and requirements imposed by the authorities having jurisdiction. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum within the limits.
- Contractor is responsible for applying for and obtaining all noise waivers with the AHJ.

IV. Pest Control

- Engage a pest-control service to minimize attraction and harboring of rodents, roaches, insects and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

V. Site Enclosure Fence

- Before construction operations begin, provide and erect specified site enclosure fence in a manner that will prevent people and animals from entering construction site except by entrance gates.
- Extent of Fence: As noted on construction drawings or, if not noted, as required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
- Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide one key to Owner's Construction Representative.
- Construction fence shall be of chain link or other Owner-approved construction, erected in a substantial manner, straight, plumb and true.
- Gates shall be built into fence at such approved locations as are necessary, be well cross-braced and hung on heavy strap hinges with proper post and hook for double gates. Provide heavy hasps and padlocks for each gate.
- Maintain the fence and gates in good condition for the duration of the construction operations and then remove them completely from the site, unless otherwise directed by the Owner.
- Restore site to original condition after removing fence.

VI. Security

- Provide adequate security and lighting devices to prevent unauthorized entrance, vandalism, theft, use, and similar violations of security to Work and existing facilities. Install substantial temporary enclosure around partially completed areas of construction including all exterior openings. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security, lock entrances at the end of each workday. Coordinate with Owner's security program to prevent security violations.
- Protection of Installed Work: Protect installed Work and provide special protection where specified in individual Specification Sections.

- Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials compatible with material being protected.
- Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer. During the construction period after the installation of the roofing system, Contractor shall be responsible for damages to the roof caused by work or materials of the other trades.
- Prohibit traffic at landscaped areas.

VII. Protective Barriers

- Provide barriers to protect existing facilities, the Work and adjacent properties from damage from demolition and construction operations.
- Provide barricades and covered walkways required by governing authorities and AHJ for public rights-of-way and for public access to existing facilities at no additional cost to the Owner for the duration of the project.
- Provide protective barriers to protect plant life designated to remain.
- Protect vehicles, stored material and structures from damage.
- Provide temporary partitions and ceilings required to separate work, to prevent penetration of dust and moisture into work areas, to prevent damage to existing areas and equipment, and to provide fire separation required by the Fire Marshal.
- Construction: Framing, plywood and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces; STC rating of 35 in accordance with ASTM E90, maximum Flame Spread Rating of 75 in accordance with ASTM E84.
- Paint surfaces exposed to view from public or occupied areas.

VIII. Safety

- Provide safety protection to all machinery, equipment, and temporary and permanent facility hazards to prevent unsafe conditions and to comply with the safety requirements of the authorities having jurisdiction, OSHA and MOSHA.
- Protect all hazards with adequately constructed guardrails, fences or barricades and provide warning signs, lanterns, warning lights, and the like, as necessary to prevent unsafe access. To this end, dispose, store, guard, and protect the premises and all Work, materials, equipment and both permanent and temporary construction so as to preclude the unauthorized use thereof and particularly to eliminate possible consequent injury to all persons.
- Institute and maintain a safety program for worker safety at the site.
- Do not load or permit any part of the Work to be loaded so as to endanger its safety.
- At completion of the Work, all temporary security, safety, construction aids and protections shall be removed.

IX. Existing Underground Utilities

- Comply with all laws and regulations concerning the identification and locations of all underground utilities. Utilities data on Drawings are based upon information obtained by Architect/Engineer and have not been verified by Architect/Engineer. Architect/Engineer and Owner are not to be responsible or liable for accuracy of the data supplied. Data shall not be relied upon by Contractor in complying with Contract Documents or safety requirements. Report to the utility any break, leak, dent, gouge, groove, or any other damage to facilities whether or not caused by the Contractor.

Contractor shall notify Owner, Architect/Engineer and nearby occupants of any emergency situations that may arise.

X. Temporary Enclosures

Provide temporary weather-tight enclosures and temporary heating for protection of the Work in progress and completed, from exposure (freezing or frost damage), foul weather, other construction operations, and similar activities as required by Contract Documents. Provide temporary weathertight enclosure for building exterior as needed to maintain acceptable working conditions and to maintain specified environmental controls for product installation.

- Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- Provide protection as necessary to ensure adequate working areas during the months that temperature drops below 40 degrees F. Protection shall be consistent with the approved construction schedule to permit the continuous progress of all work necessary to maintain an orderly and efficient sequence of construction operations.
- Provide all "weather protection" material and be responsible for all costs, including for required heating to maintain a minimum temperature of 40 degrees F (see specific Sections for stricter environmental controls for some materials), at the working surface.
- See elsewhere in this Section for temporary heating requirements.
- Fire Exits: Maintain, for the entire length of the Work, all required exits to conform with regulations of authorities having jurisdiction

XI. Temporary Fire Protection

- Provide fire protection and prevention in accordance with all applicable Federal, State and local codes and regulations and authorities having jurisdiction. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
- Develop and supervise an overall fire-prevention and fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct construction personnel in methods and procedures. Post warnings and information.
- Prohibit smoking on the entire site.
- Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
- All flammable liquid and material shall be properly stored in UL or FM listed containers, properly handled, and kept to an absolute minimum at the site.
- Provide temporary standpipes and hoses as necessary for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
- Provide and maintain fire extinguishers, and other fire-fighting equipment, as required by locations and classes of fire exposures.

c. Operation, Termination, And Removal

I. Supervision

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

Maintenance: Maintain facilities in good operating condition until removal.

Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to meet specification requirements, achieve indicated results, and to avoid possibility of damage.

II. Temporary Facility Changeover

Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion unless authorized in writing by the Owner.

Termination and Removal: Remove each temporary facility, utility, equipment, material or control when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than request for Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed or damaged because of interference with temporary facility. Repair damaged Work or existing facilities, clean exposed contaminated surfaces, and replace damaged construction that cannot be satisfactorily repaired or cleaned.

Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

At Substantial Completion, clean and restore permanent facilities and equipment used during construction period to original condition. Comply with final cleaning requirements specified in separate Division 1 Section.

III. Submittals

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

IV. Examination

Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping, and underground electrical services.

Furnish location data for work related to Project that must be performed by public utilities serving Project site.

V. Acceptance of Conditions

- Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
- Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
- Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
- Do not proceed with Work until unsatisfactory conditions have been corrected. Proceeding with Work indicates acceptance of surfaces and conditions; the cost of any corrective measures is the responsibility of the Contractor.

VI. Preparation

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

- Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- Require compliance with manufacturer's printed installation instructions, including each step in a sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.
- Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect/Engineer accordance with the requirements specified in the Contract Documents.

VII. Installation

- General: See Specifications for Product Installation requirements.
- General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
- 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.
- Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- 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.
- Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
- Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect/Engineer.
- 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.
- Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

VIII. PROGRESS CLEANING

- General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
- Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

- Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
- Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- Site: Maintain Project site free of waste materials and debris.
- Work Areas: 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.
- Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- 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.
- 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.
- Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

IX. Starting And Adjusting

- See other Specification Sections for additional information on start-up and testing of building components.
- Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

d. Use Charges

Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities for project use without cost, including, but not limited to, Owner, Architect/Engineer, Commissioning Authority, testing agencies, and authorities having jurisdiction. Contractor must pay for Sewer, Water, Gas and Electricity Services until Substantial Completion of the Construction.

e. Temporary Utilities Site Plan

Contractor must create a Temporary Utilities Site Plan showing on street utilities, connections to the site, on-site location of hookups, location of equipment such as generators and water tanks, gas tanks, fuel tanks, etc.

f. Project Identification Sign

Submit shop drawings for approval showing plan elevation, details and finishes for Project Identification Sign. Location of the sign must be approved by the Owner. Contractor is responsible to make sure that the sign is in good condition to the end of Final Completion. Details of the sign will be provided by the Owner. Sign must not hinder safe traffic view in and out of the site and must be visible from the main road by vehicular and pedestrian traffic.

g. Compliance

I. Electric Service

Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

h. Tests and Inspections

Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

i. Temporary Use of Permanent Facilities

Contractor must obtain prior written Owner approval before using any permanent facility, system or service not specified on the Contract Documents. The Owner's approval of Contractor request for use of permanent facilities, system or services shall be totally at the Owner's discretion.
Contractor shall be responsible for operation, maintenance, protection and restoration of each permanent facility, system or service during its use as a construction facility before Substantial Completion, regardless of Owner's approval of use. If used by Contractor, Contractor shall return permanent facility, system and services to "like new" condition prior to turnover to the Owner at Substantial Completion; this includes but is not limited to cleaning, replacement of filters, replacement of burnt-out lamps and replacement of worn parts. Warranties for all permanent facilities, systems and services shall start at Substantial Completion regardless of any prior use by the Contractor.

7. Final List of Sub-Contractors

Contractor must provide the owner with the list of all sub-contractors prior to start of construction.

C. Construction Phase

1. Construction Progress Meetings

Architect/Engineer will conduct progress meetings at the Project Site bi-weekly, unless otherwise directed. Days and times for meetings will be mutually agreed upon by the Contractor and Owner.
Architect/Engineer will preside at progress meetings, record significant proceedings and decisions, and will distribute copies of meeting minutes to the Owner, Architect/Engineer, Design Consultants, and Contractor no later than 5 calendar days after the meeting. Contractor shall copy and distribute minutes to subcontractors, suppliers, and others as appropriate.
Special Meetings: There are times that a special meeting about a subject may be required. Attend special meetings when requested by the Owner at Project Site or Owner's office to discuss specific project concerns. Attendees shall include Contractor project manager or Principal (as requested by the Owner) and any requested Subcontractor project manager or Principal (as requested by the Owner). All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

a. Attendees

In addition to representatives of the Owner, the Architect/Engineer, and the Contractor (including the Job Superintendent, Quality Control Manager and Project Manager), each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of near-future activities shall be represented at these meetings. When requested by the Owner, the Contractor's CPM Scheduler shall attend progress meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

b. Agenda

- Review, edit and approve minutes of the previous progress meeting.
- Review items of significance that could affect progress including any issues needing Owner and/or Architect/Engineer action to prevent delays.
- Include topics for discussion as appropriate to the status of the Project.
- Review Work progress, since the last meeting, compared against the latest approved Construction Schedule. Determine status of each current and near-future activity on the schedule to determine whether it is on time, ahead of schedule, or behind schedule. Pay especial attention to Critical Path items. Include Procurement activities (including fabrication and delivery dates) in the review.
- Corrective measures and procedures required to maintain Construction Schedule, if activities are behind schedule.
- Work scheduled for succeeding construction period (usually two weeks)
- Field observations and problems with proposed solutions. Review Contract deficiencies with regards to quality, safety, manpower, supervision, etc. Include report by Quality Control Manager.
- Status of Submittals (current log to be provided by Contractor).
- Status of Proposed Changes to the Work (current log to be provided by Contractor)
- Status of Requests for Information (current log to be proved by Contractor)
- Review of preliminary payment requests (as appropriate).
- Site Walk-through of the in-progress Work including site review of issues discussed during progress meeting. Walk-throughs shall be attended by, at a minimum: Contractor Superintendent, Contractor Project Manager, Architect/Engineer and Owner.

2. Pre-Installation Meetings

Schedule and conduct pre-installation conferences at the Project site before start of each construction activity that requires coordination with other construction.

a. Attendees

Provide 48-hour (2 workdays) written notice to the Architect/Engineer and the Owner Project Manager of all pre-installation conferences. They may attend as appropriate.

- Following shall attend the meeting:
- Contractor's Superintendent,
- Contractor's Quality Control Manager (presides over meeting and is responsible for meeting minutes),
- Owner's Construction Representative,
- Installer (subcontractor),
- Representatives from Testing Agencies
- Representatives of manufacturers and fabricators involved in or affected by the activity,

- Representatives of subcontractors that have preceded or will follow the activity or are otherwise affected by the activity, and
- Others as appropriate to activity

b. Agenda

Review the progress of other construction activities and preparations for the activity under consideration, including requirements for the following:

- Contract Documents; requirements for proper installation.
- Related Change Orders.
- Purchases and deliveries
- Approved Submittals including shop drawings, product data and quality-control samples
- Review of mockups.
- Possible conflicts and material compatibility problems.
- Time schedules for activity, project schedule
- Weather limitations.
- Manufacturer's written recommendations.
- Warranty requirements.
- Acceptability of substrates.
- Temporary facilities and controls.
- Space and access limitations.
- Regulations of authorities having jurisdiction.
- Testing and inspecting requirements including coordination with testing/inspection agencies.
- Required performance results.
- Documentation requirements.
- Protection of construction, adjacent work, and personnel.
- Required Environmental Conditions for work Safety.
- Record significant conference discussions, agreements, and disagreements of each conference. Provide copy of record to everyone involved and Owner and Architect/Engineer
- Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

3. Construction Documentation

a. Contractor's Use of Architect/Engineer's Cad Files

- At Contractor's written request, copies of Architect/Engineer's Native File Format Drawing files will be provided to Contractor for Contractor's use in connection with Project, subject to signing the Electronic File Agreement Conditions.
- Architectural Floor Plans shall be made available for use as backgrounds for preparation of shop drawings. No other CAD Drawing files will be made available.

b. Construction Reports

I. Daily Construction Reports

Contractor Superintendent shall prepare a daily construction report recording the following information concerning events at Project site:

- List of subcontractors at Project site. Provide the count of each subcontractor’s personnel, the work, and the specific area/location of the work being performed on the project (identified by Construction Schedule Activity Numbers as appropriate) being done by each subcontractor.

- List and count of General Contractor personnel at Project site. Identify the work and the specific area/location of the work (identified by Construction Schedule Activity Numbers as appropriate) being done by Contractor's forces.
- List of separate contractors at Project site. Include the count of each separate contractor's personnel and the work and the specific area/location of the work (identified by Construction Schedule Activity Numbers) being done by each subcontractor.
- Total Count of personnel at Project site.
- Visits by third parties including utilities, third-party inspectors, AHJ inspectors, etc.
- Equipment at Project site (including hours equipment was utilized, idle and down for maintenance)
- Material deliveries.
- High and low temperatures (including surface temperatures where appropriate) and general weather conditions, including any weather events requiring stoppage or some or all of the Work
- Accidents.
- Meetings and significant decisions.
- Unusual events (refer to special reports).
- Stoppages, delays, shortages, and losses.
- Meter readings and similar recordings.
- Emergency procedures.
- Orders and requests of authorities having jurisdiction (AHJ).
- Change Orders received and implemented.
- Written Modifications received and implemented.
- Services connected and disconnected.
- Equipment or system tests and startups.
- Substantial Completions authorized.

c. Materials and Equipment Data Sheets

I. Product Data

Collect information into a single submittal for each element of construction and type of product or equipment. Each submittal must indicate the specific Specification Section Title and Paragraph/Drawing Detail reference for each product included within the submittal. The individual specific Specification Section Paragraph/Drawing Detail Reference for each product must be included on every page of the submittal. If this information is not included the submittal will be rejected. See example below:

Qty.	Reference / Number	Title / Description / Manufacturer	Spec. Section Title and Paragraph / Drawing Detail Reference
	092900-2.3	Gypsum Board	Gypsum Board 092900-2.3
	092900-2.6	Cement Board	Gypsum Board 092900-2.6
	092900-2.7	Metal Trim	Gypsum Board 092900-2.7
	092900-2.8	Joint Treatment	Gypsum Board 092900-2.8
	092900-2.9	Insulation	Gypsum Board 092900-2.9

If the contractor only partially submits all required products/submittals in a specification section, then the contractor must update the submittal schedule for the remaining products/submittals that are missing. This updated submittal schedule must be included with the partial submittal, or the submittal will be rejected.
If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
Mark each copy of each submittal to show which products and options are applicable.
Include the following information, as applicable:
Manufacturer's written recommendations.
Manufacturer's product specifications.
Manufacturer's written installation instructions which meet the project requirements.

Complete full range color charts.
Manufacturer's catalog cuts.
Wiring or piping diagrams showing factory-installed wiring or piping.
Printed performance curves.
Operational range diagrams.
Mill reports.
Standard product operation and maintenance manuals which meet the project requirements.
Compliance with specified referenced standards. The contractor must highlight or identify the specification requirements on the product data. For example, if the specification requires compliance with ASTM XXX, then the project data must clearly indicate compliance with ASTM XXX, and it must be highlighted or identified on the contractor's submittal. If this information is not included the submittal will be rejected.
Test results by recognized testing agency.
Application of testing agency labels and seals.
Notation of coordination requirements.
Performance characteristics and capacities
Dimensions and clearances required.
Submit Product Data before or concurrent with Samples.

d. Shop Drawings

Prepare project-specific information, drawn accurately to scale, on original drawings. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Shop drawings shall be prepared by qualifier detailer(s).
If the contractor only partially submits all required shop drawing submittals in a specification section, then the contractor must update the submittal schedule for the remaining products/submittals that are missing. This updated submittal schedule must be included with the partial submittal, or the submittal will be rejected.

I. Preparation

Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

- Dimensions.
- Identification of products.
- Fabrication and installation drawings.
- Roughing-in and setting diagrams.
- Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
- Shopwork manufacturing instructions.
- Templates and patterns.
- Schedules.
- Design calculations.
- Compliance with specified standards.
- Notation of coordination requirements.
- Notation of dimensions established by field measurement.
- Relationship to adjoining construction clearly indicated.
- Seal and signature of professional engineer, if specified.
- Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
- Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
- Samples: Submit Samples (physical examples) of materials, equipment or work for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a

comparison of these characteristics between submittal and actual component as delivered and installed.

- Submit full-sized fully fabricated Samples cured and finished as specified and physically identical with the proposed material or product. Submit Samples for actual dye lots or production runs as available.
- Samples shall include final treatments, such as “scotch guarding” or “fireproofing” where such treatments are a requirement on the actual product
- Submit Samples that contain multiple, related components such as accessories together in one submittal package.

II. Identification

- Attach label on unexposed side of Samples that includes the following:
- Generic description of Sample (including finish and composition)
- Product name and name of manufacturer.
- Sample source.
- Number and title of appropriate Specification Section
- Location of intended use in the project.
- Unless specified otherwise, submit full range of manufacturer’s available colors, textures and patterns for review.

III. Size

- Provide Samples of sufficient size to show:
- All Salient features of the material or item, representative of the functional and aesthetic characteristics of the Product
- The extremes of variation in color, texture, finish and construction to be expected in the installed work.
- Functional characteristics of product or material, with integrally related parts and attachment devices.

IV. Disposition

- Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

V. Samples for Initial Selection

Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

VI. Number of Samples

Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect/Engineer will return submittal with options selected.

VII. Samples for Verification

- Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
- Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials;

swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- Number of Samples: Unless otherwise noted in the related section, Submit three sets of Samples. Architect/Engineer will retain one, one may be delivered to the Owner, and one must be kept at the site office.
- Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
- If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

VIII. Special Inspection Submittals

If project is designated as Third-Party, Special Inspection by Montgomery County DPS or Complex Structure by other authorities having jurisdiction, submit all information required to comply with requirements. Submittals may include, but are not limited to:

- Steel fabrication shop drawings
- Concrete mix design
- Formwork and shoring design
- Plan for removal and reshoring of formwork
- Concrete quality control plan
- Construction observations, inspections, and testing records and reports from Geotechnical Engineer and other testing agencies
- Certification from Geotechnical Engineer and testing agencies regarding soils work and foundation placement
- Written authorizations from testing agencies for stripping of formwork and shoring
- Contractor, subcontractor and supplier certifications

IX. Subcontractor List

Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A or approved equal. Include the following information in tabular form:

- Name, address, and telephone number of entities performing subcontract or supplying products.
- Number and title of related Specification Section(s) covered by subcontract.
- Drawing number and detail references, as appropriate, covered by subcontract.

e. Record Drawings

I. Submittals

- Number of Copies: Submit one set(s) of marked-up Record Prints.
- Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- Record Product Data: Submit one copy of each Product Data submittal. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

II. Record Drawings

Record Prints: Maintain one set of prints of the Contract Drawings and Shop Drawings.

Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

- Give particular attention to information on concealed elements that would be difficult to identify or measure and record 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.

Content: Types of items requiring marking include, but are not limited to, the following:

- Dimensional changes to Drawings.
- Revisions to details shown on Drawings.
- Depths of foundations below first floor.
- Locations and depths of underground utilities.
- Revisions to routing of piping and conduits.
- Revisions to electrical circuitry.
- Actual equipment locations.
- Duct size and routing.
- Locations of concealed internal utilities.
- Changes made by Change Order or Construction Change Directive.
- Changes made following Architect's written orders.
- Details not on the original Contract Drawings.
- Field records for variable and concealed conditions.
- Record information on the Work that is shown only schematically.

- Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
- Mark record sets in red. Use other colors to distinguish between changes for different categories of the Work at same location.
- Mark important additional information that was either shown schematically or omitted from original Drawings.
- Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

- Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
- Identification: As follows:
  - Project name.
  - Date.
  - Designation "PROJECT RECORD DRAWINGS."
  - Name of Architect.
  - Name of Contractor.

III. Record Specifications

- Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

- Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
- Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
- For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
- Note related Change Orders, Record Product Data, and Record Drawings where applicable.

IV. Record Product Data

- Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- 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.

V. Recording And Maintenance

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

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

f. Site Survey Records

g. Construction Progress Photography

I. Construction Progress Pictures

- Employ a qualified independent commercial photographer (minimum of three years' experience in commercial photography), mutually agreeable to Owner and Architect/Engineer, to take construction photographs.
- Cooperate with photographer; provide access to Work, and reasonable use of temporary facilities including temporary lighting.
- Take a comprehensive set of photographs, at monthly intervals, from commencement of Work until Substantial Completion of Project documenting the work performed during that month. Submit the photographs, with the monthly requisition for payment, to the Owner and the Architect/Engineer. Photographs shall be submitted monthly even if a requisition for payment is not submitted for that month.
- Provide a comprehensive set of photographs, at monthly intervals, from commencement of Work until Substantial Completion of Project documenting the work performed during that month. Provide

photographic services similar to those provided by MultiVista (678) 602-3364 - located at 12003 Golf Ridge Court, #302, Fairfax VA 22033

- Before beginning construction, take photographs of all existing conditions including sitework, existing buildings, structures and utilities. In particular, take photographs of any existing damage or deficiencies in existing conditions, including conditions adjacent to the project site, prior to commencement of work.
- Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

II. Progression Sets and Views

- Take photographs from a sufficient number of (at least three) different exterior views and from a sufficient number of interior views to show construction progress. Consult with Architect/Engineer for recommendations on views.
- Photograph from locations to factually illustrate condition of construction and state of progress.
- To the extent practicable, take successive monthly photographs from the same overall view as preceding monthly photographs.
- Do not sell or display photographs in publications without permission of Owner.
- Digital Images: Submit a complete set of digital image electronic files as a Project Record Document on USB drive and copy in the BIM360 software.
- 4 Sets of Regular Interior Progressions that captures each major wall to begin at time of substantial framing, with the final progression occurring at the finished condition of the interior, or as directed by the client.
- Exterior Progressions - 360 degrees around the project to include all elevations and building envelope on monthly intervals or as directed by the client
- Detailed Exterior Skin Exact-Built™: to capture the following items:
    - Sub-grade waterproofing up to 5’ below grade prior to backfill
    - All wrapping of exterior of the building
    - Window installation – to include flashing of the windows
    - Roof - Includes overlapping photo of every square inch at waterproofing stage
- Detailed Interior MEP Exact-Built™ of the entire building to include documentation of all mechanical, electrical and plumbing systems, to be conducted after rough-ins are complete, just prior to insulation and or drywall, or as directed by client. Includes all walls and ceilings.
- Detailed Site-Survey Exact-Built (Pre-Construction) The pre-construction site survey provides coverage of the site and its immediate surrounding area to carefully memorialize pre-existing conditions before a project begins.
- Detailed Pre-Slab Exact-Built of the Slab on Grade ONLY. This will capture all critical infrastructure and systems inside the slab prior to the placement of concrete or as directed by client
- Detailed Exterior Skin Exact-Built**™**: If applicable - Will capture the following items:
- All wrapping of exterior of the building
- Window installation – to include flashing of the windows
- Roof - Includes overlapping photo of every square inch at waterproofing stage
- Curtain Wall or Pre-Cast Exterior Exact-Built**™**: If applicable – Will capture the following items
- Waterproofing of the structure that will support initial panels
- Interior anchor points
- Final installation conditions
- Roof - Includes overlapping photo of every square inch at waterproofing stage

- Detailed Interior MEP Exact-Built™ of the entire building to include documentation of all mechanical, electrical and plumbing systems, to be conducted after rough-ins are complete, just prior to insulation and or drywall, or as directed by client. Includes all walls and ceilings.

To be provided during progression at monthly intervals and for the same durations as set forth above. Scope includes customizable sections for third party (i.e., Aerial Photographer) or Owner and Superintendent photograph collections. These will be dated and labeled per instruction of the respective party.
Provide a pre-documentation meeting with the Owner to identify project specific need, appropriate documentation intervals and common and custom element requiring detailed photo sets to include the following:

- Baseline schedule analysis in order to evaluate and estimate appropriate photo set intervals and durations.
- Determination of optimal photograph locations/perspectives ("hotspots") based on the site plans and building floor plans provided by the Client or his agent(s) and designed to capture the total progress of construction at the agreed upon intervals and/or milestones.
- A highly representative number of digital photographs at such intervals and for such durations, and at the specified milestones, as requested by the Client and set forth in Section 1.1, above.
- Linking each photo set to the appropriate location on the site plans and/or floor plans of the Client.
- On-line web hosting of the documentation on the MultiVista website for the construction period covered by the documentation, accessible from anywhere internet is accessible.
- Password protected access to the documentation.
- Digital Images: Submit a complete set of digital image electronic files as a Project Record Document on USB drive.
- Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- Do not sell or display photographs in publications without permission of Owner.
- Prints: Provide color prints monthly:
- Deliver one set of prints to Owner and one set to Architect.

4. Field Surveys

- Provide all field engineering services required to lay out the Work.
- Employ a land surveyor registered in the State of Maryland and experienced in providing the specified services, to establish elevations, lines and levels utilizing recognized engineering survey practices.
- Engage the surveyor to verify existing survey information shown on the Contract Documents including the location and verification of structures, dimensions, elevations, property lines, and indicated permanent benchmarks, control points and reference points. If discrepancies are discovered, notify Architect/Engineer and Owner promptly and before proceeding with affected work.
- The surveyor shall also establish benchmarks, control points and reference points from which the facility elevations and lines can be determined for each element of the Work. Inform installers of lines and levels to which they must comply.
- Protect and maintain all benchmarks, control points and reference points established by the surveyor. If survey control points are damaged, moved, or destroyed, engage surveyor to re-establish the control points.
- The existence and location of utilities and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence, location and elevations of

all utilities and other existing construction. Notify Architect/Engineer and Owner immediately in writing of any discovered discrepancies before proceeding with affected work.

- During the progress of the Work, establish benchmarks, reference lines, reference points and levels as necessary for each trade's work (including sitework) and for field verification of construction within specified tolerances. Check the location, level and plumb of every major element as the Work progresses; notify the Architect/Engineer when deviations from required lines and levels exceed allowable tolerances.
- Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect/Engineer or Owner.
- Upon completion of work, submit two copies of a final survey, each copy certified by the land surveyor, that the location, elevation and dimensions of the buildings and site improvements are accurately constructed in accordance with the Contract Documents. Certified surveys shall be submitted to the Owner and Architect/Engineer for record only, not for review and approval.

5. Tests and Inspections

a. Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract Documents. Testing includes operation, acceptance and/or performance tests when specified. Tests shall be documented in the test approval log. A list of tests shall be developed to include: the test name, entity contractually responsible for securing the testing, frequency, specification paragraph containing the test requirements, personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

- Verify that testing procedures comply with Contract Documents.
- Verify testing is completed prior to installation of the work when pre-construction testing of systems is required.
- Verify that facilities and testing equipment are available when needed for this Work and comply with testing standards.
- Check test instrument calibration data against certified standards.
- Verify that recording forms and test identification control number system, including all the test documentation requirements, have been prepared.
- Results of all tests taken, both passing and failing tests, shall be recorded on the Quality Control report for the date taken. Reference Specification paragraph, location where tests were taken, and the sequential control number identifying the test. If necessary, actual test reports may be submitted later, if approved by the Owner's Project Manager, with a reference to the test number and date taken. An informational copy of tests shall be provided directly to the Owner's Construction Representative. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of testing agency/facility for this contract.

b. Notification Of Noncompliance

The Owner's Project Manager or designee may notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor must, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Owner's Contract Administrator may

issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

6. Construction Commissioning – Not Applicable

7. Cutting and Patching

a. Definitions

Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work and fitting and repair work required to restore surfaces to original conditions after Cutting

b. Submittals

I. Cutting and Patching Proposal

For each specific type of requested cutting and patching, submit a written proposal to Architect/Engineer for approval at least 10 days before any cutting and patching will be performed. Proposal shall include the following information:

- Extent: Describe amount, location, and size of proposed cutting and patching, and indicate why this cutting cannot be avoided
- Procedures: Specifically describe how cutting and patching will be performed,
- Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
- Products: List products to be used. Provide specific information on products as requested by Architect/Engineer.
- Trades: Indicate the firms or entities that will perform the cutting and patching.
- Dates: Indicate when cutting and patching will be performed.
- Structural Elements: Where cutting and patching involve modifying structural elements, submit details and engineering calculations, generated by an engineer registered in the State of Maryland, indicating structural integrity of proposed modification.
- Effect on weatherproof integrity of the Work.
- Utilities: List utilities that cutting and patching activities will affect. Indicate utilities that will need to be temporarily out of service and the planned length and time of the outage. Indicate utilities that will need to be relocated.
- Samples: Provide samples for all finish materials, interior and exterior, affected.

c. Quality Assurance

I. Structural Elements

- Do not cut and patch structural elements in a manner that could reduce their load-carrying capacity or load-deflection ratio.

II. Operational Elements

- Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or results in increased maintenance or decreased operational life or safety.

III. Miscellaneous Elements

- Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or results in increased maintenance or decreased operational life or safety.

IV. Visual Requirements

- Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect/Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

V. Fire-Rated Assemblies

- At penetrations of fire-rated assemblies, completely seal penetration with firestop in accordance with Division 7 Section 07 84 00.

VI. Cutting and Patching Conference

- Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

8. Waste Management

This Section includes procedural requirements for the recycling and disposal of no hazardous construction waste.

a. Definitions

- Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- Recycle: Recovery of construction waste for subsequent processing in preparation for reuse.
- Salvage: Recovery of construction waste and subsequent sale or reuse in another facility.

b. Performance Goals

Salvage/Recycle Goals: Owner's goal is to salvage and recycle as much no hazardous construction waste as possible including, but not limited to Masonry and CMU, Wood materials, Metals, Roofing, Insulations, Carpet and pad, Gypsum board, Plumbing materials, Electrical materials, etc.

Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the uncontaminated packaging materials such as Paper, Cardboard, Boxes, Plastic sheet and film, Polystyrene, Wood crates, Plastic wraps and vessels, etc.

Regulatory Requirements: Comply with hauling and disposal regulations required by all Authorities Having Jurisdiction (AHJ).

Materials used by on-site workers: Recycle paper and beverage containers used by on-site workers.

Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to the Contractor.

c. Waste Management Meeting

Conduct meeting at Project site to Review methods and procedures related to waste management including, but not limited to, the following:

- Review and discuss waste management plan.
- Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
- Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
- Review waste management requirements for each trade.

d. Waste Management Plan

- General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.
- Waste Identification: Indicate anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
- Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
- Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
- Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- Plan Submittal: Submit a copy of Waste Management Plan within 20 days of date first Notice Top Proceed.

I. Plan Implementation

- General: Implement waste management plan as approved by Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
    - Distribute waste management plan to training participants within three days of Approved submittal return.
    - Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
    - Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

e. Recycling Construction Waste Procedure

- Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

- 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.
- Inspect containers and bins for contamination and remove contaminated materials if found.
- Stockpile processed materials on-site without intermixing with other materials.
- Place, grade, and shape stockpiles to drain surface water.
- Cover to prevent windblown dust.
- Stockpile materials away from construction area. Do not store within drip line of remaining trees.
- Store components off the ground and protect from the weather.
- Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

I. Packaging

- Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
- Polystyrene Packaging: Separate and bag materials.
- Pallets: as much as possible, require deliveries by suppliers and manufacturers 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.
- Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- Wood Materials:
  - Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
  - Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

II. Disposal Of Waste

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

9. Substantial Completion

a. Substantial Completion

This document further defines the Substantial Completion process indicated in the General Condition of Contract.

I. Procedures

Contractor must perform and submit the following tasks with the request for Substantial Completion walkthrough. Contractor must indicate in the request if any item is fully completed or not.

II. Punch List

- Perform a complete inspection of the Work.
- Prepare a list of items to be completed and/or corrected,
- Include the value of items on the list,

- Include reasons why the Work is not complete.

III. Submit the following documents

- Warranties: Supersedes the General Condition of Contract
- 1-Year contractor's warranty: Starts from the day of Certificate of Substantial Completion.
- Manufacturers' extended warranties: If certain equipment or installation is not fully operational or has problems, County may request extended warranty or different start time for the warranty.
- Workmanship bonds,
- Maintenance service agreements,
- final certifications, and similar documents
- Use and Occupancy permit(s)
- Transfer of Utilities to the Owner: Transfer all Utilities to the owner.
- Provide documentation indicating final utilities meter readings at turnover of the facility.
- Final permits closeout: Release of final building and site permits
- Use and Occupancy Permit(s): Issuance of Use and Occupancy permit and occupancy of the facility alone are not a ground for requesting a Substantial Completion.
- Operation Certificates such as Health Department,
- Fire Marshall's Approval Form.
- Operation & Maintenance manuals,
- Obtain the complete MultiVista photography/videography of the construction process on a hard disk and provide to the Owner.
- Professional Final Photography: If required in the contract provide a professional photographer and coordinate for final facility photography both exterior and interior photography.
- Damage or Settlement Surveys,
- New building and site location surveys,
- Extra material stocks: Deliver tools, spare parts, extra materials, attic stocks and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable. All materials must be included in a one comprehensive submittal list.
- Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
- Final Commissioning Report: for complete list see Commissioning Requirements
- Final Report of Safety Records and Incidents
- Final Report of % of work performed by Local Businesses and % of work performed by MFD
- Report of all Repairs performed on the new equipment
- Provide documentation that the security, fire alarm, and building automation systems (BAS) completed and properly operating and reporting to the appropriate reporting station.
- Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- Complete final cleaning requirements, including touchup painting.
- Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- Complete closeout procedure using Pype software
- Provide electronic copy of entire and complete documents in the construction management software if such software is not used or required, data must be provided on USB drive in a format that is usable without need of the construction management software.

10. Correction of Work

- Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
- Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- Restore permanent facilities used during construction to their specified condition.
- Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- Remove and replace chipped, scratched, and broken glass or reflective surfaces.

11. Final Cleaning

a. Final Cleaning

General: Provide final cleaning just prior to Substantial Completion. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

- Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscaped areas, free of rubbish, waste material, litter, obstructions and other foreign substances.
- Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
- Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- Remove tools, construction equipment, machinery, and surplus material from Project site.
- Remove snow and ice to provide safe access to building.
- Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, dust, films, and similar foreign substances.
- Clean resilient flooring, stone flooring, tile, pavers and other similar hard interior surfaces including associated bases. Refer to individual manufacturer’s recommendations and requirements for sealing, buffing, waxing and polishing.
- Remove debris and surface dust from all gutters, roof areas, roof drains, roof scuppers, and conductor heads and/or downspouts.
- Remove debris and surface dust from limited access spaces, including plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- Sweep concrete floors broom clean in unoccupied spaces.
- Vacuum carpet and similar soft surfaces, removing debris, soil and excess nap. Shampoo to remove any visible soil or stains remaining after vacuuming.
- Clean transparent and reflective materials, including mirrors and glass in doors and windows, to clear shine. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace

chipped, scratched or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

- Remove labels that are not required as permanent labels.
- Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
- Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- Clean exposed surfaces of mechanical, electrical, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- Replace parts subject to unusual operating conditions.
- Clean plumbing fixtures, drinking fountains, and similar equipment, to a sanitary condition, free of stains, including stains resulting from water exposure.
- Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- Leave Project clean and ready for occupancy.
- Avoid disturbing natural weathering of exterior surfaces.
- Heating, Ventilating, and Air Conditioning Systems:
- Clean permanent filters and replace disposable filters for units operated during construction. Clean exposed surfaces of diffusers, registers, and grills.
- Clean ducts, blowers, and coils for units operated without filters during construction.
- Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Submit a report prepared by the exterminator indicating successful completion of this work.
- Comply with safety standards and manufacturer's instructions for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

12. Final Completion

a. Final Completion

General: Refer to General Conditions Article 14.3.
Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

- Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
- Submit certified copy of Architect/Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect/Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- Submit pest-control final inspection report and warranty.
- Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- Submit any other document that was agreed by the Owner and the contractor to be provided to the owner by the contractor as a result of Final Completion process.

I. Inspection

- Submit a written request for final inspection for acceptance. On receipt of request, Architect/Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect/Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected for Owner's approval, before certificate will be issued. In processing the Certificate, the Owner may, but is not obligated to, rely on the signature approval of the Architect/Engineer in determining Contract compliance.
- Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

13. Closeout Requirements

a. Record Documents

I. General

- Maintain one copy of Contract Documents and each submittal during the construction period for Project Record Document purposes.
- Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Provide files and racks for secure storage. Do not use Project Record Documents for construction purposes.
- Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Owner's and Architect/Engineer's reference during working hours.
- Submit final Record Documents to Architect/Engineer at time of Substantial Completion.
  - Record Drawings: Maintain at site one updated and current set of annotated project Record Drawings from project Notice-to-Proceed until Completion of the Work. Keep set available for use and inspection by Architect/Engineer and Owner. Submit completed set of Record Drawings to Architect/Engineer prior to Final Completion.
- Maintain one set of blue- or black-line white prints of all of the Contract Drawings and Shop Drawings. 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 would be difficult to identify or measure and record 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.
- Content: Types of items requiring marking include, but are not limited to, the following:
- Dimensional changes to Drawings.
- Revisions to details shown on Drawings.
- Depths of foundations below first floor.
- Locations and depths of underground utilities.
- Revisions to routing of piping and conduits.
- Revisions to electrical circuitry.
- Actual equipment locations.
- Duct size and routing.
- Locations of concealed internal utilities.
- Changes made by Contract Modification, Change Order or Field Order.

- Revisions made following Architect/Engineer's Supplemental Instructions.
- Details not on the original Contract Drawings.
- Field records for variable and concealed conditions.
- Record information on the Work that is shown only schematically.
- Mark completely and accurately the 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 the Contract Drawings.
- Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- Mark important additional information that was either shown schematically or omitted from original Drawings.
- Note numbers of Field Orders, Alternates, Change Orders, and Supplemental Instructions, and similar revisions, where applicable.
- Prepare new Drawings instead of preparing Record Drawings where Architect/Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
- New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
- Consult Architect/Engineer for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

II. Format

- Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize Record Drawings including newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - Record Specifications: Maintain at site one updated and current set of annotated project Record specifications, including addenda, field orders, and contract modifications, from project Notice-to-Proceed until Completion of the Work. Keep set available for use and inspection by Architect/Engineer and Owner. Submit completed set of Record Specifications to Architect/Engineer prior to Final Completion.
- Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
- Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
- For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
- Note related Change Orders, Record Product Data, and Record Drawings where applicable.
  - Record Product Data: Submit one annotated copy of each Product Data submittal prior to Final Completion. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual, instead of submittal as Record Product Data, prior to Substantial Completion.
- Maintain samples in clean dry condition; do not use for construction purposes.
- Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

- Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
- Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
- Note related Change Orders, Record Specifications, and Record Drawings where applicable.
  - Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

b. Operation And Maintenance Trainings

I. Training Of Owner's Personnel

- Program Structure: Develop and submit to the owner and A/E for review and approval minimum 60 days prior to and scheduled training. Implement approved instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. Owner shall be given comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of equipment.
- Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect/Engineer.
- Coordinate scheduling of training with Commissioning Authority. Provide coordination with Contractor personnel, subcontractors, suppliers, and manufacturer’s representatives for the efficient scheduling of instruction.
- Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with Owner, through Architect/Engineer, with at least seven days' advance notice. Coordinate and adjust schedule to minimize disrupting Owner’s operations.
- Engage a qualified facilitator/trainer to prepare instruction program and training modules, to coordinate instructors, their schedules and course content, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- Facilitator/Trainer 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.
- Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- Set up instructional equipment, including the use of overhead projectors, sliders, videos, and audio taped material, at instruction location.
- Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

- Basis of System Design, Operational Requirements, and Criteria: Include the following:
- System, subsystem, and equipment descriptions.
- Performance and design criteria if Contractor is delegated design responsibility.
- Operating standards.
- Regulatory requirements.
- Equipment function.
- Operating characteristics.
- Limiting conditions.
- Performance curves.

- Documentation: Review the following items in detail:
  - Emergency manuals.
  - Operations manuals.
  - Maintenance manuals.
  - Project Record Documents.
  - Identification systems.
  - Warranties and bonds.
  - Maintenance service agreements and similar continuing commitments.
  - Emergencies: Include the following, as applicable:
  - Instructions on meaning of warnings, trouble indications, and error messages.
  - Instructions on stopping.
  - Shutdown instructions for each type of emergency.
  - Operating instructions for conditions outside of normal operating limits.
  - Sequences for electric or electronic systems.
  - Special operating instructions and procedures.
- Operations: Include the following, as applicable:
  - Startup procedures.
  - Equipment or system break-in procedures.
  - Routine and normal operating instructions.
  - Regulation and control procedures.
  - Control sequences.
  - Safety procedures.
  - Instructions on stopping.
  - Normal shutdown instructions.
  - Operating procedures for emergencies.
  - Operating procedures for system, subsystem, or equipment failure.
  - Seasonal and weekend operating instructions.
  - Required sequences for electric or electronic systems.
  - Special operating instructions and procedures.
- Adjustments: Include the following:
  - Alignments.
  - Checking adjustments.
  - Noise and vibration adjustments.
  - Economy and efficiency adjustments.
- Troubleshooting: Include the following:
  - Diagnostic instructions.
  - Test and inspection procedures.
  - Maintenance: Include the following:
  - Inspection procedures.
  - Types of cleaning agents to be used and methods of cleaning.
  - List of cleaning agents and methods of cleaning detrimental to product.
  - Procedures for routine cleaning

- Procedures for preventive maintenance.
- Procedures for routine maintenance.
- Instruction on use of special tools.
- Repairs: Include the following:
- Diagnosis instructions.
- Repair instructions.
- Disassembly; component removal, repair, and replacement; and reassembly instructions.
- Instructions for identifying parts and components.
- Review of spare parts needed for operation and maintenance.

- Attendance and Evaluation: For each training module, submit list of participants and length of instruction time. At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test. For each participant and for each training module, submit results and documentation of performance-based test.
- Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before training.
- At completion of training, submit one complete training manual(s) for Owner's use.
- Schedule: All Owner training shall be completed prior to Substantial Completion. SUBSTANTIAL COMPLETION WILL NOT BE GRANTED WITHOUT COMPLETION OF OWNER TRAINING.
- SPARE PARTS AND ATTIC STOCK MATERIAL
- Provide spare parts and extra (attic) stock materials in quantities specified in individual Specification Sections.
- Deliver to Project site and place in locations as directed; obtain receipt from Owner's representative.
- Submit document, at or before time of request for inspection for Substantial Completion, listing items and quantities; attach receipts.

c. Operation and Maintenance Data and Manuals

I. Operation and Maintenance Documentation Directory

Organization: Include a section in the directory for each of the following:

- List of documents.
- List of systems.
- List of equipment.
- Table of contents.

List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system. System is defined as: An organized collection of parts, equipment, or subsystems united by regular interaction. Subsystem is a portion of a system with characteristics similar to a system.
List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."
Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

II. Manuals, General

- Provide three (3) sets of all manuals. Review each manual for accuracy and completeness before submitting.
- Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system.
- Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets. Use as many binders, up to 3" thick, as necessary to avoid overloading of binders.
- If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders, if necessary, to provide essential information for proper operation or maintenance of equipment or system.
- Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
- Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab with non-erasable ink to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
- Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
- Each manual shall contain the following materials, in the order listed:
- Cover page.
- Table of contents.
- Manual contents.
- Cover Page: Enclose cover page in transparent plastic sleeve. Include the following information:
- Subject matter included in manual.
- Name and address of Project.
- Name and address of Owner.
- Date of submittal.
- Name, address, and telephone number of Contractor.
- Name and address of Architect/Engineer.
- Cross-reference to related systems in other operation and maintenance manuals.
- Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

III. Manual Contents

- System Description: Provide general overall of system or subsystem covered by the manual.
- Submittal and Product Data: Include all final approved submittal data. If submittal was not required for review, include descriptive product data.
- Equipment Supplier: Include the name, address and telephone number of the manufacturer's agent and/or service agency supplying or installing and starting up of the equipment.
- Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or

component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

- Prepare supplementary text on 8-1/2-by-11-inch white bond paper if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams.
- Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
- Attach reinforced, punched binder tabs on drawings and bind with text. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
- If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations. Do not use original Project Record Documents as part of operation and maintenance manuals.
- Final Commissioning Checklist: filled out by Contractor and approved by Commissioning Authority with specified data and submitted data.
- Parts List: edited to omit reference to items which do not apply to this installation.
- Coordination: Where operation and maintenance documentation include information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.
- Schedule: Submit three copies, and the quantity of return copies required by the Contractor, by the completion date of equipment placement. All operations manuals must be approved (i.e., submitted, reviewed by Architect/Engineer, corrected, and approved by the Architect/Engineer) prior to Substantial Completion. SUBSTANTIAL COMPLETION WILL NOT BE GRANTED WITHOUT APPROVED OPERATION AND MAINTENANCE MANUALS.
- Include a complete operation and maintenance directory.
- Correct or modify each manual to comply with Architect/Engineer's comments.
- Submit 3 copies of each corrected manual within 15 days of receipt of Architect/Engineer's comments.

IV. Operation Manuals

- Assemble a complete set of operation information indicating proper operation of each system, subsystem, and piece of equipment not part of a system.
- Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
- Prepare a separate manual for each system and subsystem, in the form of an instructional manual, for use by Owner's operating personnel
- Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
    - System, subsystem, and equipment descriptions.
    - Performance and design criteria if Contractor is delegated design responsibility.
    - Operating standards.
    - Operating procedures.
    - Operating logs.
    - Wiring diagrams.
    - Control diagrams.
    - Piped system diagrams.

  - Precautions against improper use.
  - License requirements including inspection and renewal dates.
- Descriptions: Include the following:
  - Product name and model number.
  - Manufacturer's name.
  - Equipment identification with serial number of each component.
  - Equipment function.
  - Operating characteristics.
  - Limiting conditions.
  - Performance curves.
  - Engineering data and tests.
  - Complete nomenclature and number of replacement parts.
  - Operating Procedures: Include the following, as applicable:
  - Startup procedures.
  - Equipment or system break-in procedures.
  - Routine and normal operating instructions.
  - Regulation and control procedures.
  - Instructions on stopping.
  - Normal shutdown instructions.
  - Seasonal and weekend operating instructions.
  - Required sequences for electric or electronic systems.
  - Special operating instructions and procedures.
  - Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

V. Product Maintenance Manuals

- Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- Product Information: Include the following, as applicable:
  - Product name and model number.
  - Manufacturer's name.
  - Color, pattern, and texture.
  - Material and chemical composition.
  - Reordering information for specially manufactured products.
  - Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - Inspection procedures.
  - Types of cleaning agents to be used and methods of cleaning.
  - List of cleaning agents and methods of cleaning detrimental to product.
  - Schedule for routine cleaning and maintenance.

- Repair instructions.

- Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- Warranties and Bonds: Include three copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
- Include procedures to follow and required notifications for warranty claims.

VI. Systems and Equipment Maintenance Manuals

- Assemble a complete set of maintenance data indicating maintenance of each system, subsystem, and piece of equipment not part of a system.
- Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
- Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's maintenance personnel
- Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
    - Standard printed maintenance instructions and bulletins.
    - Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
    - Identification and nomenclature of parts and components.
    - List of items recommended to be stocked as spare parts.
- Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
    - Test and inspection instructions.
    - Troubleshooting guide.
    - Precautions against improper maintenance.
    - Disassembly; component removal, repair, and replacement; and reassembly instructions.
    - Aligning, adjusting, and checking instructions.
    - Demonstration and training videotape, if available.
- Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
- Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

- Warranties and Bonds: Include three copies of warranties, maintenance bonds, and Maintenance service contracts as specified in various Specification Sections. Provide lists of circumstances and conditions that would affect validity of warranties or bonds.
- Include procedures to follow and required notifications for warranty claims.

d. Warranties

- Provide all properly executed warranties prior to, or with, request for Substantial Completion.
- Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated partial portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
- Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
- Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- Provide additional copies of each warranty to include in operation and maintenance manuals.
- One-year contractor's general warranty start date will be from the date of issuance of the Substantial Completion Certificate by the Owner or Partial Substantial Completion as agreed by the Owner. Warranties for incomplete or not accepted equipment or construction parts must start from the time of acceptance of that equipment or part as fully operational item.
- Warranties for major building components shall not begin until full Substantial Completion, including the roof, mechanical, plumbing, and electrical systems.

D. Warranty Period

a. Warranty phases

Owner may visit the site and all facilities constructed to inspect the work at any time after substantial completion. If owner observe any deficiencies and failures in the construction Contractor is required to immediately correct such issues covered either under the 1-year general construction warranty or specific manufacturer warranties. Owner will officially conduct two (2) warranty construction inspection one at about 9 months after Final Completion, and one at 11-month after Final Completion. Contractors is obligated to attend the 11-month walkthrough/inspection to witness problems if any and participate in creation of deficiencies list for contractor to correct as part of 1-Year general contractor warranty. Owner will invite the contractor to the 9-month warranty inspection. Participate of the contractor in the 9-month warranty inspection is highly recommended to witness generation of deficiencies list. Contractor is obligated to correct all 9-month deficiency list items within 60 calendar days of submittal of such list to the contractor. Contractor must comply with Owner's operation of the facilities, hours of operations and exercise care in removal, replacement, patching, and repairing materials and surfaces by methods that would not void or diminish required or existing warranties. Failure of correcting warranty punch lists will result in Owner use of contractor's insurance and surety and may result the Owner hiring other contractors to complete the items and hold the contractor responsible in accordance to terms of the Contract.

b. Warranty Requirements

I. Materials

- General: Comply with requirements specified in other Sections.
- In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

II. Examination

Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed. Comply with provisions of Section 01700.

III. Compatibility

- Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
- Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

IV. Preparation

- Temporary Support: Provide temporary support of Work to be cut.
- Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations. Protect surroundings areas from any dust or other residue resulting from cutting and patching operations.
- Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

V. Performance

- General: Cut in-place construction to provide for installation or removal of components of the Work, and subsequently patch as required to restore surfaces to their original condition. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time after approval, and complete without delay.
- Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage retained elements or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
- In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

VI. Finished Surfaces

Cut or drill from the exposed or finished side into concealed surfaces.

VII. Concrete and masonry

- Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Do not damage or cut any steel reinforcing unless specifically allowed by the approved cutting and patching proposal.

VIII. Structure

- Do not damage or cut any structural framing unless specifically allowed by the approved cutting and patching proposal.

IX. Precast

- Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Do not damage or cut any steel reinforcing unless specifically allowed by the approved cutting and patching proposal. Do

not damage or cut any structural framing unless specifically allowed by the approved cutting and patching proposal.

X. Excavating and Backfilling

- Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.

XI. Mechanical and Electrical Services

- Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- Proceed with patching after construction operations requiring cutting are complete.

XII. Patching

- Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

XIII. Inspection

- Test and inspect patched areas after completion to demonstrate integrity of installation.

XIV. Exposed Finishes

- Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
- Clean piping, conduit, and similar features before applying paint or other finishing materials.
- Restore damaged pipe covering to its original condition.

XV. Floors and Walls

- Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

XVI. Ceilings

- Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

XVII. Exterior Building Enclosure

- Patch components in a manner that restores enclosure to a weathertight condition.

XVIII. Utilities

- Where utilities are to be removed, relocated, or abandoned, by-pass before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe, duct, or conduit to prevent entrance of moisture or matter after by-passing and cutting.

XIX. Cleaning

- Clean areas and spaces where cutting and patching are performed. Completely remove debris, paint, mortar, oils, putty, and similar materials.

XX. Painting

- Where patching occurs in previously painted surface, provide appropriate prime coat followed by first finish coat of paint. Provide final finish coat over entire area containing patch; for continuous surface

extend to nearest vertical break or intersection, for an assembly refinish entire unit. Except where indicated otherwise, finish in sheen and color to match existing.

- Make simpler to understand.
- Make smaller.
- Not repetitive.
- Move similar things into an overall heading.
- Warranty

End of Section 01 10 01

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SECTION 01 10 02 – PROJECT SPECIFIC REQUIREENTS

1 RELATED DOCUMENTS

1.1 All related documents are specified in the RFP and the Contract and includes but not limited to the following:

A. The Contract
B. General Conditions of the Contract
C. Supplemental to the General Conditions of the Contract
D. Construction Drawings
E. Specifications including Division 1

2 PROJECT INFORMATION:

2.1 Project Size:

A. Construction/Renovation of 3,611 ± sq ft.
B. Number of stories: 2, excluding basement

2.2 Project Location:

10237 Carroll Place
Kensington
Montgomery County, Maryland 20895

2.3 Owner: Montgomery County, Maryland. Department of General Services, Division of Building Design and Construction

2.4 Design Team Identification:

A. Architect:
Wiedemann Architects LLC
Address 5272 River Road, Suite 610, Bethesda, MD 20816
Phone No (301) 652-4022
E-mail gwiedemann@wiedemannarchitects.com

B. Architect:
Grimm and Parker Architecture, Inc.
Address 11720 Beltsville Drive, Suite 600, Calverton, MD 20705
Phone No (240) 223-0480
E-mail rmorrison@gparch.com

C. Civil Engineer:
Adtek Engineers
Address 150 South East Street, Suite 201, Frederick, MD 21707
Phone No (301) 662-4408
E-mail JFritz@adtekengineers.com

D. Structural Engineer:
Columbia Engineering, Inc.
Address 6210 Old Dobbin Lane, Columbia, MD 21045
Phone No (410) 992-9970
E-mail creymann@columbiaengineering.com

E. Mechanical & Plumbing Engineer:
Gipe Associates, Inc.
Address 1220 East Joppa Road, Suite 223, Towson, MD 21286
Phone No (410) 832-2420
E-mail

F. Electrical Engineer:
Gipe Associates, Inc.
Address 1220 East Joppa Road, Suite 223, Towson, MD 21286
Phone No (410) 832-2420
E-mail kcurreri@gipe.net

G. Special Inspection & Complex Structure

The Project has been designated as one requiring "Third-Party Inspections" by the Montgomery County Department of Permitting Services. The Contractor is required to abide by all requirements of the Third-Party Inspections Guidelines including but not limited to: Structural steel framing (assembly & connections), Concrete inspection, sampling and testing, Soil compaction testing, Soil bearing testing for over 2000 psf, Spray applied fire protection, Light gage steel framing utilized as bearing walls, Exterior Insulation and Finish System (EIFS), Spray/blown Insulation Installation (needs installer's Compliance Letter/Form at minimum), and Other Energy Inspections. In addition, the building official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of Building Code and County laws enforced by the Department of Permitting Services, and preparation and submittal of required documentation in order to obtain the Use and Occupancy Permit.

3 ALLOWANCES

A. Items specified in the Contract Documents by Allowances. Some Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when further direction will be provided to Contractor. If necessary, additional requirements will be issued by the Owner and/or Architect.
B. Upon issuance of Field Order directive by the Contract Administrator, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work. Purchase and install products and systems selected by Architect from the designated supplier.
C. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
D. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
E. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.
F. Owner's Contingency Allowance, $100,000.00:
    1. The cost of this allowance shall be included as part of the base bid.
    2. This allowance shall only be used by the Owner, as directed by Owner for changes in work due to unforeseen conditions.

4 VERIFICATION OF CONDITIONS BY THE CONTRACTOR

The Contract Documents showing the existing construction of the facility were developed from historic documents and from limited field observations by the Architect and its consultants. Actual conditions may vary from those shown. Hidden conditions may be discovered over the course of the work. Further investigations may uncover conditions which may require remedial attention prior to proceeding with demolition or construction. Contractor shall be aware of the need to proceed with diligence and care and shall notify Architect of conditions which do not reflect those indicated or which require further testing and repair prior to proceeding. Contractor shall correct conditions that are detrimental to timely and proper execution of the Work. Contractor shall not proceed until unsatisfactory conditions have been corrected. Commencement or continuation of work constitutes acceptance of conditions and responsibility for satisfactory performance.

5 USE OF PREMISES

5.1 Use of Site:

A. Limitations:
    a. Limit use of premises to work in areas indicated on the Contract Documents and as permitted by law, ordinances and permits.
    b. Do not disturb portions of site beyond areas in which the Work is indicated.
    c. Confine construction operations to designated areas indicated on Drawings.

B. Owner Occupancy:
Not applicable.

C. Access:
At all times, provide Architect/Engineer and Owner easy and safe access to the Work.

D. Driveways and Entrances:
Keep entrances serving the premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Additionally, all driveways/entrances to neighboring properties shall be kept clear at all times.

E. Construction Parking:
Contractor permitted to park in any legal location.

F. Site Access and Staging Area:
Contractor may access site from Carroll Place and Montgomery Avenue as indicated on the drawings and approved by the Owner. The Contractor will be required to coordinate its activities with the Owner, Montgomery County Department of Permitting Services (DPS), and Town of Kensington for use of the public rights-of-way during construction. If needed, Contractor shall obtain and pay for additional storage or work area as needed for operations.

G. Crane Use and Storage:
If crane(s) is needed for construction, Contractor must obtain all necessary and required permits including FAA prior to the crane's operation. Contractor shall provide a temporary green screen chain link fence around the crane at all times. Obtain Owner and regulatory approval for any crane swing outside work area.

H. Contractor shall provide barriers, protections, warning lines, signs, lighting and personnel to segregate work areas from pedestrian or vehicular traffic and to prevent damage to the building, adjacent buildings, paved areas and surrounding landscaping. Contractor shall repair any damage incurred to existing facility elements resulting from construction activities as soon as possible after occurrence of damage. All applicable O.S.H.A., M.O.S.H. and Montgomery County Government (MCG) requirements shall be observed by Contractor.

I. Working Hours including Noise Restrictions:
The standard permitted Working Hours shall be between 7:00 a.m. and 4:00 p.m. Monday through Friday exclusive of County holidays. See General Conditions for additional information. In addition to standard work hour restrictions, the Contractor shall comply with the Authority Having Jurisdiction (AHJ) permissible noise levels for construction activities during the hours of 7:00 am to 9:00 pm, Monday through Friday, and 9:00 am to 3:00 pm on Saturday. Noise generated by construction activities beyond these hours is strictly prohibited.

J. Phasing:
See Master Schedule

K. Keep project site clean. Remove trash daily.

6 WORK UNDER OTHER CONTRACTS

Owner plans to award separate contracts for other construction work at Project site to be

conducted simultaneously with work under this Contract. Contractor must cooperate fully with these separate Owner-hired contractors so work on those contracts can be carried out smoothly, without interfering with or delaying work under this Contract. Refer to Article 7 of the General Conditions of Contract for specific information concerning this issue.

6.1 These contracts include, but are not limited to, the following:

A. Telephone and Data: A separate contract will be awarded to provide telephone, data and/or other telecommunication wiring and equipment. Contractor shall provide empty conduits, pull strings, and junction boxes, as shown on the Contract Documents.
B. A separate contract will be awarded to provide Owner's inspection and testing not included in the Contract Documents.
C. A separate contract will be awarded to provide loose furniture and equipment not included in the Contract Documents.
D. Owner may also award separate contracts for miscellaneous construction items at Project site.

7 OWNER-FURNISHED PRODUCTS

7.1 Furniture and Loose Equipment: The Owner will provide and install furniture and loose equipment denoted as "NIC" on the Contract Documents.

7.2 The following shall apply to Owner-furnished products:

A. Products noted as "Owner furnished" shall be furnished by the Owner and installed by the Contractor.
B. Products noted as "Owner furnished, and Owner installed" shall be furnished and installed by the Owner.

7.3 For Owner-furnished products installed by the Contractor:

A. Owner will provide Contractor with any shop drawings and/or product data as required for the installation of the Owner-furnished items. The Contractor shall review shop drawings and/or product data and shall promptly notify the Architect/Engineer and the Owner of any concerns or anticipated problems with installation and/or use of each item.
B. Owner will coordinate with Contractor to furnish Contractor the anticipated delivery date for Owner-furnished products. Using Owner-furnished delivery dates, Contractor shall designate delivery and installation dates of Owner-furnished items in the Contractor's Construction Schedule.
C. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule as approved by the Owner. The Work includes the Contractor providing support to receive and handle Owner's products at project site. Contractor shall arrange for the disposal of any packing material, boxes, etc. associated with Owner-furnished items.
D. After delivery, Owner and Contractor will jointly inspect delivered items for completeness and any damage.
E. If Owner-furnished items are damaged, defective, or missing, Owner will, at its option, arrange for replacement or direct to install product as received.
F. Contractor is responsible for protecting Owner-furnished items from damage during site storage, handling including damage from exposure to the elements, and installation. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall replace them or repair them to Owner satisfaction.
G. Owner is responsible for manufacturer's warranties, inspections and service.

7.4 For Owner-furnished products installed by the Owner:

A. Site Access: Provide access to Project site for Owner's construction forces.
B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

C. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

D. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

8 SITE SURVEYS

Reports of Subsurface Explorations and Geotechnical Engineering Analyses is provided in the Specification Section 02 30 00.

9 PERMITS

9.1 Refer to General Conditions for Owner-obtained and for Contractor-obtained permits.

9.2 Contractor is responsible for all requirements of all permits, whether Owner-obtained or Contractor-obtained.

9.3 Contractor is required to prepare and maintain all documentation for all project-related local, state and federal permits.

9.4 Contractor is responsible for maintaining all permits and renew/extend them as necessary, until Final Completion of the project and final close out of all permits. All project related permits must be closed out prior to requesting final payment.

9.5 Contractor is responsible to close out all permit related to project prior to issuance of final completion.

9.6 Contractor is required to maintain all SWM related items under this contract until final acceptance by Authority Having Jurisdiction and close of SWM permit.

10 COORDINATION DRAWINGS

A. General:

1. Submit required coordination drawings to Architect/Engineer and Owner for record only within 60 days of Notice-to-Proceed. Coordination drawings are not shop drawings and will not be accepted or approved by the Architect/Engineer or Owner.
2. Coordination drawings shall show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in space provided and/or to function as intended.
3. Except as otherwise specified, prepare composite coordination drawings to scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of utilities, architectural, structural, mechanical, and electrical elements, equipment and materials in relationship with each other. Include dimensions.
4. Provide coordination drawings utilizing different colors to illustrate work of separate trades or systems.
5. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to efficient flow of Work affecting one or more trades.
6. Indicate scheduling, sequencing, movement, and positioning of large equipment into building during construction.
7. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
8. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communications systems components, sprinklers, and other ceiling-mounted devices.
9. Include bottom elevation of each component above the finished ceiling.

10. Show interrelationship of components to be shown on separate Shop Drawings.
11. Indicate required installation sequences.

B. Site Utilities: The coordination drawings shall include, but not be limited to, the following site utilities:
1. Water Distribution: Indicate pipe sizes, valve and meter locations, underground structures, connections, anchors, and reaction backing. Indicate spatial relationship between piping and other piping in same trench, and proximate structures.
2. Sanitary Sewerage: Indicate pipe sizes, manholes, locations and elevations, underground structures, and connections. Indicate spatial relationship between piping and other piping in same trench, and proximate structures.
3. Natural Gas Distribution: Indicate pipe sizes, valves, gas meters, and specialties. Include details of underground structures and piping. Show other piping in same trench and clearances from natural gas piping. Indicate interface and spatial relationship between piping and proximate structures.
4. Electrical and Communications: Indicate manholes and other structures, conduit and ductbank sizes, locations, and elevations. Include details of underground structures and connections. Indicate spatial relationship between conduit and other piping in same trench, and proximate structures.
5. Storm Drainage: Indicate pipe sizes, manholes and catch basins locations and elevations. Include details of underground structures and connections. Show other piping in the same trench and clearances from storm sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.

a. Profile Drawings: Show system piping and conduits in elevation. Draw profiles at a horizontal scale of not less than 1 inch equals 50 feet and a vertical scale of not less than 1 inch equals 5 feet. Indicate pipe, conduit and underground structures. Show types, sizes, materials, and elevations of all crossing utilities on profile

C. Structural Systems: Include, but do not necessarily limit to following:
1. Structural frame showing interface with exterior elements.
2. Location of openings in relation to structure.
3. Show attachments to decking, structural elements, and other systems.

D. Above Ceiling Coordination:
1. Work by all above ceiling trades, especially work located by the Contractor (i.e. sprinkler pipes, conduit runs, etc.) must be carefully coordinated by the Contractor, prior to shop drawings submissions to assure that all work will fit in the space available. Contractor shall note that the space above the ceiling in this project is extremely congested with ducts, pipes, sprinklers and conduits.
2. The Contractor shall prepare above ceiling coordination drawings for all ceilings and all other ceiling space within 60 days of notice to proceed. The drawings should show all above ceiling work, and structure, with required clearances and dimensions shown. Clearly indicate the bottom elevation of each element in the coordination drawings. The drawing should also show exposed ceiling work. Drawings must locate all ductwork, pipes, and conduit. In preparing these drawings, verify structural conditions, and requirements of all above ceiling trades. All above ceiling work and exposed ceiling work must be fully coordinated by the Contractor, prior to submitting shop drawings for affected items.
3. Submit the coordination drawings to the Architect/Engineer and Owner for record but not review. No additional compensation will be paid to correct work that does not fit in the space available, due to inadequate coordination by the Contractor, or that could have been resolved in the coordination drawing. Bring any discrepancies to the Architect/Engineer's attention for resolution at the time of submitting the coordination drawings.
4. The Contractor should hold a pre-installation meeting with all subcontractors involved in the above ceiling and exposed ceiling work. Review the coordination drawing

requirements, plans, specifications, and proposed work sequencing and schedule. Resolve any problems or discrepancies prior to proceeding with the work.

E. Mechanical Systems: Include, but do not necessarily limit to, following:
   1. Proposed locations of piping, ductwork, equipment, and materials.
   2. Proposed locations for access panels and doors.
   3. Clearances for installing and maintaining insulation.
   4. Clearances for servicing and maintaining equipment, including coil removal, filter removal, and space for equipment disassembly required for periodic maintenance. Show access locations.
   5. Equipment connections and support details.
   6. Exterior wall and foundation penetrations.
   7. Fire-rated wall and floor penetrations.
   8. Sizes and location of required concrete pads and bases.
   9. Valve stem movement.

F. Electrical Systems: Include, but do not necessarily limit to, following:
   1. Proposed locations of major raceway systems, equipment, and materials.
   2. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance. Show access locations.
   3. Exterior wall and foundation penetrations.
   4. Fire-rated wall and floor penetrations.
   5. Equipment connections and support details.
   6. Sizes and location of required concrete pads and bases.

G. Notify Architect of conflicts and other coordination issues requiring resolution prior to commencing construction in each affected area. Respond to Architect/Engineer's requests for information concerning the coordination drawings.

H. Transmit copies of final coordination to all interested parties including all concerned subcontractors. Keep a copy of all final coordination documents in the contractor's field office; make available for review and use by Architect/Engineer and Owner during construction.

11 COORDINATION OF SPACE

A. Coordinate use of ceiling space in accordance with the submitted ceiling coordination drawings.

B. Coordinate use of Project space and sequence of installation of plumbing, fire protection, mechanical and electrical Work. Follow routings shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space; place runs parallel with building lines. Utilize space efficiency to maximize accessibility for other installations, maintenance, and repairs.

C. Layouts of plumbing, fire protection, mechanical, and electrical systems, equipment, fixtures, piping, ductwork, conduit, specialty items, and accessories indicated on Drawings are diagrammatic. Contractor shall make minor variations in alignment, elevation, and details required to avoid interference and to satisfy architectural and structural limitations.

D. Prior to installation of material and equipment, review and coordinate Work with Architectural and Structural Drawings to establish exact space conditions. Where available space is inadequate or where reasonable modifications are not possible, request information from Architect/Engineer before proceeding.

E. Coordinate installation to prevent conflicts and cooperate in making, without extra charge, reasonable modifications in layout as needed.

F. Provide clear access to control points, valves, strainers, control devices, and specialty items of every nature related to such systems and equipment to obtain maximum head room. Provide adequate clearances as necessary for operation and maintenance.

12 UTILITY COORDINATION

12.1 Once the General Contractor has received the Notice-to-Proceed 1 (NTP-1) for the project, the General Contractor will take on the responsibility of being the main correspondent between the project and all utilities inherent in the project. The General Contractor's duties will include the following:

12.2 All site work related submittals for the project must be submitted by the General Contractor no later than 60 days from the Notice-to-Proceed (NTP-1) from the County to the General Contractor for each phase. All Utility work to be shown on the ICPM and all CPM schedules.

12.3 The General Contractor will be solely responsible for the coordination of all utilities inherent in the project. Any delay in response to the General Contractor's submittal by any of the project's utility companies will be considered non-compensable should the delay effect the construction critical path of the project's sequence of construction.

12.4 The General Contractor is solely responsible for all bond and permit costs for all utilities required by the project.

12.5 Within sixty (60) days of Notice To Proceed (NTP-1) Contractor must test pit location of all existing utilities with new utility services' locations prior to starting of utility work to confirm location of existing utilities in order to resolve any conflict.

12.6 Contractor must perform utility connection work within 120 days of issuance of NTP-2 in the street/road/ROW and bring utility services to within 5 feet of property line or Limit of Disturbance, unless not permitted during that time by the approved sequence of construction.

12.7 Contractor must schedule and perform work in such a manner that all permanent utility services such as gas, power, sewer, water and communication, etc. are ready for use a minimum of 120 days prior to project Substantial Completion date.

13 SPECIAL PROJECT CONDITIONS - GRAND OPENING REQUIREMENTS

A. The Contractor shall coordinate the Grand Opening events with County officials. The coordination shall include one on-site meeting with County officials. The Contractor shall provide the items specified below to facilitate a Public Grand Opening to be held by the Owner for the Project.

B. Tents, Tables and Chairs: The Contractor shall provide two 25' x 25' "open air" tents, 25 folding chairs, and three 30"x 60" folding tables.

C. Bottled Water: The Contractor shall provide at least one hundred forty-four (144) bottles of drinking water for use by Grand Opening attendees (officials and the general public).

D. The Contractor shall remove all of its Grand Opening requirements within two (2) hours after the end of the Grand Opening event.

14 TAXES

Refer to General Conditions

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SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.

2. Hazardous material abatement to be included with special care in protecting existing heritage of facility (including but not limited to entire exterior including windows and doors); refer to drawings for existing portions of building to remain and items to be removed and reinstalled.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

D. Demolish: Tearing down, destruction, breakup, razing or removal of the whole or part of a building or structure, or a free standing machinery or equipment that is directly related to the function of the structure.

E. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.

1.3 SUBMITTALS

A. Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI A10.6 and NFPA 241.

E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.5 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Abatement: Coordinate hazardous materials management with abatement trades, as required. [OSHA 1926.850(e); ANSI A10.6]

1. Determine lead concentrations in any suspect surface coatings, structural steel rust inhibitors and ceramic tiles prior to selective demolition. Coordinate lead management with abatement trade, as required. [29 CFR 1926.850(e) and 1926.62(d)(2)]

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

D. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

E. Survey of Existing Conditions:

1. Record existing conditions by use of preconstruction photographs.

2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.

2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
3. Cover and protect furniture, furnishings, and equipment that have not been removed.
4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."

B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. 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. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. 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 fire watch and portable fire-suppression devices during flame-cutting operations.
4. Maintain adequate ventilation when using cutting torches.
5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
6. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Roofing:

1. Cut, patch, repair and extend roofing and installation as follows:
   a. Where disturbed or damaged by alteration Work or activities related to same.

b. Where new Work connects to existing construction.

2. Roof areas penetrated for alterations shall be protected against damage and leakage by the Contractor performing the Work. Roof openings shall not be left uncovered or unprotected overnight or during any periods of rainy or inclement weather.

3. Work shall be performed in a manner to provide for permanent water-tight splice or repair.

4. Roof repair and alteration Work and materials shall match existing roofing materials and construction.

5. Upon completion and inspection of splice or repair Work, remove debris from the roof and replace the aggregate as required.

6. Protect undisturbed existing and newly repaired roofing subject to traffic and damage.

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.

1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

F. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

G. Hazardous Materials:

1. Coordinate hazardous materials management with abatement trades, as required." [OSHA 1926.850(e); ANSI A10.6]

2. Determine lead concentrations in any suspect surface coatings, structural steel rust inhibitors and ceramic tiles prior to selective demolition. Coordinate lead management with abatement trade, as required. [29 CFR 1926.850(e) and 1926.62(d)(2)]

3. CAUTION: Lamp ballasts are regulated toxic substances. PCB and DEHP WASTES shall be salvaged. [EPA 40 CFR 761]

4. CAUTION: Hydraulic door closures may contain PCB oils. Recover hydraulic door closures intact for salvage and coordinated delivery to Owner. [EPA 40 CFR 761 and 29 CFR 1926.850(e)]

5. CAUTION: Fluorescent tubes, batteries and tilt-switch thermostats contain MERCURY. [29 CFR 1926.850(e)]

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 02 43 13
STRUCTURE RELOCATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Lifting / moving of the existing Noyes Children's Library to allow for new basement to be constructed.

1.2 SCOPE OF WORK

A. The intent of this performance specification is to outline the requirements for the lifting the existing library. The preferred option would be to jack up the building and provide temporary cribbing support for the existing building while the crawl space below is demolished and the new basement is constructed. At that time, the building would be lowered down on to the new foundations. The scope of work includes the following:

1. Confirm that the General Contractor has disconnected all utilities.
2. Separate the existing library from the existing crawl space foundation.
3. Provide any supports, internal and external bracing, or other reinforcing needed to properly lift the structure.
4. Provide all structure, materials and equipment needed to lift the library. Once lifted, provide cribbing and or other support as required to support building.
5. When the new foundations are complete, lower the library down to the new basement foundation walls.
6. Anchoring to the new foundation walls will be by the General Contractor. When anchored, remove any temporary supports, bracing, etcetera and remove all equipment and materials from the site.
7. See structural drawing S2.0 for additional information.

B. The existing conditions shall be documented by the contractor prior to moving. The contractor should reference the structural drawings for the final framing condition. New steel beams and stud walls will be utilized to support the first-floor framing. It is the contractor's responsibility to temporarily support the existing building during the various phases of construction. The contractor will be responsible for all damages.

1.3 SUBMITTALS

A. Refer to Division 1, for submittal procedures.

B. Shop Drawings: Contractor shall submit signed and sealed shop drawings and calculations to the engineer of record for review. Shop drawing and calculations shall be signed and sealed by a professional engineer registered in the State of Maryland.

C. Proof of insurance.

D. Submit documentation that Building Relocation Company is a member in good standing of the International Association of Structural Movers.

1.4 QUALITY ASSURANCE

A. Building relocation Company Qualifications:

1. Be a member in good standing of the International Association of Structural Movers.
2. Have moved at least 5 structures of this size or larger in the past 5 years.

B. Regulatory Requirements:

1. Comply with all Montgomery County regulations and applicable codes.
2. Comply with OSHA requirements.

PART 2 PRODUCTS

2.1 ACCEPTABLE MOVERS

A. Subject to compliance with these specifications and the drawings, the following movers are acceptable:

1. Expert House Movers of Maryland, Inc. - 800-669-7315 Contact: Gabriel Matyiko
2. Wolfe House and Building Movers, LLC. - 610-488-1020
3. Ayers House Moving, Inc. - 540-898-9083

2.2 MATERIALS, EQUIPMENT AND COMPONENTS

A. As required by the Building Relocation Contractor.

PART 3 EXECUTION

3.1 BUILDING RELOCATION

A. Building Relocation Contractor to determine means and methods for lifting and supporting the building and complying with the project requirements.

3.2 QUALITY CONTROL

A. Perform a survey detailing the condition of the existing building prior to starting jacking operations. After the building has been relocated to its final position, repair any damage to interior structure or finishes scheduled to remain.

END OF SECTION

SECTION 03 01 30
CONCRETE MODIFICATIONS AND REPAIR

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of concrete and subsequent replacement and patching; provided for guidance should any concrete modification and repairs be required during Work of this Project.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.

B. Store cementitious materials off the ground, under cover, and in a dry location.

C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

1.4 FIELD CONDITIONS

A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

2.2 BONDING AGENTS

A. Epoxy Adhesive:

1. The compound shall be a two (2) component, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces.

2. Product Selection:

a. Euco Epoxy No. 452MV or No. 620 by the Euclid Chemical Company.

b. Sikadur Hi-Mod by the Sika Chemical Corporation.

c. REZI-WELD 1000 by W. R. Meadows

2.3 PATCHING MORTAR

A. Polymer-Modified, Cementitious Patching Mortar:

1. Exposed Localized Slab Repairs - Less than 1/2 inch thickness: Polymer modified patch; minimum 6,500 psi compressive strength.

a. Euco Thin Coat by Euclid Chemical Company.

b. Durathin by L&M Construction Chemicals, Inc.

c. MEADOW-PATCH T1 by W. R. Meadows.

2. Exposed Localized Slab Repairs - 1/2 inch to 2 inch thickness: Polymer modified patch; minimum 6,000 psi compressive strength.

a. Euco Concrete Coat by Euclid Chemical Company.

b. Duratop by L&M Construction Chemicals, Inc.

c. MEADOW-CRETE GPS by W. R. Meadows.

PART 3 EXECUTION

3.1 PREPARATION

A. Ensure that supervisory personnel are on-site and on duty when concrete maintenance work begins and during its progress.

B. Protect persons, surrounding surfaces of building from harm resulting from concrete maintenance work.

1. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials.

2. Use only proven protection methods appropriate to each area and surface being protected.

3. Contain dust and debris generated by concrete maintenance work and prevent it from reaching the public or adjacent surfaces.

4. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.

5. Protect adjacent surfaces and equipment by covering them with heavy polyethylene film and waterproof masking tape. If practical, remove items, store, and reinstall after potentially damaging operations are complete.

6. Dispose of debris by legal means.

C. Preparation for Concrete Removal: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.

1. Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain. Strengthen or add new supports when required during progress of removal work.

D. Preparation of Floor Joints for Repair: Saw-cut joints full width to edges and depth of spalls, but not less than 1 inch(25 mm) deep. Clean out debris and loose concrete; vacuum or blow clear with compressed air.

3.2 BONDING AGENT APPLICATION

A. Epoxy Bonding Agent: Apply to concrete by brush, roller, or spray according to manufacturer's written instructions, leaving no pinholes or other uncoated areas. Place patching mortar or concrete while epoxy is still tacky. If epoxy dries, recoat before placing patching mortar or concrete.

3.3 PATCHING MORTAR APPLICATION

A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer.

B. Pretreatment: Apply specified bonding agent.

C. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete.

1. Stage 1: Prepare smooth surface to receive sheet waterproofing.

2. Stage 2: Fill remaining thickness following installation of sheet waterproofing.

D. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-saturated absorptive cover.

3.4 FIELD QUALITY CONTROL

A. Manufacturers Field Service: Engage manufacturers' factory-authorized service representatives for consultation and Project-site inspection and to provide on-site assistance when requested by Owner.

1. Have manufacturers' factory-authorized service representatives perform the following number of Project-site inspections to observe progress and quality of the Work, distributed over the period of product installation, regardless of on-site assistance requested by Owner.

a. Bonding-Agent and Packaged Patching-Mortar Installation: inspections.

END OF SECTION

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SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.2 REFERENCE STANDARDS

A. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute.

B. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.

C. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.

D. ACI 347 – Guide to Formwork for Concrete; American Concrete Institute.

E. ASME A17.1 – Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers.

1.3 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on void form materials.

C. Shop Drawings: Indicate pertinent dimensions, materials, bracing and arrangement of joints and ties.

1. Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Shop drawings shall be signed and sealed by an engineer registered in the local jurisdiction.

2. Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

3. Indicate location of all slab joint types.

1.4 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

1. Maintain one copy of standards on project site.

PART 2 PRODUCTS

2.1 FORMWORK – GENERAL

A. Provide concrete forms, accessories, shoring and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

D. Comply with relevant portions of ACI 347, ACI 301 and ACI 318.

2.2 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.3 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.

2.4 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.

C. Corners: Chamfered, rigid plastic or wood strip type, ¾ x ¾ inch size, maximum possible lengths.

D. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

G. Waterstops: Preformed mineral colloid strips, ¾ inch thick, moisture expanding.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION – FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Provide chamfer strips on external corners of beams, joists, and columns.

D. Install void forms in accordance with manufacturer’s recommendations. Protect forms from moisture or crushing.

E. Coordinate this section with other sections of work that require attachment of components to formwork.

F. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION – FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for items to be embedded or passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

2. During cold weather, remove ice and snow from within forms. Do not use deicing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless more stringent tolerances are required within the contract documents.

B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.8 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to the Statement of Special Inspections noted in the structural drawings.

B. Inspect erected formwork, shoring and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

C. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finished concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.2 REFERENCE STANDARDS

A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.

B. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.

C. ACI SP-66 – ACI Detailing Manual; American Concrete Institute.

D. ASTM A 615/A 615M – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

E. ASTM A 1064/A 1064M – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain, Deformed, for Concrete.

F. CRSI (DA4) – Manual of Standard Practice; Concrete Reinforcing Steel Institute.

G. CRSI (P1) – Placing Reinforcing Bars; Concrete Reinforcing Steel Institute.

1.3 SUBMITTALS

A. See Section 01 30 00: Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.4 QUALITY ASSURANCE

A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, ACI SP-66, and ACI 318.

1. Maintain one copy of each document on the project site.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).

1. Deformed billet-steel bars.

2. Unfinished.

B. Steel Welded Wire Reinforcement: ASTM A 1064/A 1064M, plain type.

1. Flat sheets.

2. Mesh Size and Wire Gage: As indicated on drawings.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Supports and Spacers in Contact with the Ground:
    a. Precast concrete supports with a surface area of not less than 4 in2, a compressive strength equal to or greater than the specified compressive strength of the concrete being placed, and embedded tie wires for securing the reinforcement.
    b. Chairs with plastic components and sand plates.
    c. Spacers: Plastic.
4. Provide stainless steel components for placement within 1½ inches of weathering surfaces.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) – Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
    1. Review location of splices with Architect.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement before and during concrete placement. Do not deviate from required position.

B. Clean reinforcement of loose rust, mill scale, earth, ice and other foreign materials that would reduce bond to concrete.

C. Do not displace or damage vapor barrier.

D. Accommodate placement of formed openings.

E. Conform to structural drawings for concrete cover over reinforcement.

3.2 FIELD QUALITY CONTROL

A. An independent inspection agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before placing concrete. Inspection services shall conform to the Statement of Special Inspections noted in the structural drawings.

END OF SECTION

SECTION 03 30 00
CAST IN PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete for composite floor construction.

B. Floors and slabs on grade.

C. Concrete foundation walls and building walls.

D. Footings.

E. Beams.

F. Joint devices associated with concrete work.

G. Miscellaneous concrete elements, including equipment pads.

1.2 RELATED REQUIREMENTS

A. Section 03 10 00 – Concrete Forming and Accessories.

B. Section 03 20 00 – Concrete Reinforcing.

C. Section 03 35 13 – High Tolerance Concrete Floor Finishing.

D. Section 03 39 00 – Concrete Curing.

E. Section 07 95 13 – Expansion Joint Cover Assemblies.

F. Section 07 90 05 – Joint Sealers.

1.3 REFERENCE STANDARDS

A. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute.

B. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.

C. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute.

D. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute.

E. ACI 305R – Hot Weather Concreting; American Concrete Institute.

F. ACI 306R – Cold Weather Concreting: American Concrete Institute.

G. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.

H. ASTM C 33 – Standard Specification for Concrete Aggregates.

I. ASTM C 39/C 39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

J. ASTM C 94/C 94M – Standard Specification for Ready-Mixed Concrete.

K. ASTM C 150 – Standard Specification for Portland Cement.

L. ASTM C 173/C 173M – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

M. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.

N. ASTM C 494/ C 494M – Standard Specification for Chemical Admixtures for Concrete.

O. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

P. ASTM C 881/C 881M – Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete.

Q. ASTM C 989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.

R. ASTM C 1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

S. ASTM C 1107/C 1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).

T. ASTM C 1240 – Standard Specification for Silica Fume Used in Cementitious Mixtures.

U. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types).

V. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.

W. ASTM E 329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction.

X. IBC 2015 – International Building Code.

1.4 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's data on manufactured products showing compliance with specified requirements.

C. Samples: Submit samples of under-slab vapor retarder to be used.

D. Design Mixtures:

1. Submit for each concrete mixture.

2. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

3. Indicate amounts of mixing water to be withheld for later addition at project site.

1.5 QUALITY ASSURANCE

A. Concrete Producer: Engage a firm with experience in producing concrete similar to that indicated for this project and within 15 percent of this project size, with a record of successful in-service performance as well as sufficient production capacity to supply concrete without delaying the work.

1. Provide documentation that concrete producer has supplied concrete for at least 3 projects within 15 percent of project size and complexity in the last six years.

B. Concrete Contractor: Engage a firm with experience in placing and finishing concrete similar to that indicated for this project and within 15 percent of this project size, with a record of successful in-service performance.

1. Provide documentation that the concrete contractor has installed concrete for at least 3 projects within 15 percent of project size and complexity in the last six years.

C. Perform work of this section in accordance with ACI 301 and ACI 318.

1. Maintain one copy of each document on site.

D. Follow recommendations of ACI 305R when concreting during hot weather.

E. Follow recommendations of ACI 306R when concreting during cold weather.

F. All form release agents and membrane curing compounds used for slabs and walls that are to be waterproofed shall be submitted to the manufacturer of hot fluid waterproofing system for compatibility review prior to application.

G. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1.

2. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

PART 2 PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.2 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.3 CONCRETE MATERIALS

A. Cement – ASTM C 150 Type 1 – Normal Portland type.

1. Acquire all cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C 33.

1. Acquire all aggregates for entire project from same source.

C. Ground Granulated Blast Furnace Slag: ASTM C 989, Grade 100 or 120.

D. Fly Ash: ASTM C 618 Class F.

E. Calcined Pozzolan: ASTM C 618 Class N.

F. Silica Fume: ASTM C 1240.

G. Color Additive: Concentrated piments specially processed for mixing into concrete and complying with ASTM C979.

1. Manufacturer: Davis Colors
2. Location: Interior stair treads
3. Color: charcoal grey to match landing tile
4. Onsite mock-up required.

H. Water: Clean and not detrimental to concrete.

I. Regional Materials: Provide cement and aggregate manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

2.4 CHEMICAL ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C 260.

C. High Range Water Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

D. High Range Water Reducing Admixture: ASTM C 494/C 494M, Type F.

E. Water Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.

F. Water Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

G. Accelerating Admixture: ASTM C 494/C 494M, Type C.

H. Retarding Admixture: ASTM C 494/C 494M, Type B.

I. Water Reducing Admixture: ASTM C 494/C 494M, Type A.

2.5 ACCESSORY MATERIALS

A. Underslab Vapor Barrier / Vapor Retarder: Comply with ASTM E 1745, Class A.

1. Maximum Permeance ASTM E 96: 0.018 perms (English).
2. Provide standard accessories and tape for complete system.
3. Acceptable Products:
    a. Florprufe 120 by W.R. Grace
4. Single ply polyethylene is prohibited.

B. Non-Shrink Grout: ASTM C 1107/C 1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
2. Minimum Compressive Strength at 28 Days: 7,000 psi.

C. Curing Materials: Comply with requirements of Section 03 39 00.

2.6 BONDING AND JOINTING PRODUCTS

A. Bonding Agent: Epoxy bonding system complying with ASTM C 881/C 881M and of Type required for specific application.

B. Waterproofing Admixture Slurry: Slurry coat of Portland cement, sand, and crystalline waterproofing additive, mixed with water in proportions recommended by manufacturer to achieve waterproofing at cold joints in concrete.

1. Manufacturers:
    a. Aquafin, Inc.: www.aquafin.net.
    b. Xypex Chemical Corporation: www.xypen.com.
    c. Kryton International Inc: www.kryton.com.

C. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophilic material for adhesive bonding to concrete.

1. Available Products:
    a. Volclay Waterstop-RX: Colloid Environmental Technologies Co.
    b. Conseal CS-231: Concrete Sealants Inc.
    c. Swellseal Joint: De Neef Construction Chemicals (U.S.) Inc.
    d. Hydrotite: Greenstreak.
    e. Mirastop: Mirafil Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
    f. Adeka Ultra Seal: Mitsubishi International Corporation.
    g. Superstop: Progress Unlimited Inc.

D. Joint Filler: Non-extruding, resilient asphalt impregnated fiberboard, cork or flexible foam, complying with ASTM D 1751, thickness as indicated on drawings and full depth of slab less ½ inch; tongue and groove profile.

E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum1 inch diameter holes for conduit or rebars to pass through at 6 inches on center, ribbed steel stakes for setting.

1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.

2. Height: To suit slab thickness.

F. Sealant and Primer: As specified in Section 07 90 05.

2.7 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

1. Replace no less than 30% and no more than 50% of Portland cement in structural concrete with approved pozzolanic materials.

2. Ground Granulated Blast Furnace Slag Content: Not to exceed 50% of cementitious material by weight.

3. Fly Ash or Calcined Pozzolan Content: Not to exceed 25% of cementitious material by weight.

4. Silica Fume Content: Not to exceed 10% of total cementitious material by weight.

5. Obtain approval in advance before submitting mix containing any other pozzolanic substances.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: As indicated on drawings.

2. Water-Cementitious Materials Ratio: Maximum 58% by weight. Maximum 40% by weight for exterior concrete.

a. Interior slabs shall have a maximum water-cementitious material ratio of 50% by weight.

3. Entrained air content for trowel-finished interior slabs shall not exceed 3%, determined in accordance with ASTM C 173/C 173M.

4. Entrained air content for footings shall not exceed 4.5%, determined in accordance with ASTM C 173/C 173M

5. Air Content for Exterior Exposed Concrete: Add air entraining admixture at manufacturer’s prescribed rate to result in concrete at point of placement having an air content as follows with a tolerance of plus 1 or minus 1.5%, unless otherwise indicated.

a. Air Content: 6% entrained air, determined in accordance with ASTM C 173/C 173M.

6. Maximum Slump: 4 inches.

7. Maximum Aggregate Size: 1 inch.

2.8 MIXING

A. Transit Mixers: Comply with ASTM C 94/C 94M.

B. Do not add water to concrete during delivery, at the project site or during placement except as predetermined by concrete mix, unless approved by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent, as indicated on the drawings, in accordance with the manufacturer's instructions.

B. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

C. In locations where new concrete is doweled to existing work, drill holes in existing concrete and insert steel dowels using an epoxy adhesive approved by the Architect.

D. Install vapor retarder under interior slabs on grade in accordance with manufacturer's instructions and ASTM E 1643.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

D. Separate slabs on grade from vertical surfaces with joint filler.

E. Place joint filler in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

F. Extend joint filler from bottom of slab to within ½ inch of finished slab surface. Conform to Section 07 90 05 for finish joint sealer requirements.

G. Install joint devices in accordance with manufacturer's instructions.

H. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

I. Install joint device anchors for expansion joint assemblies specified in Section 07 95 13. Maintain correct position to allow joint cover to be flush with floor and wall finish.

J. Apply sealants in joint devices in accordance with Section 07 90 05.

K. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

L. Place concrete continuously between predetermined expansion, control and construction joints.

M. Do not interrupt successive placement. Do not permit cold joints to occur.

N. Place slabs on grade with saw cut pattern indicated.

O. Saw cut joints as soon as the concrete is firm enough not to be damaged by the cutting action. Use 3/16 inch thick blade, cut into ¼ depth of slab thickness.

3.4 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas ¼ inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas ¼ inch or more in height. Provide finish as follows:

1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of Section 03 35 13.

3.5 CURING AND PROTECTION

A. Comply with requirements of Section 03 39 00.

3.6 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.3 and Table 1705.3 of the 2015 IBC Code and the Statement of Special Inspections noted in the structural drawings. The exceptions noted in Section 1705.3 shall not be allowed.

B. Provide free access to concrete operations at project site and cooperate with appointed firm; inspection to occur for:

1. Steel reinforcement placement.
2. Anchor bolts and studs.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.
6. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Test composite samples of fresh concrete obtained according to ASTM C 172.

F. Compressive Strength Tests: ASTM C 39/C 39M.

1. Compression Test Specimens: ASTM C31/C 31M; cast and laboratory cure five 6”x12” standard cylinder specimens or seven 4”x8” standard cylinder specimens for each composite sample.
2. Test one laboratory-cured specimen at 7 days and one set of two 6”x12” or three 4”x8” specimens at 28 days. Remaining cylinders shall be held in reserve.
3. Obtain test samples for every 75 cu.yd. or less of each class of concrete placed each day.
4. A compressive-strength test shall be the average compressive strength from all specimens obtained from same composite sample and tested at age indicated.

5. Strength of each concrete mixture 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.

G. Take two additional 6”x12” or three additional 4”x8” test cylinders during cold weather concreting, cured on job site under same conditions as concrete it represents. Test at 28 days.

H. Perform one slump test, at point of discharge for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.

I. Perform air content test for each set of test cylinders taken, following procedures of ASTM C 231.

J. Test concrete temperature each hour when air temperature is 40 degrees F and below and when 80 degrees F and above, and for each set of test cylinders taken, following procedures of ASTM C 1064/C 1064M.

3.7 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to the Architect and Contractor within 24 hours of test.

1. Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by the Architect.

2. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by the Architect.

3. Additional testing and inspecting, at Contractor’s expense, will be performed to determine compliance of replaced or additional work with specified requirements.

4. Correct deficiencies that test reports and inspections indicate do not comply with specified requirements.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements. Repair or replace defective concrete, subject to the approval of the Architect.

C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express direction of the Architect for each individual area.

END OF SECTION

SECTION 03 35 13
HIGH-TOLERANCE CONCRETE FLOOR FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finishing slabs on grade and monolithic floor slabs.

B. Surface treatment with concrete hardener and sealer.

1.2 REFERENCE STANDARDS

A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.

B. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute.

C. ASTM E 1155 – Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness.

1.3 SUBMITTALS

A. Section 01 30 00 – Administrative Requirements for submittal procedures.

B. Product Data: Provide data on concrete hardener and sealer, including information on compatibility of different products and limitations.

C. Submit floor surface flatness and levelness measurements to determine compliance with specified tolerances.

D. Maintenance Data: Provide data on maintenance renewal of applied coatings.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

1. Maintain one copy on project site.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer’s sealed packaging, including application instructions.

1.6 PROJECT CONDITIONS

A. Coordinate the work with concrete floor placement and concrete floor curing.

1.7 FIELD CONDITIONS

A. Maintain ambient temperature of 50 degrees F minimum.

B. Provide ventilation sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

PART 2 PRODUCTS

2.1 COMPOUNDS – HARDENERS AND SEALERS

A. Chemical Hardener: Clear, chemically reactive, waterborne solution of inorganic siliconate materials and proprietary components, odorless, colorless, that penetrates, hardens, and densifies concrete surfaces.

1. Provide for exterior slabs and interior slabs not receiving a subsequent finish; regardless of Finish Schedule indicating concrete hardener or not.

2. VOC Content: Not to exceed 200 g/L.

3. Acceptable Products:

a. Ashford Formula, Concrete Chemical Company, Inc.

b. Seal Hard, L & M Concrete Chemicals, Inc.

c. Euco Diamond Hard, Euclid Chemical Company.

PART 3 EXECUTION

3.1 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.

B. Steel trowel surfaces that will receive carpeting, resilient floors, seamless flooring, thin set terrazzo or thin set ceramic tile.

C. Steel trowel surfaces that are scheduled to be exposed.

D. Fine-broomed finish for exterior slabs.

3.2 FLOOR SURFACE TREATMENT

A. Apply hardener to floor surfaces in accordance with manufacturer's instructions.

3.3 TOLERANCES

A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for flatness.

B. Measure for F(F) and F(L) tolerances for floors in accordance with ASTM E 1155, within 48 hours after slab installation.

C. Finish concrete to achieve the following tolerances:

1. Slabs to be Covered with Thin Floor Coverings (i.e., resilient flooring). Specified overall values of flatness F(F) 20 and of levelness F(L) 15; with minimum local values of flatness, F(F) 14 and of levelness F(L) 10.

2. Slabs to be Covered with Carpet and Other Slabs: Specified overall values of flatness F(F) 20 and of levelness F(L) 15; with minimum local values of flatness, F(F) 14 and of levelness F(L) 10.

3. The F(L) values listed above are not applicable to elevated slabs on deck. Only F(F) values apply to elevated slabs.

D. Correct the slab surface if tolerances are less than specified.

E. Correct defects by grinding or by removal and replacement of defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION

SECTION 03 39 00
CONCRETE CURING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.2 REFERENCE STANDARDS

A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.

B. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute.

C. ACI 305R – Hot Weather Concreting; American Concrete Institute.

D. ACI 306R – Cold Weather Concreting; American Concrete Institute.

E. ACI 308R – Guide to Curing Concrete; American Concrete Institute.

F. ASTM C 171 – Standard Specification for Sheet Materials for Curing Concrete.

G. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

H. ASTM D 2103 – Standard Specification for Polyethylene Film and Sheeting.

1.3 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on curing compounds, moisture-retaining sheet, and polyethylene film, including compatibility of different products and limitations.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1R.

PART 2 PRODUCTS

2.1 MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Membrane Curing Compound: ASTM C 309 Type 1 – Clear or translucent, Class B.

1. VOC Content not to exceed 350 g/L.

C. Moisture-Retaining Sheet: ASTM C 171.

1. Curing paper, regular.

2. Polyethylene film, clear, minimum nominal thickness of 0.0040 in.

3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd., 40 inches wide.

D. Polyethylene Film: ASTM D 2103, 4 mil thick, clear.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION – HORIZONTAL SURFACES

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306R for cold-weather protection and ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft./h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure floor surfaces in accordance with ACI 308.

D. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges; maintain in place for not less than 4 days.

E. Absorptive Moisture-Retaining Sheet: Saturate burlap-polyethylene and place burlap side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.

F. Membrane Curing Compound: Apply curing compound in accordance with manufacturer's instructions in one coat.

3.3 EXECUTION – VERTICAL SURFACES

A. Cure surfaces in accordance with ACI 308.

B. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

3.4 PROTECTION

A. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04 01 20
MAINTENANCE OF UNIT MASONRY

1.1 SUMMARY

A. Section includes maintenance of unit masonry consisting of brick clay masonry restoration and cleaning as follows:

1. Repairing unit masonry, including replacing units.
2. Painting steel uncovered during the work.
3. Reanchoring veneers.
4. Repointing joints.
5. Cleaning exposed unit masonry surfaces.

B. The extent of Work as indicated in the Notes on Sheets A2.2, A2.3, A2.4 and A4.1 is to remove the paint from the existing chimney, repair any damaged brick on the chimney, repoint all mortar joints on the chimney and then clean the chimney.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on masonry units as follows.

1. Provide test specimens as indicated and representative of proposed materials and construction.
2. Existing Brick: Test each type of existing masonry unit indicated for replacement, according to testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction). Carefully remove five existing units from locations designated by Architect. Take testing samples from these units.
3. Existing Mortar: Test according to ASTM C 295, modified as agreed by testing service and Architect for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength. Use X-ray diffraction, infrared spectroscopy, and differential thermal analysis as necessary to supplement microscopical methods. Carefully remove existing mortar from within joints at five locations designated by Architect or testing service.
4. Temporary Patch: As directed by Architect, provide temporary materials at locations from which existing samples were taken.
5. Replacement Brick: Test each proposed type of replacement masonry unit, according to sampling and testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction).

1.3 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.

1. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for repair work.
2. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work

is in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.

3. Restoration Worker Qualifications: Persons who are experienced and specialize in restoration work of types they will be performing. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

C. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

D. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

E. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

1. Include methods for keeping pointing mortar damp during curing period.

2. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

F. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

G. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

H. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Repointing: Rake out joints in 2 separate areas, each approximately 36 inches high by 48 inches wide for each type of repointing required and repoint one of the areas.

2. Cleaning: Clean an area approximately 25 sq. ft. for each type of masonry and surface condition.

a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.

b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Face Brick: Provide face brick, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.

1. Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork and with physical properties within 10 percent of those determined from preconstruction testing of selected existing units.

a. Face brick must match the historic brick on the chimney; FBS smooth/SW brick is not compatible with existing.

2. Provide units with colors, color variation within units, surface texture, and physical properties to match Architect's sample. Match existing units in size and shape.

3. Special Shapes:

a. Provide specially molded, 100 percent solid shapes for applications where core holes or "frogs" could be exposed to view or weather when in final position and where shapes produced by sawing would result in sawed surfaces being exposed to view.

b. Provide specially ground units, shaped to match patterns, for arches and where indicated.

c. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are not acceptable procedures for fabricating special shapes.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, white or gray or both where required for color matching of exposed mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Factory-Prepared Lime Putty: ASTM C 1489.

D. Quicklime: ASTM C 5, pulverized lime.

E. Mortar Sand: ASTM C 144 unless otherwise indicated.

1. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.

2. For pointing mortar, provide sand with rounded edges.

3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

F. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

G. Water: Potable.

2.3 CLEANING MATERIALS

A. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

B. Chemical Cleaner: Refer to Division 4 section, Unit Masonry.

2.4 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

B. Masonry Repair Anchors, Spiral Type: Type 304 or Type 316 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.

1. Provide adhesive-installed anchors complete with manufacturer's standard epoxy adhesive and injection tubes, or other devices required for installation.

2. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.

3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

a. BLOK-LOK Limited; Spira-Lok.

b. Heckmann Building Products Inc.; #391 Remedial Tie.

c. Hohmann & Barnard, Inc.; Helix Spiro-Ties.

C. Sealant Materials:

1. Provide manufacturer's standard chemically curing, elastomeric sealant(s) of base polymer and characteristics indicated below that comply with applicable requirements in Section 079200 "Joint Sealants."

a. Single-component, nonsag urethane sealant.

2. Colors: Provide colors of exposed sealants to match colors of masonry adjoining installed sealant unless otherwise indicated.

3. Ground-Mortar Aggregate: Custom crushed and ground pointing mortar sand or existing mortar retrieved from joints. Grind to a particle size that matches the adjacent mortar aggregate and color. Remove all fines passing the 100 sieve.

D. Joint-Sealant Backing:

1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) or Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2. 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 acceptable.

E. Setting Buttons: Resilient plastic buttons, nonstaining to masonry, sized to suit joint thicknesses and bed depths of masonry units without intruding into required depths of pointing materials.

F. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

G. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:
    a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
    b. Leave a residue on surfaces.

2.5 MORTAR MIXES

A. Preparing Lime Putty: Slake quicklime and prepare lime putty according to appendix to ASTM C 5 and manufacturer's written instructions.

B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

C. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

D. Do not use admixtures in mortar unless otherwise indicated.

E. Rebuilding (Setting) Mortar: Comply with ASTM C 270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

3.2 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated or are to be reused. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.

E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed damaged brick with other removed brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.

G. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

H. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per minute. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork or perform as follows (as applicable).
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.3 REANCHORING VENEERS

A. Install masonry repair anchors in horizontal mortar joints and according to manufacturer's written instructions. Install at not more than 16 inches o.c. vertically and 32 incheso.c. horizontally unless otherwise indicated. Install at locations to avoid penetrating flashing.

B. Recess anchors at least 5/8 inch from surface of mortar joint and fill recess with pointing mortar.

3.4 PAINTING STEEL UNCOVERED DURING THE WORK

A. Inspect steel exposed during masonry removal. Where Architect determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:

1. Remove paint, rust, and other contaminants according SSPC-SP 3, "Power Tool Cleaning", as applicable to meet paint manufacturer's recommended preparation.
2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).

B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch, notify Architect before proceeding.

3.5 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.

2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.

a. Equip units with pressure gages.

3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.

4. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

5. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Water Application Methods:

1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover area being sprayed.

2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not spray apply at pressures exceeding 50 psi. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

F. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

G. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.6 CLEANING BRICKWORK

A. Detergent Cleaning:

1. Wet masonry with cold or hot water applied by low-pressure spray.

2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.

3. Rinse with cold or hot water applied by medium-pressure spray to remove detergent solution and soil.

4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

B. Chemical Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply cleaner to masonry in two applications by brush or low-pressure spray. Let cleaner remain on surface for period indicated below:
   a. As recommended by chemical-cleaner manufacturer.
   b. As established by mockup.
   c. Two to three minutes.
3. Rinse with cold water applied by medium-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use a steam cleaning.

3.7 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:

1. All joints in areas indicated.
2. Joints where mortar is missing or where they contain holes.
3. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
4. Cracked joints where cracks are 1/16 inch or more in width and of any depth.
5. Joints where they sound hollow when tapped by metal object.
6. Joints where they are worn back 1/4 inch or more from surface.
7. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
8. Joints where they have been filled with substances other than mortar.
9. Joints indicated as sealant-filled joints.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth 2 times joint width, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
   a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.
   b. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks,

loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.

2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

   a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

   b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

F. Pointing with Sealant:

1. After raking out, keep joints dry and free of mortar and debris.

2. Clean and prepare joint surfaces according to Section 079200 "Joint Sealants." Prime joint surfaces unless sealant manufacturer recommends against priming. Do not allow primer to spill or migrate onto adjoining surfaces.

3. Fill sealant joints with specified joint sealant according to Section 079200 "Joint Sealants" and the following:

   a. Install cylindrical sealant backing beneath the sealant, except where space is insufficient. There, install bond-breaker tape.

   b. Install sealant using only proven installation techniques that will ensure that sealant will be deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding masonry and matching the contour of adjoining mortar joints.

   c. Install sealant as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:

      1) Fill joints to a depth equal to joint width, but not more than 1/2 inch deep or less than 1/4 inch deep.

   d. Immediately after first tooling, apply ground-mortar aggregate to sealant, gently pushing aggregate into the surface of sealant. Retool sealant to form smooth,

uniform beads, slightly concave. Remove excess sealant and aggregate from surfaces adjacent to joint.

e. Do not allow sealant to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces, particularly rough textures. Remove excess and spillage of sealant promptly as the work progresses. Clean adjoining surfaces by the means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved mockup.

4. Cure sealant according to Section 079200 "Joint Sealants."

G. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.8 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

B. Wash adjacent woodwork and other nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.9 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.

B. Notify inspectors in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors and Architect's Project representatives have had reasonable opportunity to make inspections of work areas at lift device or scaffold location.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete block.

B. Clay facing brick.

C. Mortar and grout.

D. Reinforcement and anchorage.

E. Flashings.

F. Lintels.

G. Accessories.

1.2 SUBMITTALS

A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar and masonry accessories.

B. Samples for Verification: For each type and color of the following:

1. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

D. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

1. Masonry units.

a. Include material test reports and certifications substantiating compliance with requirements.

b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.

c. For exposed brick, include material test report for efflorescence according to ASTM C 67.

d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Cementitious materials. Include brand, type, and name of manufacturer.

3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

4. Grout mixes. Include description of type and proportions of ingredients.

5. Reinforcing bars.

6. Joint reinforcement.

7. Anchors, ties, and metal accessories.

E. Shop Drawings:

1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.

2. Fabricated Flashing: Detail inside/outside corner units, sill and head conditions; end-dam conditions; base-of-wall, lintel and low roof-to-wall conditions; and other special applications.

F. Mix Designs: For each type of mortar and grout.

1. Include description of type and proportions of ingredients.

2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

G. Coordinate with Construction Waste Management requirements.

H. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

I. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with hot-weather requirements.

1.3 QUALITY ASSURANCE

A. Masonry Contractor Qualification:

1. Engage a trade contractor with at least 10 years' experience in masonry construction of type and scope included in the construction documents.

2. Demonstrate experience by submitting to the Owner a list of at least 10 masonry projects of similar size, complexity and scope.

3. Submit resumes of all key personnel that will be assigned to the Project; dedicate assigned personnel to the Project for the entire scope of Work.

B. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of Contract Documents.

1. Maintain one copy of each document on project site.

C. Fire-Resistance Ratings: Where indicated, provide materials identical to those assemblies with fire-resistance ratings conforming to the Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies, ACI 216.1-97/TMS-0216-07, National Concrete Masonry Association TEK 7-1A, and ASTM E-119, and acceptable to authorities having jurisdiction.

1. Certification of concrete masonry units for fire ratings must be provided by the National Concrete Masonry Association or qualified independent testing agency.

2. Provide Letter of Certification for aggregates used in mix design assuring compliance with ASTM C 33 and ASTM C 331.

3. Provide mix design and determined equivalent thickness, for units incorporating recycled content materials.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Store masonry units, cementitious materials, and preblended, dry mortar mix 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, securly tied. If units become wet, do not install until they are dry.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Protection of Masonry: 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.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Where 1 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.

3. Verify masonry protection at end of each day; inadequate protection by the trade contractor to be corrected or replaced by the Contractor, for proper protection; costs incurred by the Contractor is not the Owner's responsibility, but may be recovered under agreement with trade contractor.

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. Stain Prevention: 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.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. 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 and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:

1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.

2. Special Shapes:

a. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

b. Provide bullnose units for outside corners, unless otherwise indicated.

c. Bullnose units are not to be used at areas scheduled to be covered with tile.

3. Load-Bearing Units: ASTM C90, normal weight.

4. Non-Loadbearing Units: ASTM C129.

2.2 BRICK UNITS

A. Manufacturers:

1. Match to existing pending approval of Owner; refer to Section 04 01 20 for additional requirements.
2. Samples are to be provided for Owner review and acceptance as match to existing.
3. For brick site walls, brick must be cut to shape curve.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.

B. Packaged blend of portland cement complying with ASTM C 150, Type II/I or Type III, and hydrated lime.

1. Not more than 0.60 percent alkali.
2. Hydrated Lime: ASTM C207, Type S.
3. Mortar Aggregate: ASTM C144.
4. Grout Aggregate: ASTM C404.

C. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.

1. Color(s): As selected by Architect from manufacturer's full range.
2. Manufacturers:
   a. Davis Colors, a division of Venator Materials PLC: www.daviscolors.com/#sle.
   b. Lambert Corporation: www.lambertusa.com.
   c. Solomon Colors: www.solomoncolors.com.
   d. Lehigh Cement Company.

D. Admixtures: Permitted for cold- and hot-weather masonry work as permitted by referenced standards; non-chloride types.

E. Water: Clean and potable.

2.4 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:

1. Hohmann & Barnard, Inc: www.h-b.com.
2. AA Wire Products Co.
3. Dur-O-Wal: www.dur-o-wal.com.
4. Heckman Building Products, Inc.
5. WIRE-BONDwww.wirebond.com.
6. National Wire Products Industries.

B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.

1. Recycled Content: Provide steel with minimum 90 percent total recycled content, including at least 60 percent post-consumer recycled content.
2. Regional Materials: Provide at least 75 percent of steel manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

C. Single Wythe Joint Reinforcement: ASTM A951/A951M.

1. Type: Ladder.
2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

D. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.

1. Type: Ladder, with adjustable ties or tabs spaced at 16 in on center.
2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
3. Size: 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inchwire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
4. Vertical adjustment: Not less than 2 inches.
5. Fabricate so that loops are located at face of continuous insulation.
6. Insulation Clips: Provide clips at tabs or ties designed to secure continuous insulation in contact with backup construction.
7. Manufacturers:
   a. Hohmann & Barnard, Inc.; Product 280 Dub'l Loop-Lok Ladder with Byna Lok Wire Tie and Loop-Lok Washer: www.h-b.com.
   b. WIRE-BOND; Product Ladder Adjustable Double Loop Tie with Lock Washers; www.wirebond.com.

E. Joint Reinforcement - General:

1. Provide in lengths of not less than 10 feet.
2. Provide with prefabricated corner and tee units of same design type, wire thickness and finish as adjoining joint reinforcement.

F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.

1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

G. Masonry Veneer Anchors: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood studs, and as follows:

1. Anchor plates: Designed for fastening to structural backup through sheathing by two fasteners.
   a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
   b. Fabricate sheet metal anchor sections and other sheet metal parts from minimum 14 gage, steel sheet, galvanized after fabrication.
2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.

3. Vertical adjustment: Not less than 3-1/2 inches.
4. Manufacturers:
    a. Hohmann & Barnard, Inc.; BL-407 Anchor with Wedge-Lok Insulation Washer.
    b. Construction Tie Products; CTP Veneer Anchoring System with CTP Insulation Retainer Plate.
    c. Wire Bond; 2407 Adjustable Veneer Anchor with insulation Lock Washer.
5. Organic-Polymer-Coated, Steel Drill Screws:
    a. Dril-Flex; Elco Industries, Inc.
    b. Traxx; ITW-Buildex.
    c. Triangle Fastener Company.

H. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Screw-Attached Masonry-Veneer Anchor for Concrete: Screw with alternating threads, sealing washer and flanged head with eye for wire tie, designed for insertion into concrete in pre-drilled holes. Provide barrel length to match thickness of insulation.
    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
        1) Heckmann Building Products Inc.; Pos-I-Tie with Triangle Wire Tie. (Basis-of-Design)
        2) Hohmann & Barnard, Inc.; 2-Seal Concrete Anchor with 2-Seal Byna-Lok Wire Tie.
        3) Wire-Bond; Tapcon Sure-Tie for Concrete and Wood.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
3. Insulation Retainer: Heckman Thermal-Grip Brick Tie Washer or equivalent of other named manufacturers and accepted by continuous insulation manufacturer instead of installation pins.

I. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by ¼ inch thick by 24 inches long, with ends turned up 2 inches unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

J. Reinforcing Bar Positioners:
1. Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells, or as indicated on Drawings. 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. Provide units at all reinforced walls.
2. Manufacturers:
    a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
    b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
    c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
    d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

K. Reinforcing Bar Couplers:

1. Mechanical splice connectors capable of developing intension or compression at least 125 percent of the specified yield strength of the bar.

2. Representative Product: BarSplice Products, Inc., Tapered Threaded Grip-Twist Series.

2.5 FLASHINGS

A. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304, ASTM A167 stainless steel sheet bonded on one side to one sheet of polymer fabric.

1. Manufacturers:

a. Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: www.h-b.com/#sle.

b. York Manufacturing, Inc; Multi-Flash SS: www.yorkmfg.com/#sle.

c. Illinois Products, Inc.; IPCO Stainless Steel Fabric Flashing.

d. Prosoco, Inc.; R-Guard SS ThruWall

e. STS Coatings, Inc.; Gorilla Flash Stainless Fabric

f. TK Products, Inc.; TK TWF

2. Primer: Manufacturers standard product recommended for the application

3. Performance Requirements:

a. Tensile Strength: ASTM D412 Die; 100,000.

b. Puncture Resistance: ASTM E154; minimum 2,500 psi.

c. Membrane Thickness: .004 in.

d. Stainless Steel Thickness: .003 in.

e. Stainless Steel Type: Type 304.

4. Accessories (Basis-of-Design):

a. Mastic/sealant: Basis-of-Design: York Manufacturing, Inc.; UniverSeal US100.

1) Type: One part 100% solids, solvent-free formulated silyl-terminated polyether (STPE), ASTM C920-11, Type S, Grade NS, Class 50.

b. Outside corner and inside corner material; manufacturer’s standard available units using:

1) Stainless steel: 26 gauge stainless steel.

2) Sealed watertight.

c. End Dam: Flashing manufacturers preformed end dams or shop fabricated units using:

1) Stainless steel: 26 gauge stainless steel.

2) Sealed watertight.

d. Splice material: Basis-of-Design: York 304 SS by York; manufacturer’s standard self-adhered metal material; material matching system material or use Multi-Flash Stainless Steel 6” lap piece and polyether sealant as a splice.

e. Termination Bar: Basis-of-Design: York T-96 termination bar; manufacturer's standard 1" composite material bar or a 1” 26 gauge stainless steel termination bar with sealant lip.

f. Weep vent protection: Basis-of-Design: York's Weep Armor; geotextile drainage fabric at least 12" in height.

g. Repair and other materials/accessories: Manufacturer's standard.

h. Fasteners: Domestic manufactured fastener types and sizes recommended by flashing manufacturer for intended use.

5. Flexible Stainless Steel Drainage Plane Flashing:

a. Product: Flash-Vent Stainless Steel by York, complete with sealants, termination bars, splice material, stainless steel corners.

b. Characteristics:

1) Provides continuous weep vent.

(a) Selection of this option allows contractor to eliminate separate cavity drainage material; weep vent inserts in brick head joints are still required.

2) Fire Resistant: Passes ASTM E84, Class A.

6. Flexible flashing will not extend beyond face of mortar joint at any time; where drip is indicated, drip to be provided by use of stainless steel drip plates.

B. Stainless Steel Drip Plates:

1. Provide at flexible flashing locations, as indicated.

2. Material: Minimum 26 gage stainless steel.

3. Profile:

a. Provide with closed hemmed drip edge to extend past face of wall.

b. Provide vertical leg extending up backup wall minimum 2 inches.

c. Provide pitch in drip plate as indicated on Drawings.

d. Provide shop fabricated and welded inside and outside corner.

e. At lip brick profiles, match profile with step in drip plate.

4. Flexible flashing will cover drip plate; cut flush with face of mortar joint.

5. Provide 1/8 inch thick sealant tape between drip plate and steel structural member.

6. Bond flexible flashing to drip plate as recommended by flexible flashing manufacturer; product selection to ensure against adhesive drool beyond face of brick.

7. Backer rod and sealant to be provided under drip edge per Division 7, at locations protecting steel.

C. Drip Plate Fasteners - CMU Backup: Use low-velocity powder actuated ballistic point fastener with pre-mounted washer; submit ICC-ES Evaluation Report under product data submittals indicating fastener selection appropriate for intended use.

D. Drip Plate Fasteners - Stud Backup: Corrosion-resistant screws located at every stud line.

E. Self-adhering Flashing Seam Tape:

1. Sheet Material: 40 mil membrane with DuPont Elvaloy Kee; pressure sensitive clear adhesive for full bond to stainless steel drip plate and backup construction.

2. Conforms to ASTM D412, ASTM D2240, ASTM D624 Die C, and ASTM G154.

3. Basis-of-Design Product: Flex-Flash 8-inch wide roll by Hohmann & Barnard, Inc.

2.6 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

1. Sizing: Select product designed for 8- or 10-inch concrete masonry unit, extending depth of unit and providing sealant backup; sizing to eliminate need for backer rods.

B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to fully fill depth of air space, and designed to prevent mortar droppings from clogging cavity vents and allow proper cavity drainage.

1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.

a. Manufacturers:

1) Advanced Building Products, Inc; Mortar Break DT: www.advancedbuildingproducts.com/#sle.

2) Mortar Net Solutions: www.mortarnet.com/#sle.

3) York Manufacturing, Inc; Weep-Net: www.yorkmfg.com/#sle.

4) Keene Building Products; Product Keenestone Cut 2".

5) Hohmann and Barnard, Inc.; Product Mortar Trap.

C. Cavity Vents:

1. Type: Polyester mesh or cellular insect-resistant vents.

a. Locations: Flashing location at base of cavity wall construction.

2. Color(s): As selected by Architect from manufacturer's full range.

3. Manufacturers:

a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.

b. CavClear/Archovations, Inc: www.cavclear.com/#sle.

c. Dur-O-Wal: www.dur-o-wal.com.

d. Hohmann & Barnard, Inc: www.h-b.com/#sle.

e. Mortar Net Solutions: www.mortarnet.com/#sle.

f. WIRE-BOND: www.wirebond.com/#sle.

D. Cleaning Solution: Not harmful to masonry work or adjacent materials, as recommended by brick manufacturer.

E. Compressible Joint Filler: Closed cell neoprene sponge; neoprene/SBR polymer complying to ASTM D1056, Grade 2A-1.

1. Manufacturers:

a. Hohmann & Barnard, Inc.; Product NS: www.h-b.com.

b. Illinois Products Corporation; Product Neocell : www.illinoisproducts.com.

c. WIRE-BOND; Product Expansion Joint #3300: www.wirebond.com.

2.7 LINTELS

A. Concrete Lintels: Precast units made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars required to support loads indicated. Cure precast lintels by same method used for concrete masonry units.

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as required and filled with coarse grout.

Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.8 MORTAR AND GROUT MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.

1. Masonry below grade and in contact with earth: Type M.
2. Exterior, loadbearing masonry: Type S.
3. Exterior, brick veneer: Type N.
4. Interior, loadbearing masonry: Type N, except reinforced masonry to be Type S.
5. Interior, non-loadbearing masonry: Type O or Type N (Contractor's discretion).

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

3.4 INSTALLATION - GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Do not install cracked, broken or chipped masonry units for any location to be exposed in completed work; do not install cracked, broken or chipped masonry units exceeding ASTM allowances in work to remain concealed or within mechanical or electrical spaces.

E. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

G. Wetting of Brick: Wet brick before laying if 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 time of laying.

H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.

2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 46.

3.5 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Concrete Masonry Units:

1. Bond: Running.

2. Coursing: One unit and one mortar joint to equal 8 inches.

3. Mortar Joints: Concave.

E. Brick Units:

1. Bond: Match existing.

2. Mortar Joints: Match existing.

3.6 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

C. Remove excess mortar and mortar smears as work progresses.

D. Interlock intersections and external corners.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied or bitumen dampproofing is applied.

H. Pointing:

1. During the tooling of joints, enlarge voids and holes, and completely fill with mortar.
2. Point joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.
3. Prepare joints for sealant application, where indicated.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated and flexible anchors.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.7 CAVITY VENTS

A. Place cavity vents such as two consecutive vertical joints will include vent followed by a vertical joint without; repeat this placement for full length of application.

B. Install vents in contact with flashing, full-width of head joint and uninterrupted by mortar.

3.8 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug cavity vents.

B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking cavity vents.

3.9 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY AND CAVITY WALL MASONRY

A. General: Install 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.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

a. Reinforcement of this subparagraph 3 is in addition to continuous reinforcement.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated.
2. Keep open space free of mortar and other rigid materials.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Typical: Place masonry joint reinforcement in first and second horizontal joints above and below openings.

1. Extend minimum 16 inches each side of opening.

2. Modify placement where flashing occurs in joint; flashing takes precedent; joint reinforcement location adjusted as accepted by Architect.

B. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

C. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.11 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Extend flashings full width of openings and at least 4 inches into adjacent masonry at each end; turn up not less than 2 inches to form end dams.

2. Carry flashing across air space behind veneer and up face of backup construction at least 8 inches to form watertight pan; extend flashing into masonry backup minimum 1-3/4 inches; secure flashing at non-masonry construction with termination bar and seal.

3. Remove or cover protrusions or sharp edges that could puncture flashings.

4. Embed flashings in mortar joint; place flashing on sloping bed of fresh mortar and cover with fresh mortar

5. Seal lapped seams of stainless steel drip plates with self-adhering flashing seam tape; stop self-adhering flashing seam tape 3/8 inch of brick face and extend over turned up edge 3 inches onto backup construction; center tape on overlapping edge.

6. Seal lapped ends and penetrations of flashing with adhesive or sealant, as recommended by flashing manufacturer, before covering with mortar.

B. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

C. Lap end joints of flashings at least 6 inches and seal watertight as recommended by flashing manufacturer.

D. Cut flashing flush with face of mortar joint after masonry construction is complete and inspected.

3.12 GROUTED COMPONENTS

A. Lap splices minimum 64 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.13 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms 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.

2. 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 in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 48 inches.

3.14 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.15 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

E. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/8 inch, plus 1/8 inch.

3.17 CUTTING AND FITTING

A. Cut and fit for chases, pipes and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

3.18 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.

C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.

D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

1. Test three samples for each 5,000 square feet of wall or portion thereof; test one sample at 7 days and two at 28 days for each set.

3.19 REPAIRING WORK

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.

3.20 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.21 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

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SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members, support members and struts.

B. Base plates, embedded plates, and shear stud connectors.

C. Grouting under base plates.

1.2 REFERENCE STANDARDS

A. AISC (MANUAL) – Steel Construction Manual; American Institute of Steel Construction, Inc.

B. AISC S303 – Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.

C. AISC S348 – Specification for Structural Joints Using ASTM A325 or A490 Bolts.

D. ASTM A 36/A 36M – Standard Specification for Carbon Structural Steel.

E. ASTM A 53/A 53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.

F. ASTM A 108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

G. ASTM A 123/A 123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

H. ASTM A 153/A 153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

I. ASTM A 307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

J. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

K. ASTM A 490 – Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.

L. ASTM A 500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

M. ASTM A 501 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

N. ASTM A 563 – Standard Specification for Carbon and Alloy Steel Nuts.

O. ASTM A 992/A 992M – Standard Specification for Structural Steel Shapes.

P. ASTM C 1107/C 1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).

Q. ASTM E 94 – Standard Guide for Radiographic Examination.

R. ASTM E164 – Standard Practice for Ultrasonic Contact Examination of Weldments.

S. ASTM E 165 – Standard Test Method for Liquid Penetrant Examination.

T. ASTM E 709 – Standard Guide for Magnetic Particle Examination.

U. ASTM F 436 – Standard Specification for Hardened Steel Washers.

V. ASTM F 959 – Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.

W. ASTM F 1554 – Standard Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Yield Strength.

X. AWS A2.4 – Standard Symbols for Welding, Brazing, and Non-Destructive Examination.

1. American Welding Society.

Y. AWS D1.1/D1.1M – Structural Welding Code – Steel; American Welding Society.

Z. IBC 2015 – International Building Code.

1.3 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Indicate profiles, sizes, spacing, and locations of structural members.

2. Include details of cuts, openings, attachments, fasteners, splices and camber.

3. Detail all connections.

a. Indicate pre-tensioned and slip-critical high-strength bolted connections.

b. Indicate welded connections with AWS welding symbols. Include type, size and length.

c. Indicate all AWS weld designations for pre-qualified full and partial penetration welds and detail all joint preparations.

4. Provide erection details for all field welded connections.

5. For structural-steel connections indicated to comply with design loads, connections and structural analysis data shall be signed and sealed by the qualified professional engineer registered in the State of Maryland responsible for their preparation.

C. AISC certification for fabricator and erector.

D. Mill Test Reports: Signed by manufacturer certifying that the product complies with specified requirements. Indicate structural strength, destructive test analysis and non-destructive test analysis.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

F. Quality control test reports for shop and field including ultrasonic test results.

1. Submit certification by a Professional Engineer registered in the State of Maryland that all joint preparation for complete joint penetration welds meet AISC requirements and that all welding procedure specification requirements have been met.

1.4 QUALITY ASSURANCE

A. Structural steel shall be domestic origin, produced and supplied from the United States of America only.

B. Fabricate structural steel members in accordance with AISC “Steel Construction Manual” and AISC “Code of Standard Practice for Steel Buildings and Bridges”.

C. Comply with Section 10 of AISC “Code of Standard Practice for Steel Buildings and Bridges” for architecturally exposed structural steel.

D. Welding: Comply with AWS D1.1, “Structural Welding Code-Steel” for procedures, tolerances, appearance and quality.

E. Fabricator: Engage a firm experienced in fabricating structural steel similar to that indicated for this project and within 15 percent this project size, with a record of successful in-service

performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.

1. Provide documentation that fabricator has provided material for and erected at least 3 projects within 15 percent of project size and complexity, in the last six years.
2. Allow the Owner's representative to visit the fabrication plant as required to inspect in place quality control procedures and structural steel fabrication.
3. Fabricators who are not an AISC Certified Building Fabricator (BU), shall meet the following additional requirements:
    a. Demonstrate that the fabricator has in place a quality control program for meeting IBC requirements and compliance with AISC recommendations and standards.
    b. At no additional cost to the Owner, provide an independent shop inspection for compliance with IBC, AISC and AWS recommendations and standards. The independent inspection agency shall be different than the testing agency engaged by the Owner.
    c. Shop inspection tasks required by AISC 360 to be performed by the fabricator's quality control personnel, shall be overseen by the independent inspector hired by the fabricator.
    d. At completion of fabrication, and prior to erecting steel, submit a certificate of compliance signed and sealed by the third party inspector, stating that the steel fabrication complies with the requirements of the construction documents.
    e. Shop drawings shall be signed and sealed by a professional engineer, registered in the local jurisdiction, responsible for the design of the connections. The professional engineer shall carry a minimum of $1,000,000.00 of professional liability insurance.
    f. The steel fabricator shall provide field repair details, along with computations, for all required field modifications. The details and calculations shall be signed and sealed by the same professional engineer that certified the shop drawings.

F. Erector: Engage a firm experienced in erecting structural steel similar to that indicated for the project and within 15 percent of this project size, with a record of successful in-service performance.
1. Erectors who are not an AISC Certified Steel Erector (CSE) shall meet the following additional requirements:
    a. Provide an erection procedure safety document with cover letter, signed and sealed by a professional engineer registered in the State of Maryland, that states the document has been reviewed and is in conformance with erection procedures required by AISC.
2. Provide documentation that the erector has erected at least 3 projects within 15 percent of project size and complexity in the last six years.

G. Design connections not detailed on the drawings under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Maryland.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off the ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

2. Do not store materials on structure in a manner that might cause deterioration, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 COORDINATION

A. 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

2.1 MATERIALS

A. Steel angles, Channels and Plates: ASTM A 36/A 36M. ASTM A 572 where plate is noted on plans to have a yield strength of 50 ksi.

B. Steel W Shapes and Tees: ASTM A 992/A 992M.

C. Cold-Formed Structural Tubing: ASTM A 500, Grade C.

D. Pipe: ASTM A 53/A 53M, Grade B, Finish black.

E. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars. Headed stud type.

F. Rods: ASTM A 36/A 36M.

G. Structural Bolts and Nuts: Carbon steel, ASTM A 307, Grade A.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM A 325, with matching ASTM A 563 nuts and ASTM F 436 washers; Type 1, medium carbon, plain. Bolts and nuts shall be heavy hex.

I. High Strength Structural Bolts: ASTM A 490, with matching ASTM A 563 nuts and ASTM F 436 washers; Type 1 alloy steel. Bolts and nuts shall be heavy hex.

J. Anchor Rods: ASTM F 1554, Grade 36, plain, with matching ASTM A 563 nuts and ASTM F 436 washers.

K. Load Indicator Washers: Provide washers complying with ASTM F 959 at all connections requiring pre-tensioned high-strength bolts.

L. Welding Materials: AWS D1.1; type required for materials being welded.

M. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107/C 1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

N. Shop and Touch-Up Primer: Type specified in Section 09 91 20, complying with VOC limitations of authorities having jurisdiction.

O. Touch-Up Primer for Galvanized Surfaces: Fabricator’s standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Shop fabricate to the greatest extent possible.

B. Develop required camber for members.

C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements of AWS D1.1.

D. Bolt Holes: Drill or punch standard bolt holes perpendicular to metal surfaces.

E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

2.3 FINISH

A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted with slip-critical connections.

B. Surface preparation: SSPC-SP2: "Hand Tool Cleaning" or SSPC-SP3, "Power Tool Cleaning".

1. Refer to Division 9 for preparation of surfaces that are to receive coatings other than shop primer.

C. Provide a dry film thickness of not less than 1.5 mil.

D. Galvanize structural steel members to comply with ASTM A 123/A 123M. Provide minimum 1.7 oz/sq ft. galvanized coating. Galvanize shelf angles, lintels and hung plates located in exterior walls. Galvanize all exterior steel.

2.4 SOURCE QUALITY CONTROL

A. An independent testing agency will perform source quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special inspections noted in the structural drawings.

B. High-Strength Bolts: Provide testing and verification of all shop-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".

1. Pre-tensioned and slip-critical bolts shall be installed using direct-tension-indicator washer method or twist-off type tension control bolt method.

C. Welded Connections: Visually inspect all shop-welded connections and test all full penetration welds using ultrasonic testing performed in accordance with ASTM E 164.

1. Inspect all joint preparations for complete joint penetration welds and verify compliance with welding procedure specification requirements.

PART 3 EXECUTION

3.1 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on shop drawings.

D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

E. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".

F. Do not field cut or alter structural members without the approval of the Architect.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete and surfaces that will be fireproofed. Repair damaged galvanized coatings with galvanized repair paint.

H. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.2 TOLERANCES

A. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges".

3.3 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special Inspections noted in the structural drawings.

B. High-Strength Bolts: Provide testing and verification of all field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".

1. Pre-tensioned and slip-critical bolts shall be installed using direct-tension-indicator washer method or twist-off type tension control bolt method.

C. Welded Connections: Visually inspect all field-welded connections and test all full penetration welds using ultrasonic testing performed in accordance with ASTM E 164.

1. Inspect all joint preparations for complete joint penetration welds and verify compliance with welding procedure specification requirements.

D. In addition to visual inspection, field-welded shear connectors shall be tested and inspected according to the requirements of AWS D1.1 for stud welding.

E. Correct deficiencies in work that inspections indicate does not comply with the specified requirements.

END OF SECTION

SECTION 05 12 13
ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes architecturally exposed structural-steel framing; exposed interior columns, beams and bracing for glass-enclosed elevator hoistway.

1. Requirements in Division 05 Section "Structural Steel Framing" also apply to AESS framing.

1.2 DEFINITIONS

A. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

1.3 SUBMITTALS

A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Include embedment drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections. Indicate orientation of bolt heads.

5. Indicate exposed surfaces and edges and surface preparation being used.

6. Indicate special tolerances and erection requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 PRODUCTS

2.1 STEEL MATERIALS

A. Comply with Section 05 12 00 for all steel materials.

2.2 PRIMER

A. Primer: Comply with Division 09 painting Sections.

2.3 FABRICATION

A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

B. Category AESS 3:

1. Comply with overall profile dimensions of AWS D1.1/D1.1M for welded built-up members. Keep appearance and quality of welds consistent. Maintain true alignment of members without warp exceeding specified tolerances.
2. Prepare surfaces according to Part 2 "Shop Priming" Article and SSPC-SP 6 (WAB)/NACE WAB-3.
3. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and eased edges.
4. Make intermittent welds appear continuous, using filler or additional welding.
5. Seal weld open ends of hollow structural sections with 3/8-inch (9.5-mm) closure plates.
6. Limit butt and plug weld projections to 1/16 inch (1.6 mm).
7. Install bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
8. Remove weld spatter, slivers, and similar surface discontinuities.
9. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or grinding, before cleaning, treating, and shop priming.
10. Grind tack welds smooth unless incorporated into final welds.
11. Remove backing and runoff tabs, and grind welds smooth.
12. Limit as-fabricated straightness tolerance to one-half that permitted for structural-steel materials in ANSI/AISC 303.
13. Limit as-fabricated curved structural steel tolerance to that permitted for structural-steel materials in ANSI/AISC 303.
14. Limit as-fabricated straightness tolerance of welded built-up members to one-half that permitted by AWS D1.1/D1.1M.
15. Conceal fabrication and erection markings from view in the completed structure.
16. Make welds uniform and smooth.
17. Cut out mill marks from mill material or hide these markings from view in the completed structure. Where neither method is possible, remove mill marks by grinding and filling surfaces as approved by Architect.
18. Grind butt and plug welds smooth or fill, removing weld splatter exposed to view.
19. Orient HSS seams as indicated or away from view.
20. Align and match abutting member cross sections.

21. At visible open joints of copes, miters, and cuts, maintain uniform clear gaps of 1/8 inch (3.2 mm). At closed joints, maintain uniform contact within 1/16 inch (1.6 mm).
22. Fabricate with exposed surfaces smooth, square, and of surface quality approved by Architect.

C. Erection marks, painted marks, and other marks are permitted on galvanized steel surfaces of completed structure.

D. Curved Members: Fabricate indicated members to curved shape by rolling to final shape in fabrication shop.

1. Distortion of webs, stems, outstanding flanges, and legs of angles shall not be visible from a distance of 20 feet under any lighting conditions.

E. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for AESS.

F. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.4 SHOP CONNECTIONS

A. Connection Preference: Shop connections shall be welded unless specifically indicated otherwise.

B. 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.

C. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
4. Provide continuous welds of uniform size and profile where AESS is welded.
5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch for AESS.
6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
7. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
8. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.

2.5 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.

2. Surfaces to be field welded.

3. Surfaces to be high-strength bolted with slip-critical connections.

4. Surfaces to receive sprayed fire-resistive materials.

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 as required for applied finish:

1. SSPC-SP 11, "Power Tool Cleaning to Bare Metal" or;

2. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

C. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

3.3 ERECTION

A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.

B. Do not use thermal cutting during erection.

C. In addition to ANSI/AISC 303, Section 10 requirements, comply with the following.

1. Erection of Category AESS 3:

a. Erect AESS to the standard frame tolerances specified in ANSI/AISC 303 for non-AESS.

b. Comply with AWS D1.1/D1.1M. Keep appearance and quality of welds consistent. Maintain true alignment of members without warp exceeding specified tolerances.

c. Remove weld spatter, slivers, and similar surface discontinuities.

d. Grind off butt and plug weld projections larger than 1/16 inch (1.6 mm).

e. Continuous welds shall be of uniform size and profile.

f. Ream holes that must be enlarged. Use of drift pins or burning is not permitted. Replace misaligned connection plates where holes cannot be aligned with acceptable appearance.

g. Splice members only where indicated on Drawings.

h. No torch cutting or field fabrication is permitted.

i. Weld profiles, quality, and finish shall be as approved by Architect.

j. Make joint welds, including tack welds, appear continuous by filling intermittent welds.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

2. Orient bolt heads as indicated on Drawings.

B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.

1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.

2. Remove erection bolts in AESS, fill holes, and grind smooth.

3. Fill weld access holes in AESS and grind smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Division 05 Section "Structural Steel Framing." The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.

B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.

B. 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.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning, unless a more stringent finishing method is required for applied finish.

END OF SECTION

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SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Architecturally exposed roof deck, elevator shaft.

B. Composite floor deck.

C. Supplementary framing for openings up to and including 12 inches.

D. Bearing plates and angles.

E. Stud shear connectors.

1.2 REFERENCE STANDARDS

A. ASTM A 36/A 36M – Standard Specification for Carbon Structural Steel.

B. ASTM A 108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

C. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A 1008/A 1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened.

E. AWS D1.1/D1.1M – Structural Welding Code – Steel; American Welding Society.

F. AWS D1.3 – Structural Welding Code – Sheet Steel, American Welding Society.

G. SDI (DM) – Publication No. 31, Design Manual for Composite Decks, and Roof Decks; Steel Deck Institute.

H. SSPC-Paint 20 – Zinc-Rich Primers (Type I, “Inorganic”, and Type II “Organic”); The Society for Protective Coatings.

1.3 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements, for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, anchorage details, projections, openings, reinforcement, pertinent details, and accessories.

C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

D. Certificates: Certify that products furnished meet or exceed specified requirements.

E. Welders Certificates: Certify welders employed on the Work are certified to perform welding according to AWS requirements with AWS 1.3 qualification within the previous twelve months.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this Section with minimum of 5 years of documented experience.

1.5 DELIVERY, STORAGE AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers, slope for positive drainage.

PART 2 PRODUCTS

2.1 STEEL DECK

A. Roof Deck: Non-composite type, 2” dovetail.

1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), with G60/Z180 galvanized coating.

a. Grade 33.

b. Painted.

B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete.

1. Galvanized Steel Sheet: ASTM A 653/A 653M, Designation SS, with G60/Z180 galvanized coating.

a. Grade 50.

2.2 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A 36/A 36M steel.

B. Stud Shear Connectors: Made from ASTM A 108/A 108M Grade 1015 bars.

C. Welding Materials: AWS D1.1.

D. Fasteners: Galvanized hardened steel, self tapping screws, No. 10 minimum.

E. Weld Washers: Mild steel, uncoated, ¾ inch outside diameter, 1/8 inch thick.

F. Shop and Touch-Up Primer: Type specified in Section 09 91 20, complying with VOC limitations of authorities having jurisdiction.

G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

H. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.3 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage minimum thick sheet steel; of profile and size as indicated; material and finish same as deck.

B. Cant Strips: Formed sheet steel, 16 gage thick, 45 degree slope, 3½ inch nominal width and height, flange for attachment.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer’s instructions. Align and level.

B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before permanently fastening.

C. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck and support of other work.

D. Weld deck in accordance with AWS D1.3.

E. Where deck changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.

F. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

G. At openings between deck and walls, and openings, provide sheet steel closures and angle flashings to close openings.

H. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.

I. Place metal cant strips in position and field weld.

J. Weld stud shear connectors through steel deck to structural members below.

K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.3 ROOF DECK INSTALLATION

A. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1½ inches long, and as follows:

1. Weld Diameter: 3/4 inch, nominal.

2. Weld Spacing: Weld edge ribs of panel at each support; space additional welds at 12” o.c. and as indicated on Drawings.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 36 inches, and as indicated on Drawings.

1. Mechanically fasten with self-drilling, No.10 diameter or larger, carbon-steel screws.

2. Fasten with a minimum of 1½ inch-long welds.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1½ inches, with end joints lapped 2 inches minimum.

3.4 FLOOR DECK INSTALLATION

A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: 3/4 inch, nominal.

2. Weld Spacing: Weld edge ribs of panel at each support and at 12” on center.

B. Side-lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches, and as indicated on Drawings.

1. Fasten with a minimum of 1½ inch long welds.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1½ inches, with end joints butted.

3.5 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section1705.2 of the 2015 IBC Code and the Statement of Special Inspections noted in the structural drawings.

B. Inspection shall include, but not be limited to, deck alignment, support, welds, side lap attachments and touch-up galvanizing.

C. Remove and replace work that does not comply with specified requirements.

END OF SECTION

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SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rough hardware.

B. Loose bearing and leveling plates.

C. Loose steel lintels.

D. Shelf angles.

E. Steel framing and supports for mechanical and electrical equipment.

F. Steel framing and supports for applications where framing and supports are not specified in other Sections.

G. Welded steel rod or wrought iron window well grates, with means of locking and securing entry into building.

H. Ornamental railing systems.

I. Guards on all elevator beams other than hoist beam.

1. Minimum 14 gage.

2. Factory primed and field painted.

3. Bent to shapes indicated on Drawings.

4. Secured to horizontal steel tubes.

J. Shrouds enclosing three sides of elevator cab.

1. #4 satin stainless steel (304 alloy) flat vertical panels screwed to elevator cab shell and platform, covering sides and rear of cab. Extend above to hide HVAC unit sitting on top of cab, and below to cover bottom of cab platform. Abut guide rails. See drawings.
2. Contact: Scott Turner, Elevator Modernization Co., Inc. 240-455-0431, 301-502-3899 (direct). STurner@emcoelevator.com

1.2 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

F. AWS D1.1/D1.1M - Structural Welding Code - Steel.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, registered in the State of Maryland, using performance requirements and design indicated.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the metal type.

C. Structural Performance: Railings must withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:
    a. Uniform load of 50 lbf/ ft.applied in any direction.
    b. Concentrated load of 200 lbfapplied in any direction.
    c. Uniform and concentrated loads need not be assumed to act concurrently.
2. Infill of Guards:
    a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
    b. Infill load and other loads need not be assumed to act concurrently.
3. Horizontal Infill Components: Engineering of spans and selection of tube weights must account for deflection of above loading or a downward concentrated load applied at any point to resist permanent set deflection.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.

B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel," AWS D1.2 "Structural Welding Code--Aluminum," and AWS D1.3 "Structural Welding Code--Sheet Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 SUBMITTALS

A. Shop drawings detailing 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.

1. For installed products indicated to comply with design loads include structural analysis data and shop drawings signed by the qualified professional engineer responsible for their preparation.

B. Samples representative of materials and finished products as may be requested by Architect.

C. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.

E. Qualification data for professional engineer responsible for designing fabrications indicated to comply with specific design loads.

F. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer in the State of Maryland responsible for their preparation.

1.6 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate

construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Metal Surfaces, General:

1. For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes.

2. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

3. Recycled Content: Provide steel with minimum 30 percent total recycled content, 25 percent shall be post-consumer recycled content.

4. Regional Materials: Provide steel manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

5. Domestic Origin: Provide steel manufactured in the United States of America.

B. Steel Sections: ASTM A36/A36M.

C. Steel Tubing: Product type (manufacturing method) and as follows:

1. Cold-Formed Steel Tubing: ASTM A 500.

2. Hot-Formed Steel Tubing: ASTM A 501.

a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.

D. Plates: ASTM A283/A283M.

E. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.

1. Galvanized finish for exterior installations and where indicated.

2. Black finish elsewhere, unless otherwise indicated.

F. Gray-Iron Castings: ASTM A 48, Class 30.

G. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).

H. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.2 MATERIALS - ALUMINUM

A. General:

1. Recycled Content: Give preference to aluminum with the highest recycled content feasible.

2. Regional Materials: Give preference to aluminum manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

B. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632 (ASTM B 632M) Pattern 1, alloy 6061-T6.

2.3 PAINT

A. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with SSPC-Paint 20.

B. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.4 FASTENERS

A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.

C. Machine Screws: ANSI B18.6.3.

D. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).

E. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).

F. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.

G. 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 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 agency.

1. Material - General: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material - Exposed exterior or in contract with ground: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 (ASTM F 738M) and ASTM F 594 (ASTM F 836M).

H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.5 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1. Construction Grout; W. R. Bonsal Co.

2. Sure-grip High Performance Grout; Dayton Superior Corp.

3. Euco N-S Grout; Euclid Chemical Co.

4. Crystex; L & M Construction Chemicals, Inc.

5. Masterflow 928 and 713; Master Builders Technologies, Inc.

6. Sealtight 588 Grout; W. R. Meadows, Inc.

7. Sonogrout 14; Sonneborn Building Products--ChemRex, Inc.

2.6 FABRICATION

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 120 deg F.

D. Shear and punch metals cleanly and accurately; remove burrs.

E. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Remove sharp or rough areas on exposed traffic surfaces.

G. 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 that no roughness shows after finishing, and contour of welded surface matches those adjacent.

H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

I. 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.

J. 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.

K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

M. Fabricate items with joints tightly fitted and secured.

N. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

O. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.7 ROUGH HARDWARE

A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.8 LOOSE STEEL LINTELS

A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

B. Weld adjoining members together to form a single unit where indicated.

C. Size loose lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.

D. Hot dip galvanize loose steel lintels located in exterior walls.

2.9 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.

B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Equip units with integrally welded anchors; furnish inserts if units must be installed after concrete is placed.

a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.

C. Galvanize miscellaneous framing and supports in the following locations:

1. Exterior locations.

2. Interior locations where indicated.

2.11 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.

B. Provide cutouts, fittings, and anchorages as required 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 o.c., unless otherwise indicated.

C. Galvanize miscellaneous steel trim in the following locations:

1. Exterior locations.

2. Interior locations where indicated.

2.12 WELDED STEEL ROD OR WROUGHT IRON WINDOW WELL GRATES

A. Welded angle frame with bar infill; powder coated finish.

B. Design to provide means of locking.

2.13 ORNAMENTAL RAILING SYSTEMS

A. Ornamental Railings at all stairs See drawings A5.1-A5.5 for stair and railing details; painted railings where indicated.

B. Interior Stair:

1. Handrail:

a. Julius Blum 1-1/2 round iron.

b. w/ Malleable Iron Channel 1-1/4 at underside of handrail; painted color to be determined.

c. w/ mounting brackets as req to mount to Guardrail; painted color to be determined.

2. Guard Rail:

a. Julius Blum 4535 (2 1/8) Bronze Guard Rail Cap.

b. w/ Malleable Iron Channel 1-1/4 at underside of handrail top and bottom to capture balusters; painted color to be determined.

c. w/ 1-1/4 x 1-1/4 malleable Iron Newel Posts at landings/ mid-section as required; painted color to be determined.

d. w/ 368 Cast Iron base at Newels; painted color to be determined.

e. w/ 3/4 x 1/2 malleable Iron balusters; painted color to be determined.

C. Exterior Stairs/ Rails:

1. Julius Blum 4535 (2 1/8) Malleable Iron Rail Cap, w/ coordinated beveled lambs tongue at top and bottom of stairs as required; painted color to be determined.

2. w/ Malleable Iron Channel 1 1/2 at underside of handrail top and bottom to capture balusters; painted color to be determined

3. w/ 1 1/4 x 1 1/4 malleable Iron Newel Posts at landings/ mid-section as required; painted color to be determined

4. w/ 368 Cast Iron base at Newels; painted color to be determined.

5. w/ 3/4 x 1/2 malleable Iron balusters; painted color to be determined.

2.14 FINISHES - STEEL AND IRON

A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:

1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch (0.76 mm) thick or thicker.

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 "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 with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.

2.15 FINISHES - ALUMINUM

A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

B. Class I Natural Anodized Finish (unless indicated otherwise): AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.16 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. 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 the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

a. Weld Finish Standard: National Ornamental and Miscellaneous Metals Association (NOMMA) Finish #2 unless indicated otherwise.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.3 SETTING LOOSE PLATES

A. Clean concrete bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

B. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.

1. Use nonshrink, nonmetallic grout, unless otherwise indicated.

2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 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 same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a 2.0-mil (0.05-mm) minimum dry film thickness.

B. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

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SECTION 05 51 00
METAL STAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stairs with concrete treads.

B. Structural steel stair framing and supports.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.

C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (with March 2016 Errata).

E. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.4 SUBMITTALS

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

1. Must be prepared qualified engineer engaged by the manufacturer; structural analysis data and shop drawings to be signed and sealed by professional engineer licensed in the State of Maryland.

2. Include the design engineer's seal and signature on each sheet of shop drawings and cover sheet of calculations.

D. Welders' Certificates.

1.5 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design stair treads as a structural component of stair system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Uniform Load: 100 lbf/sq. ft.

2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.

3. Uniform and concentrated loads need not be assumed to act concurrently.

4. Limit deflection of treads, platforms, and framing members to L/240 typical; L/360 for precast treads; or 1/4 inch, whichever is less.

C. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.6 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of Maryland, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.1 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.

1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
3. Dimensions: As indicated on drawings.
4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
6. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:

1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
   a. Welded Joints: Continuously welded and ground smooth and flush.
   b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
   c. Exposed Edges and Corners: Eased to small uniform radius.
   d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.2 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Architectural, as defined above.

B. Risers: Formed metal; same material and thickness as tread pans.

C. Treads: Metal pan with field-installed concrete fill.

1. Concrete Depth: 1-1/2 inches, minimum.
2. Tread Pan Material: Steel sheet.
3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
4. Concrete Reinforcement: None.
5. Concrete Finish: Smooth troweled; polyurethane sealer.

D. Stringers: Rolled steel channels.

1. Stringer Depth: 12 inches unless greater is indicated on Drawings.
2. End Closure: Sheet steel of same thickness as risers welded across ends.

E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

F. Finish: Shop- or factory-prime painted.

G. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.3 MATERIALS

A. Recycled Content: Provide steel with at least 25 percent post-consumer recycled content.

B. Steel Sections: ASTM A 36/A 36M.

C. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.

1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).

2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).

D. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.

E. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.4 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime Painting: Use specified shop- and touch-up primer.

1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.

2. Number of Coats: One.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.3 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood framing.
2. Wood blocking.
3. Wood nailers.
4. Wood furring.
5. Wood grounds.
6. Wood sheathing.
7. Wood subflooring.
8. Building-wrap.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product indicated.

1. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.
2. Engineered wood products.
3. Sheathing.
4. Building wrap.
5. Metal framing anchors.
6. Construction adhesives.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.

C. Research/Evaluation Reports: For the following:

1. Treated wood.
2. Engineered wood products.
3. Metal framing anchors.
4. Power driven fasteners.

1.3 WARRANTY

A. Special Warranty

1. Special building-wrap manufacturer’s warranty for weather barrier assembly for a period of ten (10) years from the date of final weather barrier installation.
2. Approval by building-wrap manufacturer for warranty is required prior to assembly installation.

PART 2 PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end of back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, unless otherwise indicated.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable Design Stresses: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood) except that which is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX). ACQ treated lumber is not acceptable.

B. Kiln-dry material after treatment to maximum moisture content of 19 percent for lumber and 15 percent for plywood.

C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: 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, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 18 inches (460 mm) above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Current Evaluation/Research Reports: Provide fire-retardant-treated wood for which a current model code evaluation/research report exists that is acceptable to authorities having jurisdiction and that evidences compliance of fire-retardant-treated wood for application indicated.

B. Interior Type A: For interior locations use fire-retardant chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation.

1. No reduction takes place in bending strength, stiffness, and fastener holding capacities below values published by manufacturer of chemical formulation that are based on tests by a qualified independent testing laboratory of treated wood products identical to those

indicated for this Project under elevated temperature and humidity conditions simulating installed conditions.

2. No other form of degradation occurs due to acid hydrolysis or other causes related to manufacture and treatment.

3. No corrosion of metal fasteners results from their contact with treated wood.

C. Exterior type: Use for exterior locations and where indicated.

D. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

E. Available Products: Subject to compliance with requirements, fire-retardant-treated wood products that may be incorporated in the Work include, but are not limited to, the following:

1. Interior Type A Fire-Retardant-Treated Wood:

a. Dricon, Hickson Corporation.

b. Pyro-Guard, Hoover Treated Wood Products.

c. Flameproof LHC-HTT, Osmose Wood Preserving Co., Inc.

2. Exterior Type Fire-Retardant-Treated Wood:

a. Exterior Fire-X, Hoover Treated Wood Products.

2.4 DIMENSION LUMBER

A. General: Of grades indicated according to the American Lumber Standard Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Interior Partitions: Stud grade of the following species:

1. Spruce-pine-fir species, NLGA.

2. Per Structural Drawings.

C. Framing Other Than Non-Load- Bearing Partitions:

1. Per Structural Drawings.

D. Exposed Framing: Hand select material for uniformity of appearance and freedom from characteristics that would impair finish appearance.

1. Species and Grades: Southern pine, No. 1 grade; SPIB.

2.5 TIMBERS

A. For timbers of 5-inch nominal (117-mm actual) size and thicker, provide material complying with the following requirements:

1. Species and Grade: Hemlock-fir No. 2 or Spruce-pine-fir No. 1/No. 2 unless rated otherwise.

2. See structural drawings where higher stress lumber may be required.

3. Free of heart center.

2.6 BOARDS

A. Exposed Boards: Where boards will be exposed in the finished work, provide the following:

1. Moisture Content: 19 percent maximum, S-DRY or KD-19.

2. Where painted finish is indicated, provide No. 1 boards per SPIC rules, Select Merchantable Boards per WCLIB rules or No. 2 Common Boards and Better per WWPA rules.

B. Concealed Boards: Where boards will be concealed by other work, provide lumber of 19 percent maximum moisture content, S-DRY or KD-19, and of the following species and grade:

1. Southern Pine No. 2 Boards per SPIB rules, or any species graded Construction Boards or No. 3 Common per WCLIB or WWPA rules.

2. Southern Pine No. 2 Boards per SPIB rules, or any species graded Standard or No. 3 Common Boards per WCLIB or WWPA rules.

C. Board Sizes: Provide sizes indicated or, if not indicated (for sheathing, subflooring and similar uses), provide 1-inch by 8-inch boards.

2.7 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: Standard grade light-framing-size lumber of any species or board-size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 2 boards per SPIB rules.

2.8 ENGINEERED WOOD PRODUCTS

A. General: Provide engineered wood products for which current model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance for the application indicated with specified requirements and the building code in effect for this project.

B. Laminated-Veneer Lumber: Composite wood veneers with grain primarily parallel to member lengths, manufactured with exterior-type adhesive complying with ASTM D 2559. Allowable design values determined according to ASTM D 5456.

1. Allowable Design Stresses: As follows, determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

a. Extreme Fiber Stress in Bending (Fb): 2800 psi (for 12-inch deep members.

b. Modulus of Elasticity (E): 2,000,000 psi.

c. Tension Parallel to Grain (Ft): 1850 psi.

d. Compression Parallel to Grain (Fc): 2500 psi.

e. Compression Perpendicular to Grain: 400 psi and 500 psi perpendicular and parallel to glue line.

f. Horizontal Shear (Fv): 285 psi and 190 psi perpendicular and parallel to glue line.

2. Sizes: 1-3/4 inches thick by depth and length indicated.

C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1. Micro-LAM L.V.L. Headers and Beams, iLevel Corp., or approved equal.

2.9 CONSTRUCTION PANELS

A. Construction Panel Standards: Comply with PS 1 “U.S. Product Standard for Construction and Industrial Plywood” for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.

B. Trademark: Furnish construction panels that are each factory-marked with APA trademark evidencing compliance with grade requirements.

2.10 CONCEALED PERFORMANCE-RATED CONSTRUCTION PANELS

A. General: Where construction panels are indicated for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

B. Subflooring: APA Rated sheathing:

1. Exposure Durability Classification: EXTERIOR.

2. Exposure Durability Classification: EXPOSURE 1.

3. Span Rating: 32/16.

C. Wall Sheathing: APA Rated Sheathing or OSB Board Sheathing:

1. Exposure Durability Classification: EXPOSURE 1.

2. Span Rating: As required to suit stud spacing indicated.

D. Roof Sheathing: APA Rated Sheathing:

1. Exposure Durability Classification: EXPOSURE 1.

2. Span Rating: As required to suit rafter spacing indicated.

3. Span Rating: 32/16

2.11 CONSTRUCTION PANELS FOR BACKING

A. Plywood Backed Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade designation, APA C-D PLUGGED EXPOSURE 1, in thickness indicated, or, if not otherwise indicated, not less than 15/32 inch.

2.12 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements, specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.

B. Nails, Wire, Brads and Staples: FS FF-N-105.

C. Power Driven Fasteners: National Evaluation Report NER-272.

D. Wood Screws: ANSI B18.6.1.

E. Lag Bolts: ANSI B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.13 AIR INFILTRATION BARRIER

A. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV-stabilized; and acceptable to authorities having jurisdiction.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    a. DuPont (E.I. DuPont de Nemours and Company): Tyvek Commercial Wrap and related assembly components.
    b. Approved equal.

2.14 METAL FRAMING ANCHORS

A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
    1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this project.
    2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.
    3. Products:
        a. Simpson.
        b. USP.

B. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G60 and with ASTM A 446, Grade A (structural quality); ASTM A 526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.
    1. Use galvanized steel framing anchors for rough carpentry exposed to weather, in ground contact, or in areas of high relative humidity, and where indicated.

2.15 MISCELLANEOUS MATERIALS

A. Sill Sealer Gaskets: Glass fiber resilient insulation fabricated in strip form for use as a sill sealer; 1 inch nominal thickness compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated; in rolls of 50 feet or 100 feet in length.

B. 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 both adhesive and panel manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

C. Fit rough carpentry to other construction, scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view of will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

A. Install wood grounds, nailers, blocking and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

3.3 WOOD FURRING

A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.

1. Firestop furred spaces on walls at each floor level and at ceiling line of top story, with wood blocking or noncombustible materials, accurately fitted to close furred spaces.

B. Furring to Receive Plywood Paneling: Install 1-inch by 3-inch furring at 2 feet o.c., horizontally and vertically. Select furring for freedom from knots capable of producing bent-over nails and resulting damage to paneling.

C. Furring to Receive Gypsum Drywall: Install 1-inch by 2-inch furring at 16 inches o.c., vertically.

D. Suspended Furring: Install suspended furring members of size and spacing indicated, including hangers and attachment devices. Level to a tolerance of 1/8 inch in 10 feet, except ¼ inch in 10 feet for thick-coat plasterwork.

3.4 WOOD FRAMING, GENERAL

A. Framing Standard: Comply with AWC “Wood Frame Construction Manual (WFCM)”, unless otherwise indicated.

B. Framing with Engineered Wood Products: Install framing composed of engineered wood products to comply with manufacturer’s directions.

C. Install framing members of size and spacing indicated.

D. Anchor and nail as shown, and to comply with the following:

1. National Evaluation Report No. NER-272 for pneumatic or mechanical driven staples, P-Nails, and allied fasteners.

2. Published requirements of manufacturer of metal framing anchors.

3. “Recommended Nailing Schedule” of referenced framing standard and with ANSI/AWC National Design Specification (NDS) for Wood Construction with Commentary.

E. Do not splice structural members between supports.

F. Firestop concealed spaces of wood framed walls and partitions at each floor level and at the ceiling line of the top story. Where firestops are not automatically provided by the framing system used, use closely fitted wood blocks of nominal 2-inch thick lumber of the same width as framing members.

3.5 STUD FRAMING

A. General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Install single bottom plate and double top plates using 2-inch thick members whose widths equal that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction.

1. For exterior walls install wood studs as indicated on drawings.
2. For interior partitions and walls install wood studs as indicated on drawings.

B. Construct corners and intersections with not less than 3 studs. Install miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items, and trim.

1. Install continuous horizontal blocking row at mid-height of single-story partitions and at midpoint of multi-story partitions, using 2-inch thick members of same width as wall or partitions.

C. Frame openings with multiple studs and headers. Install nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

1. For nonbearing partitions, install double-jamb studs and headers not less than 4 inches (nominal) deep for openings 3 feet and less in width, and not less than 6 inches (nominal) deep for wider openings.
2. For load bearing partitions, install as shown in plans, or if not shown, install double jamb studs for openings 7 feet and less in width, and triple jamb studs for wider openings. Install headers of depth shown, or if not shown, as recommended by “AWC “Wood Frame Construction Manual (WFCM)”.

D. Install diagonal bracing in stud framing of exterior walls, except as otherwise indicated on contract documents. Brace both walls at each external corner, full story height, at a 45-degree angle, using either a let-in 1 by 4 or 2 x 4 blocking or metal diagonal bracing. Omit bracing where following types of sheathing are indicated.

1. Plywood sheathing with nailing as specified on structural plans.

3.6 FLOOR JOIST FRAMING

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1½ inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:

1. To wood bearing members by toenailing or metal framing anchors.
2. To wood supporting members with wood ledgers as shown, or if not shown, with metal joist hangers.

B. Frame openings with headers and trimmers supported by metal joist hangers; provide double headers and trimmers where span of header exceeds 4 feet.

C. Do not notch in middle third of joists; limit notches to 1/6-depth of joists at ends. Do not bore holes larger than ¼ depth of joist or locate closer than 2 inches from top or bottom. Install solid blocking (2 inches thick by depth of joist) at ends of joists unless nailed to header or bearing member.

D. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Install solid blocking (2 inches thick by depth of joist) over supports.

E. Anchor members paralleling masonry with ¼ inch by 1¼ inch metal strap anchors spaced not more than 8 feet o.c. Extend anchors at least 4 inches into masonry, turn up 4 inches and extend over and fasten to three joists.

F. Under jamb studs at openings, install solid blocking between joists.

G. Install bridging of type indicated between joists at intervals not to exceed 10’-0”.

1. Solid wood bridging 2 inches thick.

3.7 RAFTER AND CEILING JOIST FRAMING

A. Ceiling Joists: Install ceiling joists with crown up and to comply with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where principal ceiling joists are at right angles to rafters, frame as indicated with additional short joists from wall plate to first joist; nail to ends of rafters and to top plate and nail to long joists or anchor with framing anchors or metal straps. Install 1-by 8 or 2 by 4 stringers spaced 4 feet o.c. crosswise over principal ceiling joists.

B. Rafters: Notch to fit exterior wall places and toe nail to use special metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing (if any), and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, install valley rafter of size shown, twice the thickness of regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafter.

2. At hips, install hip rafters of size shown, or if not shown, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafters.

3.8 INSTALLATION OF CONSTRUCTION PANELS

A. General: Comply with applicable recommendations contained in Form No. E30, “APA Design/Construction Guide – Residential & Commercial”, for types of construction panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below.

1. Subflooring: Glue and nail to framing throughout.

2. Sheathing: Nail to framing.

3.9 EXTERIOR SHEATHING

A. General: Install OSB sheathing where shown. Fasten to exterior face of stud framing for exterior walls. Use 1½” long, 11 gage galvanized roofing nails with 3/8 inch head or 15 gage, divergent point galvanized staples ½” wide by 1½” long. Keep perimeter fasteners 3/8 inch from edges and ends of board units. Fit boards tightly against each other and around openings.

B. Install 4-foot by 8- foot or longer sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not bear against framing sills or plates. Nail or staple to each support to comply with manufacturer’s recommended spacing, but space fasteners not more than 4 inches o.c. around perimeter at edge and end supports and 7 inches o.c. at intermediate supports.

3.10 AIR INFILTRATION BARRIER (BUILDING WRAP)

A. Examination: Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

B. Installation:

1. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer’s recommendations.

2. Install weather barrier prior to installation of windows and doors.

3. Start weather barrier installation at building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

4. Install weather barrier in a horizontal manner starting at the lower partition of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

5. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
6. Window and Door Openings: Extend weather barrier over sill plate interface completely over openings.
7. Overlap weather barrier:
    a. Exterior corners: minimum 12 inches.
    b. Seams: minimum 6 inches.
8. Weather Barrier Attachment:
    a. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12-18 inches vertically on center along stud line, and 24 inches on center, maximum horizontally.

C. Seaming:
1. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
2. Seal any tears or cuts as recommended by weather barrier manufacturer.

D. Opening Preparation (for use with flanged windows):
1. Cut weather barrier in a modified “I-cut” pattern.
    a. Cut weather barrier horizontally along the bottom of the header.
    b. Cut weather barrier vertically 2/3 of the way down from the top center of window opening.
    c. Cut weather barrier diagonally from bottom center vertical cut to left and right corners of the opening.
    d. Fold side and bottom weather barrier flaps into window opening and fasten.
2. Cut a head flap at 45-deree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

E. Flashing (for use with flanged windows):
1. Cut 7-inch wide (at 2 x 4 framing) and 9-inch wide (at 2 x 6 framing) DuPontTM Flex WrapTM a minimum of 12 inches longer than width of sill rough opening.
2. Cover horizontal sill by overlapping DuPontTM Flex WrapTM edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
3. Fan DuPontTM Flex WrapTM at bottom corners into face of wall. Firmly press in place. Mechanically fasten fanned edges.
4. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
5. Install window according to manufacturer’s instructions.
6. Apply 4-inch wide strips of DuPontTM StraightFlashTM at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.

7. Apply 4-inch wide strip of DuPontTM StraightFlashTM as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

8. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPontTM StraightFlashTM over 45-degree seams.

9. Tape head flap in accordance with manufacturer's recommendations.

10. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

F. Field Quality Control

1. Notify manufacturer's designated representative to obtain (required) periodic observations of weather barrier assembly installation.

G. Protection:

1. Protect installed weather barrier from damage.

3.11 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspections shall include, but not be limited to, wood framing and sheathing for member plumbness, alignment, location and connections.

END OF SECTION

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SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Hardware.

C. Shop finishing.

D. Interior finish carpentry trims; fireplace mantle, beadboard, base cap and shoe.

1.2 DEFINITIONS

A. Work of this Section is typically referred as "Millwork" on the Drawings.

1.3 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).

1.4 SUBMITTALS

A. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, concealed blocking, accessory listings, hardware location and schedule of finishes.

B. Product Data: Provide data for hardware accessories.

C. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop and shelf unit substrate and finish.

D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards and locksets, demonstrating hardware design, quality, and finish.

1.5 QUALITY ASSURANCE

A. Quality Certification:

1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.

2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

3. Provide designated labels on shop drawings as required by certification program.

4. Provide designated labels on installed products as required by certification program.

5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

6. Replace, repair, or rework all work for which certification is refused.

B. Perform cabinet construction in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated as follows:

1. All Cabinets: Premium quality.

C. Manufacturer Qualifications: Member in good standing of the Architectural Woodwork Institute (AWI) or the Architectural Woodwork Manufacturers Association of Canada (AWMAC) and familiar with the AWI/AWMAC QSI.

1.6 PRE-INSTALLATION MEETING

A. Convene not less than one week before starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.8 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

1. Do not store or install materials until relative humidity is controlled and maintained between 25 and 55 percent.

PART 2 PRODUCTS

2.1 CABINETS

A. Quality Standard: in accordance with AWI/AWMAC/WI (AWS), AWI/AWMAC/WI (AWS), AWI/AWMAC/WI (AWS) or AWI/AWMAC/WI (AWS), unless noted otherwise.

2.2 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

B. Provide composite wood and agrifiber products manufactured with glues containing no added urea-formaldehyde.

2.3 LUMBER MATERIALS

A. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as follows:

1. Exposed Surfaces: Species Northern White Maple for running trim, including painted trim.

B. Exterior Locations - Bench and other locations indicated: Ipe.

C. Beadboard: 1 x 4 clear fir for painted finish.

2.4 PANEL MATERIALS

A. Veneer Faced Plywood Finish: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core of particleboard, medium density fiberboard, strawboard or engineered combination of core materials listed; type of glue recommended for specific application; thickness as required; face veneer as follows:

1. Exposed Surfaces: Grade AA, White Oak, rift cut, book-matched.

B. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

1. Density: 47-pound density or as required by the referenced standard, whichever is the more stringent.

C. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.

1. Use as backing for plastic laminate unless otherwise indicated.

D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels and other components indicated on drawings.

E. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.5 LAMINATE MATERIALS

A. Manufacturers:

1. Formica Corporation: www.formica.com/#sle.

2. Panolam Industries International, Inc; Nevamar: www.nevamar.com/#sle.

3. Wilsonart LLC: www.wilsonart.com/#sle.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:

1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color.

2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color.

3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color.

4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from laminate manufacturer's full range in solid colors, wood grains, and patterns, in matte finish.

2. Ten different colors may be selected by Architect for this Project.

2.6 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Edges - Plastic-Laminate Millwork:

1. Cabinet body leading edges and drawer box edging shall be flat edge 0.020 inch (0.51mm) polyvinylchloride (PVC), machine applied with hot melt adhesive.

2. Doors and drawer edges and front and rear shelf edges shall be edged with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.

3. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.

C. Fasteners: Size and type to suit application; stainless steel in applications exposed to weather and high-humidity conditions.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

E. Grommets for Cable Passage through Countertops: 2-1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "EDP series" by Doug Mockett and Co., Inc. or comparable product of Richelieu or Hafele.

2. Coordinate color with countertop; provide white with white countertops; black color elsewhere.

2.7 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Typical exposed hardware is oil rubbed bronze.

C. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9, unless otherwise indicated

D. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing, equivalent to the following:

1. Blumm No. 71 6580 with Plate 173H9100

2. Grass No. 3903VZ with mounting plate 10761
3. Hafele No. 329.07.654 with plate

E. Pulls - Basis-of-Design: Hafele No. 115.70.001; center to center 96mm.

F. Catches: Magnetic catches, BHMA A156.9, B03141, Grade 1, with clear anodized aluminum case and impregnated floating rubber magnet, zinc plated strike, slotted screw holes in case and off-center hole in strike, equivalent to No. SP41 or SP45 by Stanley Hardware, or approved equal.

G. Adjustable Shelf Standards and Supports - Utility, Supply and Concealed Locations:

1. BHMA A156.9, B04071; with shelf rests, B04081 for end-mounted cabinet shelving, equivalent to No. 255-256 by Knape and Vogt Manufacturing Co.
2. BHMA A156.9, B04102; with shelf brackets, B04112 for back-mounted wall shelving, equivalent to the following:
3. Heavy-duty:
    a. No. 87-187 by Knape and Vogt Manufacturing Co.; K&V No. 104-103 Series Back and Front Shelf.
    b. Universal Line by REEVE Store Equipment Co.
    c. CRL Series by C.R. Laurence Co. Inc.
4. Extra Heavy-duty:
    a. No. 85-185, Double-Slot by Knape and Vogt Manufacturing Co.
    b. Universal Line by REEVE Store Equipment Co.
    c. CRL Series by C.R. Laurence Co. Inc.

H. Shelf Standards and Brackets - Exposed: Continuous slotted extruded aluminum standard; surface-mounted.

1. Acceptable Product: RAKKS C-Standard by Rangine Corporation;T-Style Lab Support Bracket or angle bracket.
2. Load Capacity: 100 pounds per bracket.
3. Lengths: As indicated on Drawings.
4. Material: Extruded aluminum.
5. Bracket Quantity: As indicated on Drawings; provide one additional set of brackets for every five sets of brackets or portion thereof.

I. Shelf Rests - Millwork: Anti-tipping, two-pin type with shelf hold-down clip.

1. Material: Clear plastic.
2. Capacity: Heavy-duty; 300 lb load capacity per shelf.
3. Design: Double 5mm pins; shelf thickness 3/4-inch to 1 inch.
4. Products:
    a. Richelieu; Product T803 (Basis-of-Design)
    b. Bainbridge Manufacturing.
    c. Häfele America Co.

J. Drawer Slides: BHMA A156.9, B05111; Side-mounted, full-extension, all ball bearing zinc-plated steel drawer slides with hold-in detent, rated for indicated loads, and equivalent to the following:

1. Drawers 6-inches (152mm) or less in depth and up to 16-inches (406mm) in width:
    a. Model 3832SC, 100 lb./pr. (45kg) load rating, telescoping, self-closing movement, by Accuride International, or approved equal.

2. Drawers 6-inches (152 mm) or less in depth and up to 24-inches (610 mm) in width:
    a. Model 7432, 100 lb./pr. (45kg) load rating, progressive movement, by Accuride International, or approved equal.
3. Drawers over 6-inches (152mm) in depth and up to 42-inches (1067mm) in width:
    a. Model 3640, 200lb./pr. (90 kg) load rating, sequential movement, by Accuride International, or approved equal.

K. Plastic Slides for Sliding Glass Doors: BHMA A156.9, B07063, equivalent to Series 2412 Track and Upper Guides by Knape and Vogt Mfr. Co., or approved equal.

L. Door and Drawer Locks:
1. Door and Drawer Locks: Multi-function pin tumbler cam locks suitable for specific project applications. All brass construction with 26D-Dull Chrome finish, equivalent to "No. C8103 by National Lock Co.," or approved equal. Provide two stamped brass keys per lock. Locks to be capable of 850 key changes.

M. Casters:
1. Full rotation type, minimum of two locking per unit.
2. Zinc-plated double ball hardened raceways with 5/16-inch shouldered axle and 1/4-inch nut; 2-inch diameter rubber wheels.
3. Basis-of-Design Product: Subject to compliance with requirements, provide Colson Series 1 Caster.

N. Piano Hinges:
1. Material: Steel; polished nickel finish.
2. Open Width: 2 inches.
3. Gage: Minimum 0.04 inch.
4. Pin Diameter: Minimum 0.09 inch.
5. Basis-of-Design product Model 351.09.643 by Hafele.

O. Surface-mounted "Rakks" Counter Brackets: L-shaped bracket fabricated from aluminum T sections; Model No. EH-1818 and EH-1824 as manufactured by Rangine Corporation.
1. Load capacity per bracket: 450 pounds.
2. Finish: Custom powder paint coating.
3. Provide with 5/8 inch opening rubber grommet installed in 7/8 inch hole.
4. Other Acceptable Products:
    a. Federal Brace; engineered steel bracket of matching design and shop-applied custom powder paint coating.
    b. Custom fabrication engineered of matching design in steel or aluminum, with architectural finished welding; shop-applied custom powder paint coating.

P. Closet Rods: Knape & Voigt #770-1 heavy wall stainless steel tubing, 1-1/16” od length as required.

Q. Closet Adjustable Shelving: Shelving shall have spoon-shaped shelf supports sufficient for shelving l2" on center vertically. Provide intermediate support for all shelving greater than 30 inches. Provide end supports that permit the easy removal of the closet rod.

R. Coat Hooks:
1. Basis-of-Design: Amerock Single Prong Individual Hook Part No. H55440ORB, or comparable product.
2. Height: Approximately 1-3/4 inches.
3. Depth: Approximately 1-1/2 inches.

4. Width: 3/4 inch.
5. Finish: Oil rubbed bronze.

2.8 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Grade: Premium.

B. Cabinet, Door, and Drawer Front Interface Style: Flush overlay unless otherwise indicated on Drawings.

C. Type of Construction: Face Frame.

D. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: Grade HGS.
2. Vertical Surfaces: Grade HGL.
3. Edges: PVC edge banding, 0.12-inch (3-mm) thick, matching laminate in color, pattern, and finish.

E. Materials for Semi-Exposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
   a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12-inch (3-mm) thick, matching laminate in color, pattern, and finish.
   b. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.
2. Drawer Sides and Backs: Thermoset decorative panels.
3. Drawer Bottoms: Thermoset decorative panels.

F. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces (If required): High-pressure decorative laminate, Grade BKL.

G. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Tall classroom cabinets Wilsonart "Island" D498-60 Matte Finish.
2. Classroom counter cabinets Wilsonart "Lapis Blue" D417-60 Matte Finish.
3. Other locations: As selected by Architect from laminate manufacturer's full range.

2.9 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.

C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.

D. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, As scheduled.

E. Match materials and finish of adjacent panels or frame when providing fillers in the final installation.

2.10 INTERIOR FINISH CARPENTRY FOR TRANSPARENT FINISH

A. Grade: Premium.

B. Wood Species and Cut:

1. Species and Cut: Maple plain sliced or White Oak rift cut; refer to Drawings.

2. Provide split species on trim that faces areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.

C. For trim items other than base wider than available lumber, use veneered construction. Do not glue for width.

1. For veneered base, use hardwood lumber core, glued for width.

D. For base wider than available lumber, glue for width. Do not use veneered construction.

E. For rails thicker than available lumber, use veneered construction. Do not glue for thickness.

F. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

G. Assemble casings in plant except where limitations of access to place of installation require field assembly.

H. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.11 WOOD-VENEER-FACED ARCHITECTURAL CABINETS FOR TRANSPARENT FINISH

A. AWI Grade: Premium.

B. Cabinet and Door and Drawer Front Interface Style: Flush overlay unless otherwise indicated on Drawings.

C. Type of Construction: Type B, Face Frame.

D. Wood Species and Cut for Exposed Surfaces: Maple plain sliced or White Oak rift cut; refer to Drawings

1. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.

2. Matching of Veneer Leaves: Book match.

3. Vertical Matching of Veneer Leaves: End match.

4. Veneer Matching within Panel Face: Center-balance match.

5. Veneer Matching within Room: Provide cabinet veneers in each room or other space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.

E. Semi-Exposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.

2. Drawer Sides and Backs: Solid-hardwood lumber, same species indicated for exposed surfaces Solid-hardwood lumber, stained to match species indicated for exposed surfaces.

3. Drawer Bottoms: Hardwood plywood.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

3.3 ADJUSTING

A. Adjust installed work.

3.4 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 11 13

BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cold-applied, emulsified-asphalt dampproofing.

B. Locations: Backfill side of site retaining walls.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course and auxiliary materials recommended in writing by manufacturer of primary materials.

B. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

1. BASF Construction Chemicals - Building Systems; Sonneborn Brand Products.
2. Henry Company.
3. Karnak Corporation.
4. Koppers Inc.
5. Meadows, W. R., Inc.

B. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.

C. VOC Content: 30 g/L or less.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

D. Patching Compound: Epoxy or latex-modified repair mortar of type recommended in writing by dampproofing manufacturer.

E. Protection Course:

1. ASTM D 6506, 1/8-inch- thick, semirigid sheets of fiberglass or mineral- reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners; or,

2. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side or both sides with plastic film, nominal thickness 1/4 inch, with a compressive strength of not less than 8 psi per ASTM D 1621, and maximum water absorption by volume of 0.6 percent per ASTM C 272.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

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 the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.

C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.

1. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations: Apply one fibered brush or spray coat at not less than 3 gal./100 sq. ft.

3.5 INSTALLATION OF PROTECTION COURSE

A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

1. Install protection course within 24 hours of installation of dampproofing (while coating is tacky) to ensure adhesion.

3.6 CLEANING

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

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SECTION 07 13 00
SHEET WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sheet Waterproofing:

1. Self-adhered modified bituminous sheet membrane.

1.2 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016.

B. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

E. NRCA (WM) - The NRCA Waterproofing Manual 2005.

1.3 SUBMITTALS

A. Product Data: Provide data for membrane.

B. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

C. Certificate: Certify that products meet or exceed specified requirements.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.6 WARRANTY

A. Contractor shall correct defective Work within a two year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

B. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.1 APPLICATIONS

A. Waterproof for building surfaces:

1. Exterior face of foundation/building walls where finished grade is above finished floor elevation; waterproofing installed from top of footing to finished grade elevation.

2. Concealed vertical face of separation of stepped floor elevations.

2.2 MEMBRANE MATERIALS

A. Self-Adhered Modified Bituminous Sheet Membrane:

1. Thickness: 60 mil, 0.060 inch, minimum.
2. Tensile Strength:
   a. Film: 5000 pounds per square inch, minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches per minute.
   b. Membrane: 325 pounds per square inch, minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
3. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
4. Basis-of-Design: GCP Applied Technologies; www.gcpat.com.
   a. Vertical below grade walls:
      1) Bituthene 3000 (use above 40°) and Bituthene 3000 Low Temperature (use 25° - 40°) self-adhering waterproofing membrane.
   b. Horizontal between concrete slab ours at exterior brick walkways:
      1) Bituthene Deck Prep
      2) Bituthene 3000 over Deck Prep
5. Other Acceptable Manufacturers: subject to compliance with this section and comparable to Basis-of-Design.
   a. Carlisle Coatings & Waterproofing Inc.; www.carlisleccw.com.
   b. Henry Company; www.henry.com.
   c. W.R. Meadows, Inc; www.wrmeadows.com.

B. Composite Laminate Membrane: Comprised of 56 mils thickness of rubberized asphalt and a 4 mils thickness of polyethylene film with release liner on adhesive-side; 60 mils total thickness.

1. Tensile Strength: 325 psi, measured in accordance with ASTM D 412.
2. Water Absorption: 231 percent increase in weight, maximum, measured in accordance with ASTM D 570, 24 hour immersion.
3. Water Vapor Permeability: 0.05 perm inch, measured in accordance with ASTM E 96/E 96M.

2.3 ACCESSORIES

A. Seaming Materials: As recommended by membrane manufacturer.

B. Membrane Sealant: As recommended by membrane manufacturer..

C. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core.

1. Basis-of-Design: GCP Applied Technologies.
   a. Vertical below grade walls: Hydroduct 220.
   b. Horizontal between concrete slab ours at exterior brick walkways: Hydroduct 660.

D. Termination Bars: Aluminum; compatible with membrane and adhesives.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.

E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

3.3 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

B. Roll out membrane and minimize wrinkles and bubbles.

C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.

D. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.

E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.

G. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.

H. Seal membrane and flashings to adjoining surfaces.

1. Install termination bar along edges.

2. Install counterflashing over exposed edges.

3.4 INSTALLATION - DRAINAGE PANEL

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

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SECTION 07 16 16
CRYSTALLINE WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Crystalline waterproofing within elevator pit.

1.2 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Test data showing hydraulic permeability.

2. Details for waterproofing at joints, intersections, and other special conditions.

B. Specimen warranty.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of products of the type specifiedand providing technical representatives to visit project site.

B. Installer Qualifications: Acceptable to manufacturer, with documented experience on at least five projects of similar nature within last five years.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Take necessary precautions to keep cementitious materials dry.

1.5 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results; do not install products under environmental conditions outside manufacturer's absolute limits.

1.6 WARRANTY

A. Provide installer's warranty agreeing to correct leaking waterproofing for two years from Date of Substantial Completion, unless leakage is caused by structural failure, movement of the structure, or other causes beyond the installer's control.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Crystalline Waterproofing:

1. Euclid Chemical Company; HEY'DI K-11: www.euclidchemical.com/#sle.

2. Koster American Corporation; Koster NB-1 Grey: www.kosterusa.com/#sle.

3. Tremco Commercial Sealants & Waterproofing; Permaquik Crystalline Waterproofing: www.tremcosealants.com/#sle.

4. W.R. Meadows, Inc; CEM-KOTE CW PLUS: www.wrmeadows.com/#sle.

5. Xypex Chemical Corporation; XYPEX Concentrate: www.xypex.com/#sle.

6. Anti-Hydro International, Inc.; Hydro Cap.

7. Conproco Corp.; Super Seal.

2.2 APPLICATIONS

A. Waterproofing for Building Surfaces:

1. Inside of elevator pits.

2.3 MATERIALS

A. Crystalline Waterproofing: Portland cement and chemical compound that when applied to surface of concrete forms insoluble crystals in capillary pores preventing passage of liquids, while having no adverse effect on normal properties of concrete.

1. Hydraulic Permeability: No measurable leakage or water flow at 200 psi pressure when tested in accordance with COE CRD-C 48, using minimum 2 inch thick sample and 20 days duration.

B. Plugging Compound: Cementitious compound meeting requirements specified for waterproofing, with additional characteristic of rapid set under water, recommended or approved by waterproofing manufacturer.

C. Patching Compound: Ready-mixed cementitious mortar recommended or approved by waterproofing manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions, and use sand blasting, water blasting, or acid etching as recommended.

C. Plug water leaks.

D. Patch holes, construction joints, and cracks; remove defective concrete.

E. Obtain approval of manufacturer's field representative before beginning installation.

3.3 INSTALLATION

A. Install in strict accordance with manufacturer's instructions, maintain environmental conditions required and recommended by manufacturer, and keep a copy of manufacturer's instructions on site.

B. Coordinate installation with installation of products that must penetrate waterproofed surfaces.

C. Prevent excessive drying of surface.

1. Cure waterproofing for at least three days, or length of time required by manufacturer, with water spray and adequate air circulation.

2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.

D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire-rated insulation foam for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

B. Board insulation at perimeter foundation wall and underside of floor slabs.

1.2 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance criteria and product limitations.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.3 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 INSULATING FOAM SEALANT

A. Insulation for voids, cavities and irregularly shaped areas: Medium expansion polyurethane foam.

B. Type: Low density, single component acrylic foam sealant designed to expand while curing but not exert undue force against adjacent construction. Expansion shall not exceed a maximum of 50 percent.

C. Acceptable Products:

1. Touch ‘N Foam; Product Touch ‘N Foam Window and Door Sealant.
2. Geocel Corp.; Product Geocel #3824 Minimal Expanding Foam Sealant.
3. Dow Chemical Company; Product Great Stuff Pro.
4. Insta-Foam Products, Inc.; Product Insta-Seal.
5. Commercial Thermal Solutions; Product TigerFoam.

2.2 RIGID FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.

1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
3. R-value; 1 inch of material at 72 degrees F: 5, minimum.
4. Board Edges: Square.
5. Thermal Conductivity (k factor) at 25 degrees F: 0.18.
6. Compressive Resistance: 40 psi.
7. Board Density: 1.3 lb/cu ft.
8. Water Absorption, Maximum: 0.3 percent, by volume.
9. Manufacturers:

a. Dow Chemical Co: www.dow.com.

b. Owens Corning Corp: www.owenscorning.com.

c. Kingspan Insulation LLC; www.trustgreenguard.com.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulationand adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities or materials or substances that may impede adhesive bond.

3.2 INSTALLATION OF INSULATING FOAM SEALANT

A. Install materials in accordance with manufacturer's instructions and acceptable to authorities having jurisdiction to provide required air seal.

B. Apply sealants within recommended application temperature ranges. Consult manufacturer when sealants cannot be applied within specified ranges.

C. Apply sealants within recommended humidity ranges. Consult manufacturer low humidity conditions.

D. Do not overfill void.

E. Provide continuity with the air barrier systems by sealing the following areas within the construction and construction assemblies. Please note that these areas are typical in nature and does not limit the application of these products to these noted areas but any and all details within the construction that present similar air leakage characteristics should receive similar applications. Please note the following:

1. Various roof locations including penetrations of all kinds and roof to fascia junctions.

2. Window head, jamb and sill areas.

3. Junction of roof air/vapor barrier and wall air/vapor barrier.

4. Storefront systems at frame and adjacent veneer panels.

5. Exterior soffit overhangs.

6. Provide reduced air leakage into and out of building by sealing gaps, leaks and holes in interior and exterior construction.

7. Allow access for independent inspections; provide all repairs as required to ensure compliance with the Contract Documents.

3.3 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Apply adhesive to back of boards:

1. Three continuous beads per board length.

B. Install boards horizontally on foundation perimeter.

1. Place boards to maximize adhesive contact.

2. Install in running bond pattern.

3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.4 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

END OF SECTION

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SECTION 07 21 27
ENCLOSED CAVITY FOAMED INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Foamed-in-place insulation.

B. Transition Membranes.

1.2 REFERENCES

A. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

B. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

C. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.

D. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.

E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

F. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

G. ASTM E 2357 - Standard for Air Barrier Materials.

H. NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory test Apparatus.

1.3 SUBMITTALS

A. Product Data: Provide product description, insulation properties, and preparation requirements.

B. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

C. ICC-ES Evaluation Report to establish code compliance and R-Value.

D. Submit proof of compliance with NFPA 285 assemblies if applicable; include certification of intumescent coating system by spray foam insulation manufacturer or engineering judgement.

E. Submit certification of ASTM E-2357 compliance.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than five years of documented experience.

B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years of experience.

C. Contractor shall provide a written Safety Program, written Respirator Program and a written Job Hazard Analysis.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke limitations.

1.6 FIELD CONDITIONS

A. Do not install insulation when ambient temperature is lower than 40 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Walltite by BASF.

B. ProSeal by Icynene (Basis-of-Design)

2.2 MATERIALS

A. Insulation: Polyurethane type.

1. Thermal Conductivity: When tested in accordance with ASTM C 518:
2. Water Vapor Transmission: 1.82 perms (1 inch SPF), measured in accordance with ASTM E 96.
3. Air Permeance: 0.000025 L/s/sq. m. at 75 Pa, when tested in accordance with ASTM E 2178.
4. Compressive Strength: 22 psi, when tested in accordance with ASTM D 1621.
5. Density: 2.0 lb/cu ft, when tested in accordance with ASTM D 1622.
6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25 / 350, when tested in accordance with ASTM E 84 (4 inches SPF thickness).
7. R-Value: Minimum of R-20.
8. Thickness: Refer to Drawings.
    a. Variation from thickness will be no more than plus 1/2 inch and no less than minus 1/4 inch.

B. Insulation installed within the building interior: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.

C. Intumescent Coating and Top Coat: Subject to compliance with assembly requirements and approval of spray foam manufacturer.

D. Flexible Flashing and Transition Membrane: For flashing not exposed to the exterior, use the following, unless otherwise indicated:

1. Product:
    a. York Manufacturing, Inc; Multi-Flash SS: www.yorkmfg.com.
    b. Mighty-Flash-SA Self Adhering Stainless Steel Fabric Flashing by Hohmann & Barnard, Inc.
2. Primer: Manufacturers standard product recommended for the application.
3. Performance Requirements:
    a. Tensile Strength: ASTM D412 Die; 100,000.
    b. Puncture Resistance: ASTM E154; minimum 2,500 psi.
    c. Membrane Thickness: 0.004 in.
    d. Stainless Steel Thickness: 0.003 in.
    e. Stainless Steel Type: Type 304.
4. Accessories (Basis-of-Design):
    a. Mastic/sealant: Basis-of-Design: York Manufacturing, Inc.; UniverSeal US100.
        1) Type: One part 100% solids, solvent-free formulated silyl-terminated polyether (STPE), ASTM C920-11, Type S, Grade NS, Class 50.
    b. Outside corner and inside corner material; manufacturer’s standard available units using:
        1) Stainless steel: 26 gauge stainless steel.

c. Splice material: Basis-of-Design: York 304 SS by York; manufacturer’s standard self-adhered metal material; material matching system material or use Multi-Flash Stainless Steel 6” lap piece and polyether sealant as a splice.

d. Termination Bar: Basis-of-Design: York T-96 termination bar; manufacturer's standard 1" composite material bar or a 1” 26 gauge stainless steel termination bar with sealant lip.

2.3 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify work within construction spaces or crevices is complete prior to insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.2 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

C. Provide transition membranes between dissimilar materials all instances.

3.3 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply insulation by spray method, to a uniform monolithic density without voids.

C. Allow required duration of time and apply intumescent coating as directed by insulation and coating manufacturers.

E. Patch damaged areas.

3.4 FIELD QUALITY CONTROL

A. Engage an independent testing agency to perform inspections and tests. Contractor is to coordinate with and provide full access to Work that the independent testing agency will be inspecting.

B. Inspection will include verification of insulation and overcoat thickness and density.

C. Test adhesion performance.

END OF SECTION

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SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, bridge and seal air leakage pathways and gaps; including all accessories necessary for a complete installation.

1.2 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.3 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.

1.4 SUBMITTALS

A. Product Data: Provide data on material characteristics.

B. Shop Drawings:

1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.

2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

3. Include details of interfaces with other materials that form part of air barrier including, but not limited to, the following as applicable to this Project:

a. Connection of air barrier in walls to roof membrane.

b. Connection of air barrier in walls to air barrier in foundation.

c. Application of air barrier to seismic and expansion joints.

d. Application of air barrier to openings and penetrations by windows, storefront framing, curtain wall framing, door frames, piping, conduit, ducts, masonry ties, screws, bolts, and similar components and penetrations.

e. Application of air barrier to precast concrete and other types of exterior wall construction.

4. Include details of mockups.

C. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

D. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.

E. Testing Agency Qualification Statement.

F. Certifications:

1. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

2. Acceptance of Materials: Submit document from air-barrier manufacturer certifying acceptance of materials proposed for use with air barrier that are not specified in this Section.

3. Substrate Compatibility: Submit document from air-barrier manufacturer certifying that air barrier system materials used to adhere air barrier to substrate are chemically compatible.

4. ABAA Certification: Submit evidence that air barrier system complies with requirements of ABAA Quality Assurance program specified in Quality Assurance article in this Section.

G. Product Test Reports: Submit documentation from an approved independent testing laboratory certifying compliance with the air leakage rates of the air barrier membrane assembly, including primary membrane, primer and sealants have been tested to meet ASTM E2357, ICC-AC 38, Class A flame spread index and smoke development per ASTM E-84.

H. Field Quality-Control Reports: Submit test results from testing specified in Field Quality Control article in Part 3 of this Section.

1.5 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:

1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.

2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

C. Components used for complete air barrier assembly must be sourced from one manufacturer.

1.6 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.7 WARRANTY

A. Provide minimum 5-year assembly warranty.

PART 2 PRODUCTS

2.1 WEATHER BARRIER ASSEMBLIES

A. Air-Barrier Assembly Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1. Movement/Control Joints: Provide air barrier assembly capable of accommodating movements of building and building materials, including providing expansion and control joints and applicable accessories required to accommodate these movements.
    a. Provide air barrier assembly capable of withstanding combined design wind, fan, and stack pressures, positive and negative, on building envelope without damage or displacement and transferring loads to structure.
    b. Provide air barrier assembly materials that do not displace adjacent materials and air barrier assembly materials under full load.
    c. Provide air barrier assembly joined in airtight and flexible manner to air barrier materials incorporated into adjacent construction and that allows relative movement of assemblies due to thermal and moisture variations, creep, and anticipated seismic movement.
2. Connections to Adjacent Materials: Provide connections to adjacent materials that prevent air leakage at following locations:
    a. Foundation and walls, including penetrations, ties and anchors.
    b. Walls, windows, curtain walls, storefronts, louvers and doors.
    c. Different assemblies and fixed openings within those assemblies.
    d. Wall and roof connections.
    e. Floors/soffits over unconditioned space.
    f. Walls, floor and roof across construction, control and expansion joints.
    g. Walls, floors and roof to utility, pipe and duct penetrations.
    h. Seismic and expansion joints.
    i. All other potential air leakage pathways in building envelope.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 2357.

C. Fire Propagation Characteristics: Provide air barrier system qualified as a component of a comparable wall assembly that has been tested and passed NFPA 285.

2.2 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
    1. Air Barrier Membrane:
        a. Dry Film Thickness (DFT): 30 mil, 0.030 inch, minimum.
        b. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
        c. Water Vapor Permeance: 11 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F.
        d. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure.
        e. Elongation: 200 percent, minimum, when tested in accordance with ASTM D412.
        f. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
        g. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
        h. Manufacturers:
            1) Carlisle Coatings and Waterproofing, Inc; Fire Resist Barritech-VP: www.carlisleccw.com.

2) GCP Applied Technologies; Perm-A-Barrier VPL or Perm-A-Barrier VPL Low Temperature: www.gcpat.com.

3) Henry Company; Air-Bloc 33MR: www.henry.com.

4) Sto Corp; StoGuard AirSeal: www.stocorp.com.

5) Tremco Commercial Sealants & Waterproofing; ExoAir 230: www.tremcosealants.com.

6) W.R. Meadows, Inc; Air-Shield LMP: www.wrmeadows.com.

7) Rubber Polymer Corporation, Inc.; Rub-R-Wall Airtight VP: www.rpcinfo.com.

8) Soprema Inc.; LM 204 VP.

2.3 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer, auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

B. Structurally support air barrier system to withstand positive and negative air pressures applied to the building enclosure.

C. Transition Membrane:

1. Compatible and accepted by air barrier manufacturer for locations detailed in the Drawings.

2. Provide product that has been tested in an ABAA system/assembly, with provided air barrier.

D. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

E. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

F. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

G. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.2 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

1. Apply primer to substrates at required rate and allow it to dry.

2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.

3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

D. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

E. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet to provide continuous support for air barrier.

3.3 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

D. Coatings:

1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.

2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.

3. Use flashing to seal to adjacent construction and to bridge joints.

E. Openings and Penetrations in Exterior Weather Barriers:

1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.

2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.

3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.

4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.

5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.

6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.4 FIELD QUALITY CONTROL

A. Do not cover installed weather barriers until required inspections have been completed.

B. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

C. Take digital photographs of each portion of the installation prior to covering up.

D. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

E. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.

2. Air-barrier dry film thickness.

3. Adhesion tests.

4. Continuous structural support of air-barrier system has been provided.

5. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
6. Site conditions for application temperature and dryness of substrates have been maintained.
7. Maximum exposure time of materials to UV deterioration has not been exceeded.
8. Surfaces have been primed, if applicable.
9. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
10. Termination mastic has been applied on cut edges.
11. Strips and transition strips have been firmly adhered to substrate.
12. Compatible materials have been used.
13. Transitions at changes in direction and structural support at gaps have been provided.
14. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
15. All penetrations have been sealed.

F. Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

G. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

H. Prepare test and inspection reports.

3.5 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

B. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

C. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

D. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

E. Remove masking materials after installation.

END OF SECTION

SECTION 07 31 29
WOOD SHINGLES - ALTERNATE BID

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood roof shingles.
2. Underlayment and shake interlayment materials.
3. Ridge vents.
4. Metal flashing and trim.

1.2 DEFINITIONS

A. Roofing Terminology: See ASTM D1079 for definitions of terms related to roofing Work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Wood roof shingles.
2. Underlayment and shake interlayment materials.
3. Ridge vents.
4. Metal flashing and trim.

B. Shop Drawings: For metal flashing and trim.

C. Samples: For each exposed product, in sizes indicated.

1. Wood Roof Shingles: Full size.
2. Ridge Units: Full size.
3. Ridge Vent: 12 inches long.

D. Samples for Initial Selection: For each type of wood product indicated.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For the following products, in sizes indicated:

1. Wood Roof Shingles: Full size.
2. Ridge Units: Full size.
3. Ridge Vent: 12 inches long.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For manufacturer's materials warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wood products to include in maintenance manuals.

B. Materials warranties.

C. Roofing Installer's warranty.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wood Roof Shingles: 100 sq. ft. of each size and type, in unbroken bundles.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: CSSB member.

B. Grading Agency Qualifications: An independent testing and inspecting agency recognized by authorities having jurisdiction as qualified to label wood products for compliance with referenced grading rules.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.

B. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.

C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing Work is not in progress.

D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.

1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.11 WARRANTY

A. Materials Warranty: Manufacturer's warranty administered by CSSB and on CSSB's standard form in which manufacturer agrees to repair or replace CSSB-labeled products that fail in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.

1. Materials Warranty Period: Limited lifetime from date of Substantial Completion.

B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace installed products that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of product from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Grading Rules: Provide wood products that comply with CSSB grading rules for products indicated.

1. Identification: Attach a label to each bundle of wood products that identifies manufacturer, type of product, grade, dimensions, and identification mark of grading agency acceptable to authorities having jurisdiction.

2.3 WOOD ROOF SHINGLES

A. Cedar Shingle Ridge Units: Manufactured, smooth-sawn western red cedar caps for ridges and hips of same thickness as shingles, 7 inches wide; beveled, alternately overlapped, and nailed.

1. Grade: No. 1.
2. Length: 18 inches.

B. Fancy-Butt Cedar Shingles: Clear heartwood red cedar, No. 1 grade, with butt shape indicated.

1. Basis-of-Design: Certigrade® Red Cedar Shingles; Number 1 Grade, Blue Label®.
    a. Sawn on both sides for a tailored appearance.
    b. Butt thickness is gauged using a stack of shingles to meet the proper measurement.
2. Butt Shape: Round.
3. Size: 18 inches long by 5 inches wide, in manufacturer's standard thickness.

2.4 UNDERLAYMENT AND SHAKE INTERLAYMENT MATERIALS

A. Felt: Asphalt-saturated organic felts, nonperforated and complying with the following:

1. ASTM D226/D226M: Type II; or
2. ASTM D4869/D4869M: Type IV.
3. Use as underlayment.

B. Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D1970/D1970M, minimum 55-mil- thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied. Provide primer for adjoining concrete, masonry, and metal surfaces to receive underlayment.

1. Top Surface: Textured polymer film.

2.5 RIDGE VENTS

A. Basis-of-Design: Benjamin Obdyke; Rapid Ridge 7 Ridge Vent.

1. Product must be part of system with drainage mat.
2. Minimum Net Free Area: 12.5 in squared/lin ft.
3. Width: 10.5 inches.
4. Thickness: 0.625 inches.
5. Warranty: Limited lifetime.

2.6 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D4586/D4586M, Type II, asbestos free.

B. Elastomeric Flashing Sealant: ASTM C920, Type S, Grade NS, one-part, non-sag, elastomeric polymer sealant; of class and use classifications required to seal joints and remain watertight; recommended in writing by manufacturer for installation of flashing systems.

C. Drainage Mat: Manufacturer's standard, compression-resisting, three-dimensional, nonwoven, entangled filament, nylon mat designed to permit air movement and to drain incidental moisture by gravity.

1. Basis-of-Design: Benjamin Obdyke; Cedar Breather Roof Ventilation Mat.
2. Properties:
    a. Thickness (ASTM D 5199): 0.285 in.
    b. Tensile Strength (ASTM D 5034): Machine 32.1 lbf; Crosswise 27.4 lbf.
    c. Short Term Compression (ASTM D 6364): 171 lb/SF; compression stress at 10 percent strain.
    d. UV rated: 30 days of exposure before installation of roofing.
    e. Warranty: 35 years.

D. Roofing Nails: ASTM F1667, stainless steel, Type 304, box-type wire nails, sharp pointed, and of sufficient length to penetrate a minimum of 3/4 inch into sheathing or to penetrate through roof sheathing less than 3/4 inch thick.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

E. Underlayment Nails: Aluminum, stainless steel, or hot-dip galvanized-steel wire nails with low-profile metal or plastic caps, 1-inch- minimum diameter.

1. Provide with minimum 0.0134-inch- thick metal cap, 0.010-inch- thick power-driven metal cap, or 0.035-inch- thick plastic cap; and with minimum 0.083-inch- thick ring shank or 0.091-inch- thick smooth shank of length to penetrate at least 3/4 inch into roof sheathing or to penetrate through roof sheathing less than 3/4 inch thick.

2.7 METAL FLASHING AND TRIM

A. Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."

1. Sheet Metal: Copper.

B. 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 the item unless otherwise specified in this Section or indicated on Drawings.

1. Apron Flashings: Fabricate with lower flange extending a minimum of 6 inches over and 4 inches beyond each side of downslope wood roofing and 6 inches up the vertical surface.
2. Step Flashings: Fabricate with a headlap of 3 inches and a minimum extension of 5 inches both horizontally and vertically.
3. Cricket and Backer Flashings: Fabricate with concealed flange extending a minimum of 24 inches beneath upslope wood roofing and 6 inches beyond each side of chimney and 6 inches above the roof plane.
4. Counterflashings: Fabricate to cover 4 inches of base flashing measured vertically; and in lengths required so that no step exceeds 8 inches and overall length is no more than 10 feet.

a. Provide metal reglets for installation.

5. Open-Valley Flashings: Fabricate from metal sheet not less than 24 inches wide in lengths not exceeding 10 feet, with 1-inch- high, inverted-V profile water diverter at center of valley and equal flange widths of not less than 11 inches.
6. Drip Edges: Fabricate in lengths not exceeding 10 feet with minimum 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.

C. Vent-Pipe Flashings: ASTM B749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof and extending at least 6 inches from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations through wood roofing.
3. Verify that vent stacks and other penetrations through roofing are installed and securely fastened.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF WOOD ROOF SHINGLES

A. Install wood roof shingles in accordance with manufacturer's written instructions and recommendations in CSSB's "New Roof Construction Manual" and NRCA's "The NRCA Roofing Manual: Steep-Slope Roofing Systems."

B. Install drainage mat perpendicular to roof slope in parallel courses, butting edges and ends to form a continuous layer, and fasten to roof deck.

C. Install wood-shingle starter course along lowest roof edge.

1. Install to match and replace existing shingles.

D. Install first course of wood roof shingles directly over starter course and in continuous straight-line courses across roof deck. Install second and succeeding courses of wood roof shingles in continuous straight-line courses across roof deck, to match and replace existing shingles.

1. Space shingles a minimum of 1/4 inch and a maximum of 3/8 inch apart.
2. Fasten each shingle with two nails spaced 3/4 to 1 inch from edge of shingle and 1-1/2 to 2 inches above butt line of succeeding course. Drive fasteners flush with top surface of shingles without crushing wood.
3. Maintain weather exposure of 5-1/2 inches for 18-inch- long shingles.

E. Open Valleys: Cut and fit wood roof shingles at open valleys, trimming upper concealed corners of shingles. Widen exposed portion of open valley 1/8 inch in 12 inches from highest to lowest point.

F. Fancy-Butt Shingles: Center each shingle in succeeding courses between the two shingles below it with 1/8-inch space between shingles.

G. Ridge Vents: Install continuous ridge vents over wood roof shingles in accordance with manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate roof sheathing.

H. Ridge Units: Install units over wood roof shingles trimmed at apex of ridges and hips.

1. Maintain same exposure dimension of units as roof-shingle exposure.
2. Lap units at ridges to shed water away from direction of prevailing winds.
3. Alternate overlaps of units and fasten with concealed roofing nails of sufficient length to penetrate sheathing.
4. At unventilated ridges and hips, install concealed strip of self-adhering, polymer-modified bitumen sheet underlayment over apex shingles and below ridge units.
5. Fasten ridge units to cover ridge vent without obstructing airflow.

3.3 INSTALLATION OF UNDERLAYMENT

A. Comply with underlayment manufacturer's written installation instructions and with recommendations in CSSB's "New Roof Construction Manual" and NRCA's "The NRCA Roofing Manual: Steep-Slope Roof Systems" applicable to products and applications indicated unless more stringent requirements are specified in the Section or indicated on Drawings.

B. Felt: Install on roof deck parallel with and starting at eaves and fasten with underlayment nails.

1. Double-Layer Installation:

a. Install a 19-inch- wide starter course at eaves and completely cover with a 36-inch-wide second course.
b. Install succeeding 36-inch- wide courses lapping previous courses 19 inches in shingle fashion.
c. Lap ends a minimum of 4 inches.
d. Stagger end laps between succeeding courses at least 72 inches.

2. Install felt underlayment on roof deck not covered and over areas protected by self-adhering, polymer-modified bitumen sheet.

    a. Lap sides of felt over self-adhering sheet not less than 4 inches in direction that sheds water.
    b. Lap ends of felt not less than 6 inches over self-adhering sheet.

3. Terminate felt extended up not less than 4 inches against sidewalls, curbs, chimneys, and other roof projections.

C. Self-Adhering, Polymer-Modified Bitumen Sheet: Install, wrinkle free, on roof deck.

1. Comply with low-temperature installation restrictions of underlayment manufacturer.
2. Install lapped in direction that sheds water.
3. Lap sides not less than 4 inches. Lap ends not less than 6 inches, staggered 24 inches between succeeding courses.
4. Roll laps with roller.
5. Prime concrete, masonry, and metal surfaces to receive self-adhering sheet.
6. Eaves: Extend from edges of eaves 36 inches beyond interior face of exterior wall.
7. Rakes: Extend from edges of rakes 36 inches beyond interior face of exterior wall.
8. Valleys: Extend from lowest to highest point 18 inches on each side of centerline.
9. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
10. Sidewalls: Extend 18 inches beyond sidewalls and return vertically against sidewalls not less than 4 inches.
11. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend 18 inches beyond penetrating elements and return vertically against penetrating elements not less than 4 inches.
12. Roof-Slope Transitions: Extend 18 inches on each roof slope.
13. Cover underlayment within seven days.

D. Metal-Flashed, Open-Valley Underlayment: Install one layer of 36-inch- wide felt underlayment centered in valley, running full length of valley, and on top of underlayment on field of roof that is woven through valley. Install all layers of underlayment in and through valley tight with no bridging.

1. Lap ends at least 12 inches in direction that sheds water, and seal with asphalt roofing cement.
2. Fasten to roof deck with underlayment nails located as far from valley center as possible and only to extent necessary to hold underlayment in place until installation of valley flashing.
3. Solidly cement valley underlayment to roof-field underlayment that is woven through valley using asphalt roofing cement.

3.4 INSTALLATION OF RIDGE VENTS

A. Rigid-Plastic Ridge Vents: Install continuous ridge vents over wood roof tiles in accordance with manufacturer's written instructions. Fasten with nails of sufficient length to penetrate substrate.

3.5 INSTALLATION OF METAL FLASHING AND TRIM

A. Install metal flashings and other sheet metal to comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."

1. Install metal flashings in accordance with recommendations for wood roofing in NRCA's "The NRCA Roofing Manual: Steep-Slope Roof Systems."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope wood roofing and up the vertical surface.

C. Step Flashings: Install with a headlap of 3 inches and extend over underlying wood roofing and up the vertical face. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying wood roofing. Fasten to roof deck only.

D. Cricket and Backer Flashings: Install against roof-penetrating elements extending concealed flange beneath upslope wood roofing and beyond each side.

E. Counterflashings: Coordinate with installation of base flashing and fit tightly to base flashing. Lap joints a minimum of 4 inches secured in a waterproof manner.

1. Install in reglets or receivers.

F. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inches in direction that sheds water. Fasten upper end of each length to roof deck beneath overlap.

1. Adhere minimum 9-inch- wide strip of self-adhering, polymer-modified bitumen sheet to metal flanges and to underlying self-adhering, polymer-modified bitumen sheet. Place strips parallel to and over flanges so that they will be just concealed by installed roofing.
2. Provide a closure at the end of the inverted-V profile of the valley metal to minimize water and ice infiltration.

G. Rake Drip Edges: Install over underlayment materials and fasten to roof deck.

H. Eave Drip Edges: Install below underlayment materials and fasten to roof deck.

I. Pipe Flashings: Form flashing around pipe penetrations and wood roofing. Fasten and seal to wood roofing.

3.6 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:

1. Owner: <Insert name of Owner>.
2. Owner Address: <Insert address>.
3. Building Name/Type: <Insert information>.
4. Building Address: <Insert address>.
5. Area of the Work: <Insert information>.
6. Acceptance Date: <Insert date>.
7. Warranty Period: <Insert time>.
8. Expiration Date: <Insert date>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that, during Warranty Period, Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:

a. Lightning;
b. Peak gust wind speed exceeding <**Insert mph**>;
c. Fire;
d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. Faulty construction of copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. Vapor condensation on bottom of roofing; and
g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When the work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.
4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty shall not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

END OF SECTION

SECTION 07 42 13.23
ALUMINUM COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum composite material (ACM) panels.
2. Aluminum composite material (ACM) system.

B. Locations:

1. Occurs at both interior (elevator lobby) and exterior (elevator shaft, elevator lobby exterior, canopies at entry hall 100).

a. See drawings for seam locations.
b. Provide expandable flashing for elevator shaft rain leader penetration.

2. Special shapes including formed coping panels of varying dimensions

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1. Review methods and procedures related to ACM system installation, including manufacturer's written instructions.
2. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
3. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect ACM system.
4. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
5. Review temporary protection requirements for system assembly during and after installation.
6. Review procedures for repair of panels damaged after installation.
7. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.3 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel, system, and accessory.

1. Metal composite material (ACM) panels.
2. Metal composite material (ACM) system.

B. Shop Drawings:

1. Include fabrication and installation layouts of ACM system; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, accessories, and special details.
2. Accessories: Include details of flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
3. Provide signed and sealed drawings, by a qualified professional engineer in the State of Maryland, of ACM system showing compliance with performance requirements and design criteria identified for this Project.

C. Samples for Initial Selection: For each type of ACM panel indicated, with factory-applied color finishes.

1. Size: Manufacturers' standard size.

2. Include Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of ACM panel required, with factory-applied color finishes.

1. ACM Panel: One sample, manufacturers' standard size.

E. Delegated Design Submittals: For ACM system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports: For each ACM system, for tests performed by manufacturer and witnessed by a qualified testing agency.

a. ACM Panel Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.
b. Fabricator's ACM System Test Reports: Certified test reports showing system compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.

1) Wet Seal System: Tested to AAMA 501.1.

2. Research Reports: For ACM systems, from an agency acceptable to authorities having jurisdiction showing compliance.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

C. Qualification Statements: For manufacturer, fabricator and testing agency.

D. Delegated design engineer qualifications.

E. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For ACM panels.

B. Warranty Documentation:

1. Manufacturers' special warranties.
2. Installer's special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years' experience.

B. Fabricator Qualifications: Approved by ACM panel manufacturer.

C. Installer Qualifications: Fabricator of ACM system.

D. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in State of Maryland and who is experienced in providing engineering services of the type indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, ACM panels, and other manufactured items so as not to be damaged or deformed. Package ACM panels for protection during transportation and handling.

B. Unload, store, and erect ACM panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack ACM panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store ACM panels to ensure dryness, with positive slope for drainage of water. Do not store ACM panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on ACM panels during installation.

1.8 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of ACM panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

A. Coordinate ACM panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Panel Integrity Warranty: Manufacturer agrees to repair or replace components of ACM panels that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Panel Finish Warranty: Manufacturer agrees to repair finish or replace ACM panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

C. ACM System Warranty: Fabricator's standard form in which manufacturer agrees to repair or replace components of ACM systems that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design ACM system.

B. Structural Performance: ACM systems to withstand the effects of the following loads, based on testing in accordance with ASTM E330/E330M:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested in accordance with ASTM E283/E283M at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

D. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

E. Water Penetration under Dynamic Pressure: No water penetration when tested in accordance with AAMA 501.1 at the following test pressure:

1. Test Pressure: 12 psf.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

G. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.

H. Fire Propagation Characteristics: ACM system passes NFPA 285 testing.

2.2 METAL COMPOSITE MATERIAL (ACM) WALL PANELS

A. Metal Composite Material (ACM) Wall Panels: Provide ACM panels fabricated from two metal facings bonded to a solid, extruded thermoplastic core.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ALPOLIC Materials; Mitsubishi Chemical Composites.
b. ALUCOBOND; 3A Composites USA, Inc.
c. Reynobond Composite Material; Arconic.

2. Core: FR.
3. Panel Thickness: 0.157 inch.
4. Bond Strength: 22.5 in-lb/in. when tested for bond integrity in accordance with ASTM D1781.
5. Fire Performance: Flame-spread index less than 25 and smoke-developed index less than 450, in accordance with ASTM E84 or UL 723.

B. ACM Panel Materials:

1. Aluminum-Faced Panels: ASTM B209/B209M alloy as standard with manufacturer, temper as required to suit finish and forming operations with 0.020-inch- thick, aluminum sheet facings.

a. Exterior and Interior Finish (where exposed): Mica fluoropolymer.

1) Color - Basis-of-Design: Reynobond Composite Material; Colorweld 500 Classic Bronze.

2.3 METAL COMPOSITE MATERIAL (ACM) SYSTEM

A. Wet-Seal Barrier ACM System: Provide factory-formed and -assembled, ACM panels formed into profile for wet-seal barrier system installation. Include attachment assembly components, panel stiffeners, sealants, and accessories required for weathertight system.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Citadel Architectural Products, Inc.
b. East Coast Metal Systems.
c. Fairfield Metal, LLC.
d. MillerClapperton.
e. Protean Construction Products, Inc.

f. SAF (Southern Aluminum Finishing Company, Inc.).
g. Sobotec.

B. System Panel Depth: As indicated on drawings.

C. Attachment Assembly Components: Manufacturer's standard formed from material compatible with panel facing.

D. Labeling: Comply with labeling requirement of applicable building code.

2.4 ACCESSORIES

A. Metal Subframing and Furring: ASTM C955 cold-formed, metallic-coated steel sheet ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of ACM system.

B. System Accessories: Provide components required for a complete, weathertight wall system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of ACM panels unless otherwise indicated.

C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Use gasketed or approved coated fasteners between dissimilar metals.

1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
2. Provide exposed fasteners with heads matching color of ACM panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

D. Panel Sealants: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in ACM panels and remain weathertight; and as recommended in writing by ACM system manufacturer.

2.5 FABRICATION

A. Fabricate and finish ACM panels at the factory, by panel manufacturer's standard procedures and processes, as necessary to fulfill indicated panel performance requirements demonstrated by laboratory testing.

B. Shop-fabricate ACM systems and accessories by fabricator's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with requirements of ACM panel manufacturer, of indicated system profiles, and with dimensional and structural requirements.

1. Fabricate panels to dimensions indicated on Drawings based on an assumed design temperature of 70 deg F. Allow for ambient temperature range at time of fabrication.
2. Formed ACM panel lines, breaks, and angles to be sharp and straight, with surfaces free from warp or buckle.
3. Fabricate panels with sharply cut edges and no displacement of face sheet or protrusion of core.
4. Fabricated Panel Tolerances: Shop-fabricate panels to sizes and joint configurations indicated on Drawings.

a. Width: Plus or minus 0.079 inch at 70 deg F.
b. Length: Plus or minus 0.079 inch at 70 deg F.
c. Squareness: Plus or minus 0.079 inch at 70 deg F.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. 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 exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams.
4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Coil-Coated Metal Finish:

1. PVDF Fluoropolymer: AAMA 2605, two-coat, with suspended mica flakes, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, ACM system supports, and other conditions affecting performance of the Work.

1. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by ACM system manufacturer.

    a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and assemblies penetrating ACM system to verify actual locations of penetrations relative to seam locations of ACM panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ACM SYSTEM

A. General: Install ACM system in accordance with system manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor ACM system securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving ACM system.
2. Flash and seal ACM system at perimeter of all openings. Fasten with self-tapping screws.
3. Install screw fasteners in predrilled holes.

4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as ACM system work proceeds.
6. Align bottoms of ACM panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
7. Provide weathertight escutcheons for all items penetrating system.
8. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by ACM system manufacturer.
9. Attach ACM panels to supports at locations, spacings, and with fasteners recommended by manufacturer to meet listed performance requirements.

B. Attachment Assembly, General: Install attachment assembly required to support ACM panels and to provide a complete weathertight wall system, including tracks, drainage channels, anchor channels, perimeter extrusions, and panel clips.

1. Install subframing, furring, and other panel support members and anchorages in accordance with ASTM C955.
2. Install support system at locations, at spacings, and with fasteners recommended by ACM system manufacturer to meet listed performance requirements.

C. Wet-Seal ACM System: Attach ACM panels by interlocking panel into channels.

1. Seal vertical joints between adjacent ACM panels with sealant backing and sealant in accordance with requirements specified in Section 07 92 00 "Joint Sealants."

D. Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install accessory components required for a complete ACM system assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by ACM system manufacturer.

E. 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 are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install trim to fit substrates and to result in waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.3 INSTALLATION TOLERANCES

A. Shim and align ACM panels within installed tolerance of 1/4 inch in 20 ft., non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed ACM system installation, including accessories.

B. ACM system will be considered defective if it does not pass test and inspections.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.5 CLEANING

A. Remove temporary protective coverings and strippable films as ACM panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, clean finished surfaces as recommended by ACM panel manufacturer. Maintain in a clean condition during construction.

B. After installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

3.6 PROTECTION

A. Replace ACM panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 46 46
FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fiber-cement siding and soffit.

1.2 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.3 SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Product Certificates: For each type of fiber-cement siding and soffit.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

D. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.

E. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish full lengths of fiber-cement siding and soffit including related accessories, in a quantity equal to 2 percent of amount installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including cracking and deforming.

b. Deterioration of materials beyond normal weathering.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 FIBER-CEMENT SIDING

A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.

B. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Siding: Lap siding, smooth finish, factory primed, field painted. Confirm available widths to match as closely as possible to existing siding widths. To be used in 1 hr. rated exterior wall at Vestibule 101, JH/FCS 60-02 rating, ASTM E119.

1. Basis-of-Design: James Hardie Artisan Collection Hardie Plank lap siding; smooth finish.

D. Factory Priming: Manufacturer's standard acrylic primer.

2.3 FIBER-CEMENT SOFFIT

A. Soffit Panels: Smooth finish, factory primed, field painted, 48” x 96” x 1/4”, butt joined and caulked; with a flame-spread index of 25 or less when tested according to ASTM E 84.

B. Ventilation: Provide unperforated soffit unless otherwise indicated.

C. Factory Priming: Manufacturer's standard acrylic primer.

2.4 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.

1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.

B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:

1. Corner posts.

2. Door and window casings.

3. Fasciae.

4. Moldings and trim.

C. Flashing: Provide aluminum flashing complying with Section 076200 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.

1. Finish for Aluminum Flashing: High-performance organic finish.

D. Fasteners:

1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch into substrate.

2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch, or three screw-threads, into substrate.

3. For fastening fiber cement, use stainless-steel fasteners.

E. Insect Screening for Soffit Vents: Stainless steel, 18-by-18 mesh.

F. Continuous Soffit Vents: Aluminum, hat-channel shape, with perforations; 2 inches wide and not less than 96 inches long.

1. Finish: Factory painted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and soffit and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.

2. Install fasteners no more than 24 inches o.c.

B. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION

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SECTION 07 54 19
PVC THERMOPLASTIC SINGLE-PLY ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Adhered system with PVC thermoplastic roofing membrane.
   1. Include covering of duct above building link.
B. Insulation, flat and tapered.
C. Flashings.
D. Roofing cant strips, stack boots and walkway pads.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Emergency Response Plan:
   1. Any damage to the building caused by the Work, leaks or accidents must be addressed immediately by the Contractor as an emergency.
   2. The Contractor must respond to leaks or problems at the site during construction with a repair crew within three hours of phone notification.
   3. Provide a complete emergency telephone list for at least three responsible company representatives that will be on call during the course of the Project; include cell phone numbers, pager numbers and home phone numbers.
   4. Designate one emergency contact in writing to Owner on a weekly basis.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's written information listed below.
   1. Product data indicating membrane materials, flashing materials, insulation, surfacing and fasteners.
   2. Copies of specification; if deviations from Contract Specifications are required by the roofing system manufacturer, clearly indicate such deviations.
B. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
   1. Submit dimensioned shop drawings including:
      a. Outline of roof area(s) with dimensions.
      b. Plan locations and profile details of flashing methods for penetrations and terminations.
      c. Typical and special details, including those that differ greatly from the published documents.
      d. Tapered insulation layouts with high and low elevations, drain locations, etc.
      e. Metal batten and termination bar locating plans.
      f. Technical acceptance from roofing system manufacturer.
   2. Submit plan with engineered system attachment plan to comply with wind uplift requirements for indicated criteria and windstorm resistance classification.
C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
   1. Submit evidence of meeting performance requirements.
      a. Include wind uplift design specific to this project, with uplift pressures indicated on roof plan and manufacturer’s certification of the system’s capability to perform to the requirements; indicate product names in certification.

b. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

c. Research/Evaluation Reports: For components of membrane roofing system.

d. Manufacturer's product data including Energy Star certificate and emissivity data.

2. Associated Products Certificate: Provide a letter, on the roofing manufacturer's letterhead and signed by representative of the roofing manufacturer, accepting the products selected by the installer for prefabricated metal edge systems, prefabricated expansion joints, and insulation to be covered within the total system warranty.

3. Provide letter from roofing manufacturer providing materials and warranty for this project, indicating installer is qualified under the program listed under the Quality Assurance provisions of this section.

D. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application and supplementary instructions given.

E. Specimen Warranty: For approval.

F. Warranty:

1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

G. Qualification Data: For qualified Installer and manufacturer.

1. Provide letter from roofing manufacturer providing materials and warranty for this project, indicating installer is qualified under the program listed under the Quality Assurance provisions of this section.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum twenty (20) years of documented experience.

B. Installer Qualifications:

1. Qualified firm approved by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

a. Firm experienced in installation of system to be provided for this project.

b. Firm having successful completion of minimum 5 projects of comparable scale and complexity within three years of bid date, with same roofing manufacturer proposed for this Project.

c. Firm having adequate number of skilled workmen experienced with the specified requirements and the methods needed for proper performance of the work in this section.

2. Maintain full-time supervisor/foreman, not workman/foreman, on job site during times that roofing work is in progress. Supervisor must have minimum of three years' experience in roofing work comparable to scale and complexity of this project.

3. Installer must have a repair crew or shall contract with a repair crew within a 100 mile radius of the project.

C. Installer Certification:

1. Installer must be certified by the manufacturer providing product for this project, within that manufacturer's quality or training program listed below:

a. Certified Applicator; Carlisle Syntec.

b. Sarnifil Registered Contractor; Sika Sarnifil.

c. Authorized Soprema Contractor (through Contractor’s Training Program); Soprema.

d. Certified Applicator; Tremco.

e. Gold Medal Quality Contractor; Versico.

f. NRCA PRO Certification Program is acceptable in place of a manufacturer’s program.

2. The installer’s ability to purchase materials to perform the Work of this Project is not acceptable instead of official standing in one of the named programs.

3. Proposed alternative programs based on volume of work instead of performance or training are not acceptable.

D. Source Limitations:

1. Obtain components for membrane roofing system from roofing membrane manufacturer.

2. Obtain roof system components through sources acceptable to roofing manufacturer providing total system warranty. Provide a letter, on the roofing manufacturer's letterhead and signed by representative of the roofing manufacturer, accepting the products selected by the installer.

E. Should there be any deviation from the Contract Documents without the prior written consent of the roofing material manufacturer and the Architect; the Contractor must do all necessary corrective work to make the roof acceptable to the Architect at no additional cost to the Owner.

F. Provide a part time factory trained technician on the Project that is a full time employee of the manufacturer or an independent roofing consultant employed by the Contractor. Two days a week that production is being performed, the technical inspector must be on the project for a minimum of four hours.

1. Under the Contractor's option to hire an independent roofing consultant, the consultant must have minimum 5 years experience as an independent consultant. And the independent consultant can not be an employee of any other roofing company or have been an employee of this roofing installer in the past.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Protect products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.6 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

D. The installer shall take care during application and storage that overloading of the deck and structure does not occur.

E. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Where such access is absolutely required, the installer must provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas in accordance with roofing system manufacturer's recommendations.

F. Prior to and during applications, all dirt, debris and dust must be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods.

G. Liquid materials such as solvents and adhesives must be stored and used away from open flames, sparks and excessive heat.

H. Contaminants, such as petroleum products, acids, grease, fats, oils, and solvents must not be allowed to come into contact with the roofing membrane; any such contact must be reported to roofing system manufacturer's representative.

I. Contractor must verify that all roof drain lines are unblocked before starting work; report any blockages to the Architect immediately.

J. All landscaped areas damaged by construction activities shall be raked clean and restored to original condition.

1.7 WARRANTY

A. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.

1. Warranty Term: 25 years.

2. For repair and replacement include costs of both material and labor in warranty.

3. Warranty Type: Manufacturer's No-Dollar-Limit (NDL) form, without monetary limitation, 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.

a. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, substrate board, vapor retarder and other components of membrane roofing system.

b. The warranty will be a total system warranty; no exclusion of any materials including perimeter metal, metal trim and expansion joints.

c. Warranty cannot exclude damage resulting from wind; warranty must cover roof damage resulting from wind speeds up to and including 60 mph.

d. Manufacturer's roof system warranty must include repair of damages caused by winds less than the wind speed used for Design Velocity Pressure Calculation submitted with shop drawings.

B. Special Project Warranty: Submit roofing installer's warranty, signed by installer, covering work of this section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, and walkway products, for the following warranty period.

1. Warranty Term: 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Carlisle SynTec:

1. Project Standard: 80 mils (0.080 inch) SureFlex PVC.

B. Sika Sarnafil (U.S.) Inc.: (Basis-of-Design)

1. Project Standard: 80 mils (0.080 inch) G410.

C. Soprema:

1. Project Standard: Sentinel P200 80 mils (0.080 inch).

D. Tremco:

1. Project Standard: 80 mils (0.080 inch) TPA.

E. Versico:

1. Project Standard: 80 mils (0.080 inch) VersiFlex PVC.

2.2 ROOFING APPLICATIONS

A. PVC Membrane Roofing: One ply membrane, fully adhered, over insulation.

B. Roofing Assembly Performance Requirements and Design Criteria:

1. Solar Reflectance Index (SRI): Minimum of 64 based on three-year aged value; if three-year aged data is not available, minimum of 82 initial value.

a. Calculate SRI in accordance with ASTM E1980.

b. Field applied coating may not be used to achieve specified SRI.

2. Roof Covering External Fire Resistance Classification: Class A when tested per UL 790.

3. Wind Uplift:

a. Designed to withstand wind uplift forces calculated with ASCE 7.

b. Refer to Structural Drawings for additional project specific requirements.

2.3 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:

1. Material: Polyvinyl chloride (PVC) complying with ASTM D4434/D4434M; Type II or Type IV.

a. Material 50 percent or more above reinforcing scrim for 80 mil products; minimum 27 mils above scrim for 60 mil products.

2. Sheet Width: Factory fabricated into largest sheets possible.

3. Color: To be selected by Architect from manufacturer's full color range.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: As recommended and approved by membrane manufacturer.

D. Flexible Flashing Material: Same material as membrane.

1. Thickness: 60 mils (0.060 inch), minimum.

E. Base Flashing: Provide waterproof, fully adhered base flashing system at all penetrations, plane transitions, and terminations.

1. Thickness: 60 mils (0.060 inch), minimum; preformed corner and T accessories to be as indicated under accessories.

2.4 INSULATION

A. Composite Polyisocyanurate (ISO) Board Insulation: ASTM C1289, Type II, Class 2 - Faced with coated polymer-bonded glass fiber mat facers on both major surfaces of the core foam, laminated to high density polyisocyanurate cover board.

1. Core Foam Grade and Compressive Strength: Grade 2, 20 psi, minimum.

2. Maximum single layer to be 2.6 inches.

B. Insulation Performance Across Roof Areas: U = 0.032 or better, using LTTR values; taper to drain cannot be less than 1-inch below minimum insulation thickness determined by performance requirement.

C. Fabrication of tapered insulation:

1. Factory pre-cut boards not to exceed 4' x 4' with top surface cut to provide a continuous slope indicated on Drawings.

2. Tapered insulation exceeding 4 inches shall be in two layers, to include starter and filler blocks fabricated to assure staggering of all vertical joints both ways between layers.

3. All miters shall be factory cut, consisting of two diagonally cut abutting blocks with matching edges and thickness.
4. Each piece shall be identified in accordance with reviewed shop drawings.

2.5 ACCESSORIES

A. Prefabricated Flashing Accessories:
   1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
      a. PVC Inside Corners; 80 mils (0.080 inch) thick.
      b. PVC Outside Corners; 80 mils (0.080 inch) thick.
      c. PVC T-Joint Covers; 60 mils (0.060 inch) thick, 4-1/2 inch diameter.
   2. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.
      a. PVC Molded Pipe Flashings; for pipes 1 inch to 6 inches in diameter.
      b. PVC Split Pipe Seals; for pipes 1 inch to 6 inches in diameter.
      c. PVC Square Tubing Wraps. 3 inches, 4 inches, and 6 inches square.
      d. PVC Molded Sealant Pockets. 6 inches by 7-1/2 inches oval; in white membrane only.

B. Walkway Rolls: Sure-Flex Heat Weldable Walkway Rolls; 80 mils (0.080 inch) thick; gray membrane.

C. PVC Roof Walkway, Loose-Laid:
   1. Basis-of-Design: Carlisle SynTec; Product Sure-Flex PVC Crossgrip Walkway.
      a. Provide white product at area indicated for full coverage of material; gray for designated walkways.
   2. Design of product cannot restrict flow of water.
   3. Certified Slip Resistance: ASTM F1677; 1.0/0.9 (dry/wet)
   4. Provide means to connect runs of walkway product at intersections corners and end joints as recommended by manufacturer; for area of full coverage provide connection of side abutting joints of product runs, as recommended by manufacturer.

D. Miscellaneous Flashing: Non-reinforced PVC membrane; 80 mils (0.080 inch) thick, in manufacturer's standard lengths and widths.
   1. Wall and Curb Flashing (Basis-of-Design): Sarnaclad.

E. Insulation Adhesive: Two component polyurethane, expanding foam.

F. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
   1. Length as required for thickness of insulation material and penetration of deck substrate.
   2. Fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470.
   3. The same brand fastener is to be used throughout the Work.
   4. Number of fasteners and layout must be as recommended by the manufacturer and as per engineered wind uplift resistance design.
   5. Length of fastener to vary with the thickness of the insulation.
      a. Fasteners must be of appropriate length to achieve a consistant 1-inch penetration in areas of exposed metal deck; Contractor will be required to cut exposed fasteners of obvious varied lengths.

b. Fasteners in areas of cellular roof deck or roof decks with dovetail flute design must be of length to remain concealed in design of steel deck; exposed fasteners in these areas will not be permitted.

G. Membrane Adhesive: As recommended by membrane manufacturer.

H. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

I. Sealants: As recommended by membrane manufacturer.

J. Cleaner: Manufacturer's standard, clear, solvent-based cleaner.

K. Edgings and Terminations: Manufacturer's standard edge and termination accessories.

1. Perimeter Edge System: Refer to Section 07 71 00 - Manufactured Roof Specialties.

2. Coping: Refer to Section 07 71 00 - Manufactured Roof Specialties.

3. Termination Bar:

a. Typical: Roofing manufacturer-accepted, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

b. Exposed Locations where indicted: Provide prefabricated product manufactured or accepted by roofing manufacturer, of a continuous retainer shape to accept snap-on cover concealing fasteners; fluoropolymer finish in color to be selected by Architect.

c. Products:

1) OMG; Product Snap-On Face Reglet.

2) Metal Era; Product CF-175/CB-175.

3) Roofing manufacturer providing roofing system for this Project.

4. Separation of membrane roofing on vertical surface and weather resistive barrier:

a. Basis-of-Design: Aluminum Tape; 2” wide pressure-sensitive aluminum tape.

b. Other Manufacturers: Flexible stainless steel; 2 mil Type 304. Product cannot include a polymer fabric/coating.

1) York Manufacturing, Inc; York 304 SA.

2) Wire-Bond; Bond-N-Flash S.A.

L. Fasteners: Fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470.

1. General: Non-ferrous metal or galvanized steel, except hard copper nails must be used with copper; aluminum or stainless steel nails must be used with aluminum; and stainless steel nails must be used with stainless steel.

2. Wood: Roofing nails of galvanized steel, long enough to penetrate the wood by at least 3/4 inch on flashings and parapet walls.

a. Provide fasteners with hot-dip zinc coating complying with ASTM A 153 and thickness to prevent corrosion with chemical preservative or fire-resistive treatments; G-185 designation or heavier coating.

3. Masonry: Nail-in expansion type device with zinc body, plated steel nail, mushroom head and long enough to embed into the masonry a minimum of 1inch.

M. Wood Nailers: Refer to Division 6.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

F. It is the intent of this specification that the roofing system be installed as a complete assembly. Installation shall not proceed until all nailers and blocking are in place, all openings in the roof deck are permanently supported with steel framing, all curbs, skylights, smoke vents, and similar equipment are on the project site ready for installation, and all work of other trades on the roof is completed to the extent practical.

3.2 PREPARATION, GENERAL

A. Clean substrate thoroughly prior to roof application.

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.

3.3 INSTALLATION - GENERAL

A. Perform work in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

F. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

G. Wood Nailers:

1. Install continuous treated wood nailers as detailed.

2. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot in any direction. Fastener spacing shall be a maximum of 3 feet on center. Fasteners shall be installed within 6 inches of each end. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.

3. Allow a 1/2 inch open space between adjacent lengths of nailers.

4. Thickness shall be as required to match substrate or insulation height.

5. Existing woodwork that is in questionable condition shall be removed and replaced with suitable new materials.

3.4 INSULATION

A. Attachment of Insulation over Metal Deck:

1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.

a. Comply with wind uplift requirements for indicated criteria and windstorm resistance classification.

b. Fasteners in areas of cellular roof deck or roof decks with dovetail flute design must be of length to remain concealed in design of steel deck; exposed fasteners in these areas will not be permitted.

2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.

a. Comply with wind uplift requirements for indicated criteria and windstorm resistance classification.

B. Do not install wet, damaged, or warped insulation boards.

C. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

E. Lay boards with edges in moderate contact without forcing, and gap between boards no greater than 1/4 inch. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

F. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.

G. Do not apply more insulation than can be completely waterproofed in the same day.

3.5 MEMBRANE APPLICATION

A. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technician or independent consultant.

B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

C. Shingle joints on sloped substrate in direction of drainage.

D. Fully Adhered Application: Apply adhesive to substrate at rate required by manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

E. Seam Welding:

1. Seam Welding: Overlap edges and ends and seal seams by heat welding, minimum 2 inches.

2. Cover all seams with manufacturer's recommended joint covers.

3. Probe all seams once welds have thoroughly cooled. (Approximately 30 minutes.)

4. Repair all deficient seams within the same day.

5. Seal cut edges of reinforced membrane after seam probe is complete.

F. At intersections with vertical surfaces:

1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.

2. Fully adhere flexible flashing over membrane and up to nailing strips.

3. Insert flashing into reglets and secure.

G. Perimeter Metal Work including Expansion Joints:

1. Complete all metalwork in conjunction with roofing and flashings so that a watertight condition exists daily.

2. Metal shall be installed to provide adequate resistance to bending and to allow for normal thermal expansion and contraction.

3. Metal joints shall be watertight.

H. Install prefabricated joint components in accordance with manufacturer's instructions.

I. Coordinate installation of roof drains and sumps and related flashings.

J. Install walkway pads. Space pad joints to permit drainage.

K. Daily Seal: Install daily seal per manufacturers instructions at the end of each work day. Prevent infiltration of water at incomplete flashings, terminations, and at unfinished membrane edges.

3.6 FIELD QUALITY CONTROL

A. Manufacturer Inspection Service:

1. Keep the Architect and Owner informed as to the progress and quality of the Work as observed.

2. Provide job site inspections:

a. Refer to Quality Assurance subsection of this section.

b. Provide a written report when onsite indicating the exact hours present.

3. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

B. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.

1. Electric Field Vector Mapping (EFVM): Testing agency shall survey entire roof area for potential leaks using electric field vector mapping (EFVM).

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

2. There will be no deviation from this Section, without prior written consent of the Architect and manufacturer, who will have the option of refusing to accept the installation.

3. Confirm that the manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

4. Repair of Deficiencies: Installations or details noted as deficient during Final Inspection must be repaired and corrected by applicator, and made ready for reinspection, within five working days.

5. Warranty will be issued upon approval of the installation.

D. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 CLEANING

A. Remove wrappings, empty containers, paper, and other debris from the roof daily. Dispose of debris in compliance with local, State, and Federal regulations.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.8 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

1. Permit free drainage.
2. Round all edges and corners of wood bearing on roof surface.
3. Receive review and approval of manufacturer's technician or independent consultant before any traffic is permitted over roofing.

C. Inspect roofing for deterioration and damage, describing its nature and extent in a written report copied to Architect and Owner, at removal of protection.

D. Protection of Property:

1. Provide protection of property during course of roofing Work.
2. Protect lawns, shrubbery, paved areas, and building from damage; necessary repair of damages will be at no extra cost to Owner.

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SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following sheet metal flashing and trim:

1. Manufactured reglets.
2. Formed wall flashing and trim.
3. Exposed trim not part of other assemblies.
4. Parapet wall covering.

1.2 PERFORMANCE REQUIREMENTS

A. General: 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. 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.

C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:

1. Identify material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
4. Details of expansion-joint covers, including showing direction of expansion and contraction.

C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.

1. Include similar samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches long. Include fasteners, closures, and other attachments.
2. Trim: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

1.4 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Mockups: Demonstrate aesthetic effects and set quality standards for fabrication and installation, as appropriate within wall construction mockups required under other sections.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements.

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, and roof-mounted equipment.

2. Review methods and procedures related to sheet metal flashing and trim.

3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.

4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 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.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. 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.

1.6 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 PRODUCTS

2.1 SHEET METALS

A. 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:

1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

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 2604.

b. Color: Match Architect's samples.

2. Aluminum Thickness: Fabricate components not specified under other Sections or indicated on Drawings, from coil stock minimum thickness 0.040 inch.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

1. Finish: No. 2D (dull, cold rolled).

2. Through-wall: Minimum 0.0156 inch thick.

2.2 MISCELLANEOUS MATERIALS

A. General: 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.

1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.

2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.

3. Blind Fasteners: High-strength stainless-steel rivets.

C. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory- mitered and -welded corners and junctions.

1. Available Manufacturers:

a. Fry Reglet Corporation.

1) Heckmann Building Products Inc.

2) Hickman, W. P. Company.

3) Keystone Flashing Company, Inc.

4) Sandell Manufacturing Company, Inc.

b. Material: Stainless steel, 0.0187 inch thick.

c. 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.

d. Masonry Type: Provide with top flange to set in mortar joint; bent leg to resist pull-out.

e. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.4 FABRICATION, GENERAL

A. General: 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.

C. 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.

1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

E. 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 sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. 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.

2.5 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12 foot long, sections, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch- high end dams. Fabricate from the following material:

1. Stainless Steel: 0.0156 inch thick.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

B. 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.

1. Coat side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

E. 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.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement 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 sealant concealed within joints.

G. 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.

1. Aluminum: Use aluminum or stainless-steel fasteners.

2. Stainless Steel: Use stainless-steel fasteners.

H. Seal joints sealant as required for watertight construction.

1. 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.

2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.

1. Do not solder prepainted, metallic-coated steel and aluminum sheet.

2. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.

3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

J. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

3.3 WALL FLASHING INSTALLATION

A. General: 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.

3.4 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. 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.

D. 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

SECTION 07 71 00
ROOF SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Custom roof specialties, including copings and fascias.

B. Expandable flashings for rain leaders.

C. Underlayment (transition) membrane materials for built in gutter details and roof perimeter underlayment.

1.2 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems.

C. NRCA (RM) - The NRCA Roofing Manual.

D. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.3 PERFORMANCE REQUIREMENTS

A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal Movements: Provide manufactured roof specialties 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 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.

C. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.

D. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to ANSI/SPRI/FM 4435/ES-1 and capable of resisting the project specific design pressures per IBC.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, provide data on shape of components, materials and finishes, anchor types and locations.

B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

1. Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work. Include the following:

2. Details for fastening, joining, supporting, and anchoring manufactured roof specialties including fasteners, clips, cleats, and attachments to adjoining work.

3. Details for expansion and contraction.

4. Details of termination points and assemblies, including fixed points.

5. Details of special conditions.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings and roof edge flashings with performance requirements.

D. Warranty: Special warranty specified in this Section.

E. Samples: Submit two samples of finished material in color selected, 2 x 4 inch in size, illustrating component finish, and color.

F. Certifications:

1. Provide certification from roofing manufacturer stating systems of this section will be accepted within the roofing system warranty.

2. Provide manufacturer certificate confirming compliance with provisions of this section and others required by the roofing manufacturer.

1.5 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

B. Manufacturer Qualifications: Manufacturer capable of providing engineering and field service representation during construction.

1. Company with a minimum of ten years of continuous experience manufacturing perimeter metal systems of the type specified and capable of providing the following information.

2. List of five other projects of similar size, including approximate date of installation and name of architect for each.

C. Product Qualifications: Products must be accepted by roofing manufacturer within the total system warranty and listed by name on the roofing manufacturer's letterhead.

D. Preinstallation Conference: Installer and manufacturer' s representative to participate in roofing system preinstallation conference.

1.6 COORDINATION

A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.7 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

B. Special Warranty for Wind Resistance:

1. Manufacturer shall guarantee that a standard size roof edge system, when installed per manufacturer’s instructions, will not blow off, leak, or cause membrane failure,

even in wind conditions up to 110 mph, or the manufacturer shall at their option repair or replace their materials.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Custom Roof Edge Copings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.

1. Configuration: Refer to Drawings; wet seal joint installation.
2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by IBC 2015 - International Building Code and applicable local building code.
3. Material: Select from the following.
   a. Formed aluminum plate, 0.125 inch thick minimum.
   b. Aluminum Composite Panel, 5mm thick minimum; fire-resistant core.
4. Finish: 70 percent polyvinylidene fluoride.
5. Color: To be selected by Architect from manufacturer's full range.
6. Provide matching mitered and welded corner units; field verify actual constructed angles for factory-fabricated project-specific prefabricated corners.
7. Available Products:
   a. Reynobond/Alpolic.
   b. Metal Sales and Service/Metalwerks.

B. Roof Edge Fascia: Manufactured, three-piece, roof edge fascia consisting of snap-on aluminum fascia cover in section lengths not exceeding 12 feet, concealed joint splice, and a continuous extruded aluminum retainer, with integral cleat.

1. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by IBC 2015 - International Building Code and applicable local building code.
2. Available Products: Flush face design, with concealed (blind) drip.
   a. TerminEdge EX by OMG Edge Systems.
   b. PAC-TITE WT Fascia by PAC-CLAD Petersen, a Carlisle Company.
   c. Anchor-Tite HG Fascia by Metal-Era.
   d. Roofing Manufacturer.
3. Fascia Cover: Fabricated from the following exposed metal:
   a. Aluminum: Minimum 0.063 inch thick.
4. Fascia Cover Color: ATAS Silversmith or match by other named manufacturers.
5. Provide matching mitered and welded corner units; field verify actual constructed angles for factory-fabricated project-specific prefabricated corners.
6. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

C. Expandable Flashings for Rain Leaders:

1. DekTite Series of products by ITW Buildex.

2.2 CONCEALED METALS

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

C. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

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 polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.4 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).

2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).

3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.

b. Grace Construction Products, a unit of W. R. Grace & Co; Ultra.

c. Henry Company; Blueskin PE200 HT.

d. Owens Corning; WeatherLock Metal High Temperature Underlayment.

B. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

2.5 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2. 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.

B. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected by Architect from manufacturers full range.

2.6 ACCESSORIES

A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

B. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

B. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.3 INSTALLATION

A. Install components in accordance with manufacturer's instructionsand NRCA (RM) applicable requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.

1. Install manufactured roof specialties with provisions for thermal and structural movement.

2. Torch cutting of manufactured roof specialties is not permitted.

B. Seal joints within components with elastomeric sealant when required by component manufacturer for watertight assembly.

C. 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 manufacturer.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.

D. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.

E. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

F. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.

G. Fasteners: Use fasteners of type and size recommended by manufacturer but 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.

H. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties, for watertight assembly.

3.4 COPING INSTALLATION

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings to resist uplift and outward forces according to performance requirements.

3.5 ROOF EDGE FLASHING INSTALLATION

A. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings to resist uplift and outward forces according to performance requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess sealants.

B. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings and pieces of flashing. Maintain in a clean condition during construction.

C. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 23
GUTTERS AND DOWNSPOUTS

PART1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pre-fabricated aluminum gutters and downspouts.
2. Inline downspout cleanouts.

1.2 REFERENCES

A. American Architectural Manufacturers Association:

1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM International: ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. Federal Specification Unit: FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

D. Sheet Metal and Air Conditioning Contractors' National Association, Inc.: SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

B. Product Data: Submit data on manufactured components, materials, and finishes.

C. Samples: Submit two samples, 24 inches long illustrating component design, finish, color, and configuration.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA Manual; maintain one copy of manual on site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack products to prevent twisting, bending, and abrasion, and to provide ventilation; slope to drain.

B. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

A. Available Manufacturers:

1. ATAS.
2. Berger Building Products Corp.
3. Metal-Era.
4. W.P. Hickman Company.

B. Product Description:

1. Gutters: SMACNA profile; Figure 1-2.

a. Aluminum Half Round Painted Single Bead 6"; 0.027 Royal Brown (BR) to match existing.

b. Aluminum box gutter at canopy (roofer confirm size)

2. Downspouts: SMACNA round profile; Figure 1-32A.

a. 4” painted aluminum downspout Royal Brown (BR) to match existing.

3. Downspouts - Entry Hall #100 East and West Elevations: 3” painted aluminum downspouts’ painted Royal Brown (BR) to match existing.

C. Performance Requirement:

1. SPRI Wind Design Standard: Manufacture and install roof-edge flashings tested according to ANSI/SPRI/FM 4435/ES-1 and capable of resisting the project specific design pressures per IBC.

2.2 COMPONENTS

A. Pre-Finished Aluminum Sheet:

1. ASTM B209, manufacturer’s standard alloy and temper for specified finish; shop pre-coated with three coat PVDF (polyvinylidene fluoride) coating.

a. Gutters: 0.050 inch thick.

b. Downspouts: 0.050 inch thick.

2. Color: Bronze.

2.3 ACCESSORIES

A. General: “C” style end caps, 90 degree mitered corners, brick hooks, plain round sickle hooks for wood, universal leaf strainers, and offsets as required.

B. Anchors and Supports: Profiled to suit gutters and downspouts.

1. Anchoring Devices: In accordance with SMACNA requirements.

2. Gutter Supports: Brackets and straps sized per SMACNA Table 1-8.

3. Downspout Supports: Brackets; SMACNA Figure 1-35E.

C. Strainers: 15 gage stainless steel wire baskets.

D. Fasteners: Aluminum or Stainless steel, with EPDM washers.

E. Protective Backing Paint: FS TT-C-494, Bituminous.

F. In-line Downspout Cleanouts:

1. Basis-of-Design: Zambelli 4-inch Downspout Cleanouts by RapidMaterials; material matched to downspout.

2.4 FABRICATION

A. Form gutters and downspouts of profiles and sizes indicated.

B. Fabricate with required connection pieces.

C. Form sections to shape indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance; allow for expansion at joints.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FACTORY FINISHING

A. PVDF (polyvinylidene fluoride) Coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 2605.

B. Color: Custom to match Architect's sample.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mils.

3.3 INSTALLATION

A. Join lengths with formed seams sealed watertight.

B. Support Spacing:

1. Gutters:

a. Brackets: 36 inch o.c.

b. Straps: 36 inch o.c. offset 18 inches o.c. of bracket locations.

2. Downspouts: SMACNA Figure 1-35.

C. Flash and seal gutters to downspouts and accessories.

D. Slope gutters minimum 1/16 inch per foot.

E. Provide gutter slip joints every 20 feet in length for contraction and expansion; seal joints with sealant of matching color.

F. Set downspouts plumb and not less than 1 inch from the wall.

G. Provide leaders to connect gutters on overhanging eaves to downspouts; set leaders with a slope not less than 1/16 inch per foot or more than 30 degrees below a horizontal line.

H. Fit leaders over the outlet tube in gutter bottom riveted to the downspout; rivet spacing shall be not more than 2 inches.

I. Set strainers loosely in the outlet tube opening in gutter.

J. Make joints between lengths of downspouts by telescoping the end of the upper lengths at least 3/4 inch into the lower length.

END OF SECTION

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SECTION 07 81 23
INTUMESCENT FIREPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Spray application of intumescent fire resistive coatings on interior, exposed structural steel with flange columns, beams, pipe columns, and related exposed structural steel to provide rated fireproofing.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1. Steel surfaces with less than 3 feet clear working access may necessitate applying material to inaccessible surfaces prior to erection of the finished steel members, either at the point of fabrication or on-site.

2. Coordinate sequence of Work with other trades.

1.3 SUBMITTALS

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Performance characteristics and test results.

2. Preparation instructions and recommendations.

3. Storage and handling requirements and recommendations.

4. Installation methods.

C. Manufacturer's Installation Instructions: Submit information including special procedures, and conditions requiring special attention.

D. Manufacturer's Certificate:

1. Certify applied fireproofing products meet or exceed specified requirements.

2. Certify acceptance of steel primer.

E. Submit certified test reports indicating the following:

1. Fire test reports of fireproofing application to substrate materials, including primers, similar to Project conditions, conducted in conformance to ASTM E 84 and ASTM E 119.

2. UL Design Listings from Underwriters Laboratories, Inc.

F. Submit applicator's current certification, by product manufacturer, as a factory trained and manufacturer approved installer of this product.

H. Contract Closeout Submittals:

1. Manufacturer's Field Reports: Indicate compliance with manufacturer's installation instructions and Contract Documents.

2. Contractor's Certificate: Provide certification to the Owner and the Architect at the completion of the Contract that the applied fireproofing is complete at all required locations and in conformance with the methods and materials of the appropriate UL Test Report.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Company specializing in manufacturing products specified in this Section, with minimum five years' experience.

2. Applicator: Company specializing in performing Work of this Section, with minimum five years' experience and approved by manufacturer.

B. Product: Manufactured under UL or Warnock Hersey Follow Up Program; each container or package to bear UL or Warnock Hersey label.

C. Regulatory Requirements:

1. Conform to applicable code for fire resistance ratings.

2. Submit certification of acceptability of fireproofing materials to authority having jurisdiction and to Architect.

1.5 MOCK-UP

A. Apply system to a column or beam selected by the Architect.

B. Examine installation to determine variances from specified requirements.

C. Receive Architect's approval prior to proceeding with Work; mock-up will serve a standard to installation and finish for remainder of Project.

D. Incorporate accepted mock-up as part of Work.

1.6 FIELD CONDITIONS

A. Do not apply sprayed intumescent fireproofing when temperature of substrate and surrounding air is below 50 degrees F.

B. Do not apply when surface temperature is less than 5 degrees F above the dew point.

C. Provide ventilation in areas to receive fireproofing during and 72 hours, minimum, after application, to dry materials.

D. Relative humidity in work area must not exceed 75 percent throughout the total period of application and drying for the intumescent fireproofing, and must not exceed 65 percent throughout the application and drying for the protective decorative finish coat; relative humidity of 40 percent to 60 percent is recommended in work area.

E. Maintain non-toxic, unpolluted working area; provide temporary enclosure to prevent spray from contaminating air.

1.7 WARRANTY

B. Provide two year manufacturer's warranty.

C. Provide one year applicator's warranty.

D. Warranty:

1. Fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation and blistering.

2. Reinstall or repair such defects or failures.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Provide fire rated assemblies to hourly rating or UL Design indicated on Drawings; when indicated by hourly rating, intumescent coating manufacturer will determine and submit an appropriate UL tested design.

B. Primer: Type recommended or approved by fireproofing manufacturer.

C. Topcoat: Suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.

D. Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

2.2 INTUMESCENT FIRE RESISTIVE COATINGS

A. Field-Applied Coating: Steel indicated to receive intumescent fire-resistive coatings and not particularly indicated to have shop-applied coatings. Contractor also has the option of shop-applying all intumescent coatings at his discretion.

1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

a. Albi Manufacturing, Division of StanChem, Inc.; Albi Clad TF.

b. International Paint Limited, subsidiary of Akzo Nobel N.V.; Interchar 1120.

c. Isolatek International; Cafco SprayFilm WB 5.

d. Sherwin-Williams Company; Firetex FX5120.

2. Application: Designated for "conditioned interior space purpose" use by a qualified testing agency acceptable to authorities having jurisdiction.

3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design.

4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.

5. Hardness: Not less than 60, Type D durometer, according to ASTM D 2240.

6. Finish: Spray-applied, back-rolled and sanded; appearance may be minor orange peel.

a. Color and Gloss: Match Architect's sample.

B. Shop-Applied Coatings: Provide at locations specifically indicated to be shop-applied finish; all steel indicated to receive intumescent fire-resistive coatings may have the coating shop-applied, at the contractor’s decision, and mars repaired in the field following transport and erection.

1. Availble Products: Subject to compliance with requirements, available products that may be incorporated into the Work under this Contractor Option include:

a. Interchar 212 manufactured by International Paint LLC.

b. Pitt Char by PPG Coatings.

c. THERMO-LAG 3000 by Carboline.

2. Finish: High decorative finish; spray-applied, back-rolled and sanded. Appearance may be minor orange peel.

a. Basis-of-Design: Finish Standard No. 3 of International Paint LLC.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify surfaces are ready to receive intumescent coatings.

B. Verify clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

C. Verify ducts, piping, equipment, or other items interfering with application of fireproofing have not been installed.

D. Verify voids and cracks in substrate have been filled and projections have been removed where intumescent coatings will be exposed to view as finish material.

E. Verify roof traffic has ceased and roof mounted equipment is in place.

F. Confirm compatibility of surfaces to receive fireproofing materials; steel surfaces should be primed with a compatible primer.

G. Beginning of installation means acceptance of project conditions.

3.2 PREPARATION

A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.

B. Remove incompatible materials affecting bond by scraping, brushing, scrubbing, or sandblasting.

C. Prepare substrates to receive intumescent coatings; Commercial Blast Cleaning (SSPC-SP6/NACE No. 3) is recommended for minimum surface preparation; weld flashes should be ground smooth prior to commencement of application.

D. Seal all penetrations or open ended fireproofing termination by chamfering at a 45 degree angle and sealing with high heat silicone sealant.

E. Install reinforcement over structural members as indicated on Drawings, or UL Fire Resistance Directory Listings.

F. Apply intumescent coatings manufacturer's recommended bonding agent on primed steel.

G. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.

H. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION

A. Apply primer according to primer manufacturer's recommendations; provide primer "cut-back" 3 inches for bolted connections and 12 inches for welded connections.

B. Apply intumescent base coat in sufficient thickness to achieve required fire ratings, with as many passes as necessary to cover with monolithic blanket of uniform appearance.

C. Apply color coat at rate recommended by fireproofing manufacturer.

D. Patch damaged Work.

3.4 FIELD QUALITY CONTROL

A. Field Inspection:

1. Provide independent third-party inspection of the installed intumescent coating after application and curing for integrity. Ensure that actual thicknesses and bond strengths meet requirements for specified ratings.

2. Verification of thickness is to be conducted in accordance with "Technical Manual 12B, Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide," published by the Association of the Wall and Ceiling Industries - International.

3. Independent third-party inspector to re-inspect the installed intumescent coating for integrity of fire protection, after installation of subsequent Work.
4. Repair or replace any damaged areas of intumescent coating.

B. Manufacturer's Field Services:

1. Observe site conditions, conditions of surfaces and installation, quality of workmanship, and initiate instructions when necessary.
2. Manufacturer's Field Reports: A representative directly employed by the manufacturer will document above observations; include environmental conditions under which fireproofing materials were installed.

C. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Test and inspect as required by the IBC, 1704.11.

D. Correct unacceptable Work and provide further inspection to verify compliance with requirements, at no additional cost.

3.5 ADJUSTING

A. Patch fireproofing, which has been cut away to facilitate work of other trades, so as to maintain complete coverage of full thickness on appropriate substrate.

3.6 CLEANING

A. Remove excess material, overspray, droppings, and debris.

B. Remove fireproofing from materials and surfaces not specifically required to be fireproofed.

3.7 PROTECTION

A. Protect adjacent surfaces and equipment from over-spray of sprayed materials.

B. Protect installed intumescent fireproofing from damage due to subsequent construction activities, so fireproofing is without damage or deterioration at time of Substantial Completion.

C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

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SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all openings, joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not.

C. Smoke seals to be accomplished with materials specified by this section.

1.2 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.

C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops.

E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.

G. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies.

H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

I. ITS (DIR) - Directory of Listed Products.

J. FM 4991 - Approval Standard for Firestop Contractors.

K. FM (AG) - FM Approval Guide.

L. SCAQMD 1168 - Adhesive and Sealant Applications.

M. UL 1479 - Standard for Fire Tests of Penetration Firestops.

N. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems.

O. UL (DIR) - Online Certifications Directory.

P. UL (FRD) - Fire Resistance Directory.

1.3 SUBMITTALS

A. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly and firestopping test or design number.

B. Product Data: Provide data on product characteristics, performance ratings and limitations.

1. Include product test reports of qualified testing agency.

C. Sustainable Design Submittal: Submit VOC content documentation for all non-preformed materials.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements including compatibility of all materials in contact with systems.

1.4 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with ASTM E119 and ASTM E814.

1. Listing in UL (FRD), FM (AG) or ITS (DIR) will be considered as constituting an acceptable test report.
2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:

1. Approved by Factory Mutual Research Corporation under FM 4991.
   a. Verification of minimum three years documented experience installing work of this type.
   b. Verification of at least five satisfactorily completed projects of comparable size and type.
   c. Licensed by local authorities having jurisdiction (AHJ).
   d. UL Qualified Firestop Contractor.
2. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to installer engaged by Contractor does not in itself confer qualification on buyer.

D. Assign installation of firestopping systems to a single qualified installer.

E. Source Limitations: Obtain firestopping systems, for each kind of joint and construction condition, through one source from a single manufacturer.

1.5 COORDINATION

A. Coordinate construction of joints, openings and penetrating items to ensure that firestopping systems are installed according to specified requirements.

B. Coordinate sizing of joints, sleeves, openings, core-drilled holes, or cut openings to accommodate fire-resistive joint systems.

C. Notify testing agency at least seven days in advance of firestopping system installations; confirm dates and times on day preceding each series of installations.

1.6 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.

C. Mold and Mildew Resistance: Provide firestoppping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

D. Compatibility: Provide materials that are compatible with joint substrates, under conditions of service and application, as demonstrated by firestopping system manufacturer based on testing and field experience.

E. Accessories: Provide components of firestopping systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required; use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems selected.

2.2 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.

1. Movement: Provide systems that have been tested to show movement capability as required.

2. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.

3. Air Leakage: Provide systems that have been tested to show L Rating as required.

4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as required.

B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.

1. Movement: Provide systems that have been tested to show movement capability as required.

C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.

1. Movement: Provide systems that have been tested to show movement capability as required.

2. Air Leakage: Provide systems that have been tested to show L Rating as required.

3. Watertightness: Provide systems that have been tested to show W Rating as required.

4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.

2. Air Leakage: Provide systems that have been tested to show L Rating as required.

3. Watertightness: Provide systems that have been tested to show W Rating as req1uired.

4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

E. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.

2.3 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.

1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

2. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

B. Provide fireproofing systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed; fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.

2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.

C. Joints at Exterior Curtain Wall/Floor Intersections:

1. Provide fire-resistive joint systems with rating determined by ASTM E 119 based on testing at a positive pressure differential of 0.01-inch wg or ASTM E 2307.

2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.

D. Penetrations in Fire-Resistance-Rated Walls:

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls and fire partitions.

2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

E. Penetrations in Horizontal Assemblies:

1. Horizontal assemblies include floors, floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.

2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.

3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

F. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

3.3 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Priming:

1. Prime substrates using firestopping manufacturer's recommended products and methods.

2. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3. Installer must use primer for applications of all firestopping systems regardless if the manufacturer may otherwise relieve the installer of primer use under conditions within acceptable parameters; installer will only be relieved of primer use when manufacturer documents the application to be non-compliant to tested assembly.

C. Do not cover installed firestopping until inspected by authorities having jurisdiction.

D. Install labeling required by code.

3.4 IDENTIFICATION

A. Identify firestopping systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Firestopping System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.

1. Inspecting of completed installations of firestopping systems to take place in successive stages as installation of fire-resistive joint systems proceeds; do not proceed with installation of firestopping systems for the next area until inspecting agency determines completed work shows compliance with requirements.
2. Inspecting agency must state in each report whether inspected firestopping systems comply with or deviate from requirements.
3. Perform additional inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.6 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.7 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

B. Provide final protection and maintain conditions during and after installation that ensure firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce firestopping systems complying with specified requirements.

END OF SECTION

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SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.2 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.

B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.

C. ASTM C834 - Standard Specification for Latex Sealants.

D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants.

H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.

I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

K. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.

L. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

M. SCAQMD 1168 - Adhesive and Sealant Applications.

N. SWRI (VAL) - SWR Institute Validated Products Directory.

1.3 SUBMITTALS

A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.

3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.

4. Substrates the product should not be used on.

5. Substrates for which laboratory adhesion and/or compatibility testing is required.

6. Sample product warranty.

7. Certification by manufacturer indicating that product complies with specification requirements.

8. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

F. Installation Plan: Submit at least four weeks prior to start of installation.

G. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

H. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

I. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

J. Installation Log: Submit filled out log for each length or instance of sealant installed.

K. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

1. Manufacturer must designate a representative authorized to prepare a manufacturer’s certificate, indicating compatibility of materials intended for each application.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.

1. Adhesion Testing: In accordance with ASTM C794.

2. Compatibility Testing: In accordance with ASTM C1087.

3. Stain Testing: In accordance with ASTM C1248.

4. Allow sufficient time for testing to avoid delaying the work.

5. Deliver to manufacturer sufficient samples for testing.

6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

7. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

E. Installation Plan: Include schedule of sealed joints, including the following.

1. Installation Log Form: Include the following data fields, with known information filled out.

a. Substrates.

b. Sealant used.

c. Stated movement capability of sealant.

d. Size and actual backing material used.

e. Date of installation.

f. Name of installer.

g. Actual joint width; provide space to indicate maximum and minimum width.

h. Actual joint depth to face of backing material at centerline of joint.

i. Air temperature.

F. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.

1. Identification of testing agency.

2. Name(s) of sealant manufacturers' field representatives who will be observing

3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.

a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.

b. Test date.

c. Sealant used.

d. Stated movement capability of sealant.

e. Test method used.

f. Date of installation of field sample to be tested.

g. Date of test.

h. Copy of test method documents.

i. Age of sealant upon date of testing.

j. Test results, modeled after the sample form in the test method document.

k. Indicate use of photographic record of test.

G. Field Quality Control Plan:

1. Visual inspection of entire length of sealant joints.

2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.

a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.

b. If any failures occur in the first 10 linear feet, continue testing at 12 inch intervals at no extra cost to Owner.

3. Field testing agency's qualifications.

4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

H. Field Adhesion Test Procedures:

1. Allow sealants to fully cure as recommended by manufacturer before testing.

2. Have a copy of the test method document available during tests.

3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
    a. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
5. Evaluation of Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
    a. Document cleaning and preparation procedures used for passing tests, to serve as standard practice for Project.

I. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
2. Repair failed portions of joints.

J. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.
1. Extent of Testing: Test completed and cured sealant joints as follows:
    a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
    b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.
2. 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.
3. 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.

K. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 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 (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish 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:
    a. Silicone Sealants: Twenty years from date of Substantial Completion for vertical applications.
    b. Silicone sealants for horizontal applications: Five years from date of substantial Completion.

B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 JOINT SEALANT APPLICATIONS

A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    a. Wall expansion and control joints.
    b. Joints between door, window, and other frames and adjacent construction.
    c. Joints between different exposed materials.
    d. Openings below ledge angles in masonry.
    e. Other joints indicated below.
2. Interior Joints: Interior joints to be sealed include, but are not limited to, the following items:
    a. Joints between door, window, and other frames and adjacent construction.
    b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
        1) Exception: Such gaps and openings in gypsum board finished stud walls and suspended ceilings.
        2) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
3. Do not seal the following types of joints.
    a. Intentional weepholes in masonry.
    b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    d. Joints where installation of sealant is specified in another section.
    e. Joints between suspended panel ceilings/grid and walls.

B. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.2 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
1. Prohibit Methylene chloride and perchloroethylene in sealants.

B. Installer must use primer for exterior assembly applications, including interior face of exterior wall joints, regardless if the manufacturer may otherwise relieve the installer of primer use under conditions within acceptable parameters; installer will only be relieved of

primer use when manufacturer documents the application to be non-compliant to tested assembly.

C. 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 joint-sealant manufacturer, based on testing and field experience.

D. Stain-Test-Response Characteristics: Where 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.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range; allow custom colors for masonry joints.

F. Minimum movement joint width 1/4-inch; minimum non-moving joint 1/8-inch.

2.3 NONSAG JOINT SEALANTS

A. Type A - Non-Staining Silicone Sealant: ASTM C920, Grade NS; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: 50 percent movement in both extension and compression, minimum.

2. Non-Staining To Porous Stone: When tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

4. Manufacturers:

a. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.

b. Pecora Corporation; 311 NS: www.pecora.com/#sle.

c. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.

d. Momentive Performance Materials; GE SCS 9000 Silpruf NB: www.siliconeforbuilding.com..

5. Joint Locations:

a. Exterior joints in vertical surfaces and horizontal non-traffic surfaces.

1) Construction joints in cast-in-place concrete.

2) Joints between plant-precast architectural concrete units.

3) Control and expansion joints in unit masonry.

4) Openings below ledge angles in masonry.

5) Joints between metal panels.

6) Joints between different materials.

7) Perimeter joints between materials listed above and frames of doors, frames and louvers.

8) Control and expansion joints in soffits and other overhead surfaces.

b. Interior joints.

1) Control and expansion joints on exposed interior surfaces of exterior walls.

2) Perimeter joints of exterior openings where indicated.

B. Type B - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.

1. Color: As selected by Architect from manufacturers full range.

2. Manufacturers:
    a. The Dow Chemical Company; DOWSIL 786 Mildew Resistant: consumer.dow.com/en-us/industry/ind-building-construction.html.
    b. Momentive Performance Materials; GE SCS 1700: www.siliconeforbuilding.com.
    c. Pecora Corporation; 898NST: www.pecora.com/#sle.
    d. Sika Corporation; Sikasil GP: www.usa-sika.com/#sle.
    e. Tremco Commercial Sealants & Waterproofing; Tremsil 200 Sanitary: www.tremcosealants.com/#sle.
3. Joint Locations:
    a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    b. Tile control and expansion joints.
    c. Other joints as indicated.

C. Type C - Hybrid Urethane Sealant: ASTM C920, Grade NS; single component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 35 percent, minimum.
2. Hardness Range: 20 to 40, Shore A, when tested in accordance with ASTM C661.
3. Color: Match adjacent finished surfaces.
4. Manufacturers:
    a. Sherwin-Williams Company; Stampede 1H Hybrid Sealant: www.sherwin-williams.com/#sle.
    b. Tremco Commercial Sealants and Waterproofing; Dymonic FC: www.tremcosealants.com/#sle.
    c. BASF; MasterSeal NP 100: www.master-builders-solutions.basf.us.
5. Joint Locations: Contractor may use either this Type C hybrid sealant or Type A silicone, at locations indicated under Type A; remain consistent throughout the project.

D. Type D - Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's full range.
4. Joint Locations: Interior joints in horizontal traffic surfaces.

E. Type E - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
1. Manufacturers:
    a. Pecora Corporation; AC-20+: www.pecora.com/#sle.
    b. Sherwin-Williams Company; Sherwin-Williams; S-W Sher-Max Ultra Acrylic Sealant: www.sherwin-williams.com/#sle.
    c. Top Gun, a brand of PPG Architectural Coatings; Top Gun 200: www.ppgpaints.com/#sle.
    d. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
    e. Bostik, Inc.; Chem-Calk 600.

f. BASF Building Systems; MasterSeal NP 520: www.master-builders-solutions.basf.us.

g. Momentive Performance Materials; RCS 20 Siliconized Acrylic Sealant: www.siliconeforbuilding.com.

2. Joint Locations: Interior joints in vertical surfaces and horizontal non-traffic surfaces.

a. Vertical joints on exposed surfaces of interior unit masonry or concrete walls and partitions.

b. Perimeter joints between interior wall surfaces and frames of interior doors, lites and elevator entrances.

c. Exposed joints in sound rated construction and exposed flanking sound paths, to be painted.

F. Type - F - Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

1. Products:

a. Acoustical Solutions; OSI SC-175 Acoustical Caulk: www.acousticalsolutions.com.

b. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.

c. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant: www.tremcosealants.com/#sle.

d. USG Sheet Rock Brand; Acoustical Sealant: www.usg.com.

2. Joint Locations: Covered or concealed joints in sound rated construction; covered or concealed flanking sound paths.

2.4 SELF-LEVELING SEALANTS

A. Type G - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .

1. Movement Capability: Plus and minus 25 percent, minimum.

2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.

3. Manufacturers:

a. The QUIKRETE Companies; QUIKRETE® Polyurethane Self-Leveling Sealant: www.quikrete.com/#sle.

b. Sherwin-Williams Company; Loxon SL2 Self-Leveling Smooth Polyurethane Sealant: www.sherwin-williams.com/#sle.

c. BASF Building Systems; MasterSeal SL 2 or SL 100: www.master-builders-solutions.basf.us.

d. Tremco Commercial Sealants & Waterproofing; THC-901 or Vulkem 445SSL.

4. Joint Locations: Exterior joints in horizontal traffic surfaces.

B. Type H - Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M and O; multi-component; explicitly approved by manufacturer for horizontal expansion joints.

1. Movement Capability: Plus and minus 25 percent, minimum.

2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.

3. Tensile Strength: 200 to 250 psi in accordance with ASTM D412.

4. Manufacturers:

a. Tremco Commercial Sealants & Waterproofing; THC-901 or Vulkem 445SSL: www.tremcosealants.com/#sle.

b. BASF Building Systems; MasterSeal SL 2: www.master-builders-solutions.basf.us.

c. Sherwin-Williams; S-W Loxon SL2 Self-Leveling Smooth Polyurethane Sealant: www.sherwin-williams.com/#sle.

C. Type I - Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.

1. Composition: Multi-component, 100 percent solids by weight.

2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.

3. Color: Concrete gray.

4. Joint Width, Minimum: 1/8 inch.

5. Joint Width, Maximum: 1/4 inch.

6. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.

7. Manufacturers:

a. Dayton Superior Corporation; Pro-Poxy P606: www.daytonsuperior.com/#sle.

b. Euclid Chemical Company; EUCO 700: www.euclidchemical.com/#sle.

c. Nox-Crete; DynaFlex 502: www.nox-crete.com/#sle.

d. W.R. Meadows, Inc; Rezi-Weld Flex: www.wrmeadows.com/#sle.

e. BASF Building Systems; MasterSeal CR 190: www.master-builders-solutions.basf.us.

D. Type J - Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.

1. Durometer Hardness, Type A: 75, minimum, after seven days when tested in accordance with ASTM D2240.

2. Color: Concrete gray.

3. Joint Width, Minimum: 1/8 inch.

4. Joint Width, Maximum: 3/4 inch.

5. Joint Depth: Provide product suitable for joints from 1/8 inch to 1 inch in depth excluding space for backer rod.

6. Manufacturers:

a. Adhesives Technology Corporation; Crackbond JF-311: www.atcepoxy.com/#sle.

b. ARDEX Engineered Cements; ARDEX ARDISEAL RAPID PLUS: www.ardexamericas.com/#sle.

c. Euclid Chemical Company; EUCO QWIKjoint UVR: www.euclidchemical.com/#sle.

d. Nox-Crete; DynaFlex JF-85: www.nox-crete.com/#sle.

e. SpecChem, LLC; Rapid Flex CJ: www.specchemllc.com/#sle.

f. BASF Building Systems; MasterSeal CR 100: www.master-builders-solutions.basf.us.

2.5 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.

2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.

3. Open Cell: 40 to 50 percent larger in diameter than joint width.

4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Secondary Joint Backing: Precompressed foam seals.

D. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

E. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

F. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.

1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.

2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.

3. Arrange for sealant manufacturer's technical representative to be present during tests.

4. Record each test on Preinstallation Adhesion Test Log as indicated.

5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.

6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.2 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

1. 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.

2. Clean porous joint substrate surfaces by brushing, grinding, 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 the following:

a. Concrete.

b. Masonry.

c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate 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 the following:

a. Metal.

b. Glass.

c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

E. Refer to preparation procedures documented by preconstruction testing, in producing acceptable results.

3.3 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

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.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

I. 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.

3.4 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.5 CLEANING

A. 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.

3.6 PROTECTION

A. 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.

A. END OF SECTION

SECTION 08 01 52.61
WOOD WINDOW REPAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes wood window repairs as follows:

1. Repairing wood windows and trim; building new units to match existing.

a. Wood storm windows to match existing screen panels.

b. Restoration of existing historic wood louvers with insect screen.

2. Reglazing.

a. Safety film to be added to Window W101.

b. Provide tempered glass to replace screens in all existing first floor window screen panels for energy efficiency standards.

c. Provide additional tempered glass panel to be to interior jamb of existing #W103 and #W104 in stair hall for safety at staircase.

d. Provide insulating glass units within existing openings as indicated on Drawings.

e. Refer to Window Schedule on Drawing A1.0 for additional requirements.

3. Repairing, refinishing, and replacing hardware; include new sash chords and weather-stripping.

1.2 QUALITY ASSURANCE

A. Wood-Window-Repair Specialist Qualifications: A qualified wood window specialist, experienced in repairing, refinishing, and replacing wood windows in whole and in part. Experience only in fabricating and installing new wood windows is insufficient experience for repairing wood windows.

B. Wood-Repair-Material Manufacturer Qualifications: A firm regularly engaged in producing wood consolidant and wood-patching compound that have been used for similar wood-repair applications with successful results, and with factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.

PART 2 - PRODUCTS

2.1 WOOD WINDOW REPAIRS, GENERAL

A. Quality Standard: Comply with applicable requirements in Section 6, "Interior & Exterior Millwork," in AWI/AWMAC/WI's "Architectural Woodwork Standards" for construction, finishes, grades of wood windows, and other requirements unless otherwise indicated.

1. Exception: Industry practices cited in Section 6, Article 1.5, Industry Practices, of the Architectural Woodwork Standards do not apply to the work of this Section.

2.2 WOOD-REPLACEMENT MATERIALS

A. Wood, General: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide.

1. Species: Match species of each existing type of wood component or assembly unless otherwise indicated.

B. Frame Heads and Jambs and Exterior Trim: Match existing species.

C. Exterior Trim: Match existing species.

D. Sills: Match existing species.

E. Interior Trim: Match existing species.

2.3 WOOD-REPAIR MATERIALS

A. Source Limitations: Obtain wood consolidant and wood-patching compound from single source from single manufacturer.

B. Wood Consolidant: Ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated due to weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

a. Abatron, Inc.; LiquidWood.

b. ConServ Epoxy LLC; Flexible Epoxy Consolidant 100.

c. Gougeon Brothers, Inc.; West System.

d. Protective Coating Company; PC-Petrifier PC-Rot Terminator.

e. System Three Resins, Inc.; RotFix.

C. Wood-Patching Compound: Two-part epoxy-resin wood-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

a. Abatron, Inc.; LiquidWood with WoodEpox.

b. Advanced Repair Technology, Inc.; Primatrate with Flex-Tec HV.

c. ConServ Epoxy LLC; Flexible Epoxy Consolidant 100 with Flexible Epoxy Patch 200.

d. Gougeon Brothers, Inc.; West System thickened with filler.

e. Polymeric Systems, Inc.; QuickWood.

f. Protective Coating Company; PC-Woody.

g. System Three Resins, Inc.; Sculpwood.

2.4 GLAZING MATERIALS

A. Glass: Refer to Section 08 55 00 “Wood Windows and 08 80 00 "Glazing." Match quality on aesthetic of glass provided in new windows, as specified in Section 08 55 00.

B. Glazing Systems:

1. Silicone Glazing Products: Glazing securement and silicone glazing sealant according to Section 088000 "Glazing"; struck uniformly to match taper of existing glazing system (removed); colored as required to match painted sash.

2. Primers and Cleaners for Glazing: As recommended in writing by glazing material manufacturer.

2.5 HARDWARE

A. Window Hardware: Provide complete sets of window hardware consisting of sash balances, hinges, pulls, latches, and accessories indicated for each window or required for proper operation. Sets shall include replacement hardware to complement repaired and refinished, existing hardware. Window hardware shall smoothly operate, tightly close, and securely lock wood windows and be sized to accommodate sash or ventilator weight and dimensions.

B. Other Hardware: Hardware shall smoothly operate, tightly close, and secure units appropriately for unit weight and dimensions.

C. Replacement Hardware: Replace existing damaged or missing hardware with new hardware manufactured by one of the following:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

a. Architectural Resource Center (The).

b. Ball and Ball.

c. Blaine Window Hardware Inc.

d. Bronze Craft Corporation (The).

e. Phelps Company.

f. Smith Restoration Sash.

D. Material and Design:

1. Material: Solid bronze of alloy indicated unless otherwise indicated.

2. Design: Match type and appearance of existing hardware.

3. Weight and Pulley Sash-Balance: Concealed weight and pulley balance system including steel or cast iron weights, cast-bronze pulleys, bronze sash chainor stainless-steel sash chain; size and capacity to hold sash stationary at any open position.

4. Spring Sash-Balance: Concealed spring-loaded, block-and-tackle type; size and capacity to hold sash stationary at any open position.

5. Replacement Window Hardware: Match existing window hardware of the following types:

a. Projected window hinge.

b. Window lock.

c. Window latch.

d. Handle.

e. Pole ring.

2.6 WEATHER STRIPPING

A. Compression-Type Weather Stripping: Compressible weather stripping designed for permanently resilient sealing under bumper or wiper action; completely concealed when window is closed.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

a. National Guard Products, Inc.

b. Pemko Manufacturing Co.

c. Reese Enterprises, Inc.

d. Zero International, Inc.

2. Weather-Stripping Material: Match existing materials and profiles as much as possible unless otherwise indicated.

a. Cellular Elastomeric Gaskets: Preformed; complying with ASTM C 509.

b. Dense Elastomeric Gaskets: Preformed; complying with ASTM C 864.

B. Sliding-Type Weather Stripping: Woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

a. National Guard Products, Inc.

b. Pemko Manufacturing Co.

c. Reese Enterprises, Inc.

d. Zero International, Inc.

2. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material.

C. Metal Weather Stripping: Bronze weather stripping; designed either as one piece to seal by sliding into a groove in the sash or as two pieces that interlock; and completely concealed when window is closed.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

a. Accurate Metal Weatherstrip Co. Inc.

b. Zero International, Inc.

2.7 MISCELLANEOUS MATERIALS

A. Borate Preservative Treatment: Inorganic, borate-based solution, with disodium octaborate tetrahydrate as the primary ingredient; manufactured for preserving weathered and decayed wood from further damage by decay fungi and wood-boring insects; complying with AWPA P5; containing no boric acid.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

a. Abatron, Inc.

b. Nisus Corporation.

c. System Three Resins, Inc.

B. Cleaning Materials:

1. Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.

2. Mildewcide: Commercial, proprietary mildewcide or a solution prepared by mixing 1/3 cup of household detergent that contains no ammonia, 1 quart of 5 percent sodium hypochlorite bleach, and 3 quarts of warm water.

C. Adhesives: Wood adhesives for exterior exposure, with minimum 15- to 45-minute cure at 70 deg F, in gunnable and liquid formulations as recommended in writing by adhesive manufacturer for each type of repair.

D. Fasteners: Use fastener metals that are noncorrosive and compatible with each material joined.

1. Match existing fasteners in material and type of fastener unless otherwise indicated.
2. Use concealed fasteners for interconnecting wood components.
3. Use concealed fasteners for attaching items to other work unless exposed fasteners are unavoidable or the existing fastening method.
4. For fastening metals, use fasteners of same basic metal as fastened metal unless otherwise indicated.
5. For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.
6. Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

E. Anchors, Clips, and Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel complying with requirements in ASTM B 633 for SC 3 (Severe) service condition.

2.8 WOOD WINDOW FINISHES

A. Factory-Primed Replacement Units: Manufacturer's standard factory-prime coat on exposed exterior and interior wood surfaces; compatible with indicated finish coating.

B. Factory-Finished Units: Alkyd finish system consisting of primer and two finish coats on exposed exterior and interior wood surfaces.

1. Finish Coats: Match intermediate coat and topcoat products used for adjacent, repaired wood windows.

PART 3 - EXECUTION

3.1 WOOD WINDOW REPAIRS, GENERAL

A. Have wood window repairs performed only by qualified wood-window-repair specialist.

B. Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the window interior at 5 feet away and from the window exterior at 20 feet away.

C. Execution of the Work: In repairing wood windows, disturb them as minimally as possible and as follows:

1. Stabilize and repair wood windows to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings and apply borate preservative treatment before repair.
    a. Use and alkaline paste or gel formulation for removing paint, without further deteriorating existing wood substrate.
3. Repair items in place where possible.
4. Install temporary protective measures to protect wood window work that is indicated to be completed later.
5. Refinish wood windows with semi-gloss exterior latex paint system; interior and exterior surfaces.
    a. Benjamin Moore & Co.:
        1) Primer: SuperSpec Latex Exterior Primer #169.
        2) First and Second Coats: SuperSpec Acrylic Latex Semigloss #170.
    b. Behr Process Corporation
        1) Primer: Premium Plus Int/Ext Multi-Surface Primer, 436
        2) First and Second Coats: Behr Pro e600 Exterior Semi-Gloss Paint, 670

c. PPG Glidden Professional:

1) Primer: Hydrosealer Exterior Primer Sealer 6001-1200.

2) First and Second Coats: Ultra-Hide 150 Exterior Semi-Gloss Paint 2416V.

d. PPG Architectural Coatings; PPG Paints:

1) Primer: Speedhide Exterior Acrylic Latex 6-609.

2) First and Second Coats: Speedhide Exterior Semi-Gloss Latex, 6-900XI Series.

e. Sherwin-Williams Company:

1) Primer: Exterior Latex Wood Primer .B42W8041.

2) First and Second Coats: A-100 Exterior Gloss Latex A8 Series.

f. McCormick Paints:

1) Primer: State House Exterior Acrylic Latex Primer 06438.

2) First and Second Coats: State House Exterior Lustre 100% Acrylic Latex House Paint 27.

D. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use gentle mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade wood substrate, reducing clarity of detail.

E. Repair and Refinish Existing Hardware: Dismantle window hardware; strip paint, repair, and refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.

F. Repair Wood Windows: Match existing materials and features.

1. Repair wood windows by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.

2. Sash Balance: Repair sash balances to function according to type as specified in "Hardware" Article" above. Provide missing sash balances.

G. Replace Wood Units: Where indicated, duplicate and replace units with units made from salvaged, sound, original wood or with new wood matching existing wood. Use surviving prototypes to create patterns for duplicate replacements.

H. Protection of Openings: Where sash or windows are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

I. Identify removed windows, frames, sash, and members with numbering system corresponding to window locations to ensure reinstallation in same location. Key windows, sash, and members to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.2 WOOD WINDOW PATCH-TYPE REPAIR

A. General: Patch wood members that exhibit depressions, holes, or similar voids and that have limited amounts of rotted or decayed wood.

1. Remove sash from windows before performing patch-type repairs at meeting or sliding surfaces unless otherwise indicated. Reglaze units before reinstallation.

2. Verify that surfaces are sufficiently clean and free of paint residue before patching.

3. Remove rotted or decayed wood down to sound wood.

B. Apply borate preservative treatment to accessible surfaces after removing rotted or decayed wood and before applying wood consolidant or patching compound. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom. Allow treatment to dry.

C. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood.

1. Prime patch area with application of wood consolidant or manufacturer's recommended primer.
2. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
3. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
4. Sand patch surface smooth and flush with adjacent wood, without voids in patch material, and matching contour of wood member.
5. Clean spilled compound from adjacent materials immediately.

3.3 WOOD WINDOW MEMBER-REPLACEMENT REPAIR

A. General: Replace parts of or entire wood window members at locations indicated on Drawings and where damage is too extensive to patch.

1. Remove sash from windows before performing member-replacement repairs unless otherwise indicated.
2. Verify that surfaces are sufficiently clean and free of paint residue before repair.
3. Remove broken, rotted, and decayed wood down to sound wood.
4. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member.
5. Secure new wood using finger joints, multiple dowels, or splines with adhesive and nailing to ensure maximum structural integrity at each splice. Use only concealed fasteners. Fill nail holes and patch surface to match surrounding sound wood.

B. Apply borate preservative treatment to accessible surfaces after replacements are made. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom.

C. Repair remaining depressions, holes, or similar voids with patch-type repairs.

D. Clean spilled materials from adjacent surfaces immediately.

E. Glazing: Reglaze units before reinstallation.

1. Mill new and rout existing glazed members to accommodate new glass thickness.
2. Provide replacement glazing stops coordinated with glazing system indicated.
3. Provide glazing stops to match contour of sash frames.

F. Reinstall units removed for repair into original openings.

G. Weather Stripping: Replace nonfunctioning and install missing weather stripping to ensure full-perimeter and meeting rail weather stripping for each operable sash.

3.4 GLAZING

A. Comply with combined written instructions of manufacturers of glass, glazing systems, and glazing materials, unless more stringent requirements are indicated.

B. Remove existing glass and glazing where indicated on Drawings, and prepare surfaces for reglazing.

C. Size glass as required by Project conditions to provide necessary bite on glass, minimum edge and face clearances, with reasonable tolerances.

D. Apply primers to joint surfaces where required for adhesion of glazing system, as determined by preconstruction testing.

E. Install setting bead, side beads, and back bead against stop in glazing rabbets before setting glass, according to glazing-system manufacturer's instructions.

F. Install glass with proper orientation so that coatings, if any, face exterior or interior as required.

G. Install glazing system. Install silicone glazing products as specified in Section 088000 "Glazing."

H. Disposal of Removed Glass: Remove from Owner's property and legally dispose of it unless otherwise indicated.

3.5 WOOD WINDOW UNIT REPLACEMENT

A. General: Replace existing wood window frame and sash units with new custom-fabricated units to match existing at locations indicated on Drawings; refer to Section 08 55 00.

3.6 WEATHER STRIPPING INSTALLATION

A. Install weather stripping for tight seal of joints as determined by preconstruction testing and demonstrated in mockup.

END OF SECTION

SECTION 08 14 23
ALUMINUM CLAD WOOD EXTERIOR DOORS

Part 1 General

1.1 SECTION INCLUDES

A. Aluminum Clad Wood Ultimate Outswing French Door complete with glazing, weather strip, hardware, simulated divided lite, raised panel, and standard or specified anchors; refer to Door Schedule on Drawings for additional requirements.

1.2 SYSTEM DESCRIPTION

A. Design and Performance Requirements: Design pressure are applicable to individual units and may vary with unit size

Product	Air Tested to psf	Water Tested to psf	Structural Tested to psf	Certification Rating	Design Pressure (DP)	Overall Width		Overall Height		# of Panels
						in	mm	in	mm	
Ultimate Outswing French Door IZ4 6080 (XX)	1.57	9.75	+97.5/-120	LC-PG65-SHD	+65/-80	(73)	(1845)	95 1/2	(2426)	2
Ultimate Outswing French Door IZ4 3080 (0)	1.57	9.75	+97.5/-120	LC-PG65-FD	+65/-80	(37)	(951)	95 1/2	(2426)	1

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings under provisions of Division 1.

B. Product Data: Submit catalog data under provisions of Division 1.

C. Samples:

1. Submit corner section under provisions of Division 1.
2. Include glazing system, quality of construction and specified finish

D. Quality Control Submittals: Certificates: submit manufacturer’s certification indicating compliance with specified performance and design requirement under provisions of Division 1.

1.4 QUALITY ASSURANCE

A. Requirements: consult local code for IBC (International Building Code) and IRC (International Residential Code) adoption year and pertinent revisions.

1.5 DELIVERY

A. Deliver in original packaging and protect from weather.

1.6 STORAGE AND HANDLING

A. Prime and seal wood surfaces, including to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation.

B. Store door panels flat on a level surface in a clean and dry storage area above ground to protect from weather.

C. Condition doors to local average humidity before hanging.

1.7 WARRANTY

A. Clear insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass is warranted against stress cracks caused by manufacturing defects from ten (10) years from the original date of purchase.

B. Standard exterior aluminum cladding finish is warranted against manufacturing defects resulting in chalk, fade and loss of adhesion (peel) per the American Manufacture's Association's (AAMA) Specification 2605-11 Section 8.4 and 8.9 for twenty (20) years from the original date of purchase.

C. Factory applied interior finish is warranted to be free from finish defects for a period of five (5) years from the original date of purchase.

D. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from the original date of purchase.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Description: Factory-assembled Ultimate Outswing French Doors as manufactured by Marvin Windows and Doors, Ripley, Tennessee

2.2 FRAME DESCRIPTION

A. Interior: Non Finger-Jointed Pine

1. Kiln-dried to moisture content no greater than twelve (12) percent at time of fabrication

2. Water repellant, preservative treated in accordance with WDMA I.S.4.

B. Frame exterior aluminum clad with 0.055" (1.4mm) thick extruded aluminum

C. Frame width: 4 9/16" (116mm)

D. Frame thickness: 1 1/16" (27mm)

E. ADA compliant threshold

2.3 SASH DESCRIPTION

A. Interior: Non Finger-Jointed Pine

1. Kiln-dried to moisture content no greater than twelve (12) percent at time of fabrication

2. Water repellant, preservative treated in accordance with WDMA I.S.4.

B. Sash exterior aluminum clad with 0.055" (1.4mm) thick extruded aluminum

C. Panel thickness: 1 3/4" (44mm)

D. Top rail and stile width: 4 3/4" (121mm)

E. Bottom rail height: 8 1/8" (206mm)

F. Panel corners glued and fastened with 5/8" x 4 inch (16mm by 102mm) fluted hardwood dowels.

2.4 FINISH

A. Exterior: Aluminum Clad. Fluoropolymer modified acrylic topcoat applied over primer. Meets AAMA 2605 requirements.
    1. Aluminum clad color options: Custom colors to match existing window sashes

B. Interior Finish Options:
    1. Prime: Factory applied enamel primer. Meets WDMA TM-11 requirements.
    2. Painted Interior Finish. White. Meets WDMA TM-14 requirements.

2.5 HARDWARE

A. Hinges:
    1. 4 1/4” x 3 3/4” with 3/8” radius corners. Adjustable is 3/16” for horizontal and vertical of panels in frame
    2. Four adjustable hinges
    3. Metal finish: Oil Rubbed Bronze (Brass substrate)

B. Handle Set: Refer to Door Schedule.
    1. Metal finishes: Oil Rubbed Bronze

C. Locking System: Refer to Door Schedule.

2.6 WEATHER STRIP

A. Frame: Sill weather strip, frame weather strip
    1. Color: beige or black

B. Panel: Active panel sweep, inactive panel sweep, panel weather strip, panel cover weather strip, astragal weather strip, bulb weather strip
    1. Color: beige or black

C. Surface mounted aluminum panel drip mounted at bottom of panel (units will have the drip installed)
    1. Standard colors: Matches panel finish with matching screws
    2. Custom colors: Matches panel finish with stainless steel screws

2.7 RAISED PANELS

A. Milled raised panel; refer to drawings for special 3-panel layout

B. Surround Frame:
    1. Species: Pine
    2. Interior finished: Prime
    3. Pull bar: Wood wrapped extruded aluminum
    4. End cap color will default with track color

2.8 ACCESSORIES AND TRIM

A. Installation and Hardware Accessories:
    1. Aluminum nailing fin/drip cap
    2. Masonry brackets: 6”, 10”

2.9 ADA SILL

A. Pemko Sill and Saddle 253X4DFG and 234DPK- dark anodized aluminum

1. Reduces height approximately 1” with standard 8-1/8” bottom rail. FS 37-7/16” x 85-1/16”

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions. Report frame defects or unsuitable conditions to the General contractor before proceeding.

B. Acceptance of Condition: Beginning on installation confirms acceptance of existing conditions.

3.2 INSTALLATION

A. Assemble and install window/door unit(s) according to manufacturer’s instruction and reviewed shop drawing.

B. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants. Do not use expansive foam sealant.

C. Install accessory items as required.

D. Use finish nails to apply wood trim and mouldings.

3.3 FIELD QUALITY CONTROL

A. Remove visible labels and adhesive residue according to manufacturer’s instruction.

B. Unless otherwise specified, air leakage resistance tests shall be conducted at a uniform static pressure of 75 Pa (~1.57 psf). The maximum allowable rate of air leakage shall not exceed 2.3 L/sm^2 (~0.45 cfm/ft^2).

C. Unless otherwise specified, water penetration resistance testing shall be conducted per AAMA 502 and ASTM E1105 at 2/3 of the fenestration products design pressure (DP) rating using “Procedure B” – cyclic static air pressure difference. Water penetration shall be defined in accordance with the test method(s) applied.

3.4 CLEANING

A. Remove visible labels and adhesive residue according to manufacturer’s instruction.

B. Leave windows and glass in a clean condition. Final cleaning as required in Division 1.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

END OF SECTION

SECTION 08 21 50

STILE AND RAIL MDF & WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stile and Rail MDF and Wood Doors
2. Factory Pre-fitting and Pre-machining
3. Stile and Rail MDF and Wood Pocket Doors with hardware
4. Factory Finishing of Stile and Rail Doors

B. Refer to Door Schedule on Drawings for additional requirements.

1.2 SUBMITTALS

A. Shop Drawings: Indicate:

1. Door number
2. Door Type
3. Door Sizes
4. Handing
5. Fire rating
   a. Neutral Pressure - UL10-B/ UBC - 43-2/ UBC - 7-2-94
   b. Positive Pressure - UL10-C / UBC 7-2-97.
6. Door elevations
7. Hardware Set Numbers

1.3 QUALITY ASSURANCE

A. Manufacturer: Shall be a company specializing in the manufacture of stile and rail doors specified in this section for a minimum of 10 years. All stile and rail doors specified in this section MDF, Wood and Fire doors shall be supplied and manufactured by one company. All details including panels, sticking and profiles shall match.

B. Fire Ratings: Fire rated doors shall comply with local building codes as enforced by the AHJ. Doors shall be installed in accordance with NFPA 80. All doors shall bear the appropriate certification labels.

C. Storage and Handling: Doors shall be stored and handled in accordance with the manufacturer's recommendations and the WDMA - Appendix Section - "Care and Installation at Job Site".

1. Doors shall be stored on a flat and level surface in a well-ventilated dry building. Doors shall not be stored on edge and shall be protected from dirt, water and abuse.
2. Protect doors from exposure to light for veneers which are light sensitive.
3. Doors shall not be subjected to extreme heat or humidity. HVAC systems should be set to provide a temperature range of 50 -90 degrees F and 30-60% relative humidity.
4. Handle doors with clean hands or gloves. Do not drag doors across floors or other surfaces.
5. Each Door shall be marked with the opening number.

D. Warranty: Submit in accordance with Section 01700. For factory finished or prime doors, warranty shall be in effect of the Life of the Installation for interior, interior fire doors and exterior doors.

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. TruStile Doors, LLC. or approved equal.

2.2 DOOR CONSTRUCTION – STILE AND RAIL DOORS

A. Description:

1. Type: TruStile TS3060 MDF Doors.
2. Size and Panel Types: See Drawings and specifications.
3. Stile Thickness: 1-3/4”.
4. Finish: Factory primed
5. Profiles and dimensions shall be Trustile standards unless otherwise noted in the drawings and elevations.
6. STC rating 34 - Standard 1-3/4” doors for sound control.

B. Stile and Rail (Sticking) Type:

1. Quarter Bead Sticking.

C. Panel Type:

1. Raised Panel (Panel A)
2. Panels shall be constructed of 42 pound density MDF routed to profile specified. Panels shall float inside the sticking in true stile and rail construction. Panels shall be held in place by the sticking and flexible bumper shall be installed inside sticking to keep panel centered.
3. Panel Thickness: As indicated in TruStile specifications for panel selected.

D. Door Top Type:

1. Square Top.

E. Stile Construction

1. Core material to be constructed of 2 pieces of 42 pound density MDF laminated with PVC adhesive for interior. For exterior doors MDF shall be exterior grade MDF manufactured with phenolic resins to resist moisture.
2. Stiles are to be constructed for improved screw holding by use of hardwood “wedge”, 1-5/8” x 7/8” (1-3/4” doors) “Wedge” to extend the entire height of door.

2.3 DOOR CONSTRUCTION - WOOD/ GLASS DOORS

A. Door Type:

1. Type: TruStile FL1501.
2. Size and Panel Types: See Drawings and specifications.
3. Stile Thickness: 1-3/4”.
4. Profiles and dimensions shall be Trustile standards unless otherwise noted in the drawings and elevations.

B. Side Light:

1. FL501.

C. Door Top Type:

1. Square Top.

D. Stile Construction

1. Core material to be constructed of engineered wood to resist moisture, warping, checking and improved screw pull.
2. Stiles are to be constructed for improved screw holding by use of hardwood “wedge”, 1-5/8” x 7/8” (1-3/4” doors) “Wedge” to extend the entire height of door.

2.4 FIRE RATED TYPE H STILE AND RAIL DOORS

A. Core: for 60 minute rated doors; the core material shall allow panel profiles to match non rated doors.

B. Panel and Sticking types to match TruStile TS3060 MDF/Wood Stile and Rail doors in every detail.

C. Stile Construction:

a. Stiles are to be constructed for improved screw holding by use of hardwood “Firewedge”, 1-5/8” x 7/8” (1-3/4” doors)

b. “Firewedge” to extend the entire height of door.

D. Fire doors to be Category A with concealed intumescent strips where positive pressure is required by code.

2.5 FACTORY PREFITTING AND PREMACHINING

A. Doors: Prefit and premachine doors at factory.

1. Obtain accurate field measurements of hardware mortised in metal frames to verify dimensions and alignment before proceeding with machining in factory.
2. Machine doors for hardware requiring cutting of doors.
3. Comply with accepted hardware schedules, door frame shop drawings and with hardware templates to ensure proper fit of doors and hardware.

B. Tolerances: Comply with NWWDA tolerance requirements for prefitting.

2.6 DOOR FABRICATION

A. Machining for door hardware: All doors shall be machined for specified hardware that is not surface applied.

B. Prefit and Bevel Doors 1/8” in 2 at lock stile. Ensure proper gaps are maintained on fire doors to comply with NFPA 80 requirements.

C. Doors shall be factory glazed with glass as specified unless otherwise indicated.

2.7 FACTORY FINISHING

A. MDF doors to be factory prime painted with low VOC, water based primer.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1 Before installation, verify that frames are proper size and type for door and are installed plumb and square as required for proper installation of doors.

2. Inspect doors for any damage, manufacturing defects or pre-finish inconsistency prior to installation.
3. Notification: Notify General Contractor of unsatisfactory conditions in writing with copy to Architect.

B. Acceptance: Beginning of work will indicate acceptance of existing conditions by installer.

3.2 PREPARATION

A. Conditioning: Condition doors to average humidity in installation area prior to hanging.

B. Prefitting: Prefit doors to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.

C. Sealing: Before installation of hardware brush apply primer to all job site cut or planed surfaces.

1. Primer: Type recommended by manufacturer.

3.3 INSTALLATION

A. General: Install doors in accordance with manufacturer's recommendations and to comply with WDMA IS 1A and NFPA 80.

1. Installation: By skilled finish carpenters or factory authorized installers.
2. Installer: Thoroughly familiar with the requirements of the manufacturer's door warranty as currently in effect and assure compliance with all provisions.

B. Hanging:

1. After sizing doors, fit for hardware as scheduled.
2. Hang doors to be free of binding with hardware functioning properly.

3.4 ADJUSTING AND PROTECTION

A. Adjustment: At completion of job, adjust doors and hardware as required and leave in proper operating condition.

B. Protection: Advise General Contractor of proper procedures required to protect installed wood doors from damages or deterioration until acceptance of entire project.

C. Replacement: Refinish or replace doors damaged during installation.

1. Causes for Rejection: Include chips, scratches or gouges.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall and ceiling access door and frame units.

1.2 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products.

B. UL (FRD) - Fire Resistance Directory.

1.3 SUBMITTALS

A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

B. Shop Drawings: Indicate exact position of each access door and/or panel unit.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

A. Wall-Mounted Units:

1. Material: Steel.

2. Size: 12 inch by 12 inch.

2.2 ACCESS DOORS AND PANELS

A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

B. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.

1. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

2.3 WALL AND CEILING MOUNTED UNITS

A. Manufacturers:

1. Activar Construction Products Group - JL Industries.

2. ACUDOR Products Inc.

3. Babcock-Davis.

4. Karp Associates, Inc.

5. Milcor, Inc.

6. Nystrom, Inc.

B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.

1. Style: Recessed door panel for infill with wall/ceiling finish.

a. Gypsum Board Mounting Criteria: Use drywall bead type frame.

2. Door Style: Single thickness with rolled or turned in edges.

3. Frames: 16 gage, 0.0598 inch, minimum thickness.

4. Single Steel Sheet Door Panels: 16 gage, 0.0598 inch, minimum thickness.

5. Door Panels to Receive Wall/Ceiling Finish: Surface recessed 5/8 inch back from wall face.
6. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
    a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
    b. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
    c. Door: Flush panel with a core of non-combustible mineral-fiber insulation enclosed in sheet metal.
7. Steel Finish: Primed.
8. Primed and Factory Finish: Polyester powder coat; primed for field painting.
9. Hardware:
    a. Hardware for Fire-Rated Units: As required for listing.
    b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
    c. Latch/Lock: Tamperproof tool-operated cam latch.
    d. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
    e. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Perimeter sealant.

1.2 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.

1. Design Wind Loads: Comply with requirements of IBC 2015 - International Building Code.

2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

C. Energy Performance: Aluminum-framed storefronts shall have certified and labeled energy performance ratings according to NFRC.

1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.37 with 0.29 center-of-glass U value as determined according to NFRC 100.

2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a SHGC of no greater than 0.36 or better as determined according to NFRC 200.

3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified CR rating of no less than 60 as determined according to NFRC 500. Prevent condensation under the following conditions:

a. Outdoor ambient temperature of 22.3 deg F (5.9 deg C) at 4.2 mph.

b. Indoor ambient air temperature of 70 deg F (21 deg C), with 50 percent relative humidity.

4. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.

D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 12 lbf/sq ft.

E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.3 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

1. Shop drawings must be prepared by the manufacturer under the supervision of a Professional Structural Engineer.

2. Shop drawings must be signed and sealed by the supervising Professional Structural Engineer.

C. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations, including the impact of the frame mounted sunshades.

1. Must be signed and sealed by the supervising Professional Structural Engineer.

D. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

E. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience and approved by manufacturer.

1.5 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.8 WARRANTY

A. Correct defective Work within a ten year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aluminum-Framed Storefronts Manufacturers:

1. Kawneer North America; TriFab VG 451UT (exterior): www.kawneer.com.

2. Oldcastle BuildingEnvelope; Series 3000XT (exterior): www.oldcastlebe.com.

2.2 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Glazing Position: Centered (front to back).

2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
6. Sill Flashing: Provide manufacturers full height high performance sill flashing.

2.3 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing Stops: Flush.
   3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Standard Swing Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Glazing Stops: Square.
   3. Finish: Same as storefront.
   4. Products: Thermally-improved doors.
      a. Kawneer North America; an Alcoa company.
         1) Entrance System Doors: 250T Narrow Stile Insulpour Thermal Door.
      b. Oldcastle BuildingEnvelope Vistawall Architectural Products.
         1) Entrance System Doors: Narrow Stile Thermal Clad Door.

C. Strap Anchor: Aluminum extrusion with thermal separation designed to engage frame and tie assembly to supporting construction as represented on Drawings; delegated design.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209 (ASTM B209M).

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Fasteners: Stainless steel.

E. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.

F. Concealed Flashings: 0.018 inch thick stainless steel.

G. Perimeter Sealant: Type ES-1 or ES-4 specified in Section 07 92 00.

H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

I. Glass and Glazing Accessories: As specified in Section 08 80 00.

J. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight. Prepare, pretreat, and

apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Mica as selected by Architect; classic bronze or medium bronze.

2.6 HARDWARE

A. Other Door Hardware: As scheduled on Drawings or specified in Section 08 71 00.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.7 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Construct with shear block or screw spline system of assembly.

D. Prepare components to receive anchor devices. Fabricate anchors.

E. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

F. Arrange fasteners and attachments to conceal from view.

G. Reinforce framing members for imposed loads.

H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.

1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form watertight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Install operating sash.

K. Set thresholds in bed of sealant and secure.

L. Install perimeter sealant in accordance with Section 07 92 00.

M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

A. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.

1. Perform a minimum of two tests in each designated area as indicated on drawings.

2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.

3. Test a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect, before installation of interior finishes; test area may not show evidence of water penetration.

3.5 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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SECTION 08 44 26
POINT SUPPORTED STRUCTURAL GLASS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes glass, glazing and connections for the Structural Glazed Glass point supported system including all labor, materials, equipment and services necessary to complete the structural wall as shown on the architectural drawings, including, but not limited to, the following:

1. Engineering and design of structural glass wall.
2. Structural steel support system
3. S.S. channels to receive point supported glass panels.
4. Glass and metal fabrication, packaging and delivery.
5. Erection by an installer approved by the structural design engineer.

1.02 DEFINITIONS

A. Fully Tempered Glass: Glass that has been heat-treated using the horizontal (roller hearth) method and complies with:

1. ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind FT.

1.03 SYSTEM DESCRIPTION

A. The structural glass system, as erected, shall meet or exceed the following structural and weather resistance requirements as demonstrated by engineering calculations.

1. Design Performance: Refer to Structural Drawings.
2. Maximum deflection of center of glass not to exceed 1 inch.
3. Analysis: All requirements specified herein shall be analytically and mathematically proven, except for those requirements called for to be proven exclusively by physical testing methods. Finite element analysis of the glass, calculations and related data and their application in engineering, fabrication, shall be the responsibility of glass fittings manufacturer.

B. Fittings are to have outside discs or be designed to give flush appearance on outward surface of the glazing system. Fitting type to be determined by the Architect and the glass wall system designer. All fittings to be 316 grade stainless steel.

C. The articulated fixing scheme of the system is designed to prevent high stress concentrations at the holes in the glass. This allows the fittings to compensate for bending of the glass when subjected to negative and positive wind loading, seismic loads, thermal movement, construction tolerance, and live load and dead load movements.

1.04 SUBMITTALS

A. Shop Drawings: Shop drawings shall clearly indicate materials, indicate coordination with other trades and bear signed approval of the glazing system manufacturer and the glazing system installer. Drawings should include details of all supports and data to show provisions for vertical and horizontal expansion and deflections.

B. Structural Calculations: Prior to fabrication, submit design calculations prepared by a Licensed Engineer who has at least five years' experience in the design of custom glazing systems. The Engineer shall seal the calculations in the State of the Project location stating that the system components and glass conform to the structural performance requirements specified.

C. Samples:

1. Glass: Four (4) 12” x 12” samples of each glass type.

D. Test Data: Submit test reports from an independent laboratory certifying that the glass fittings proposed for use have been tested. The fitting test reports are to be incorporated into the Engineers’ glass calculations as a complete submittal. The fittings tested must be similar in type of materials and design shown on the Architect’s drawings; utilizing counter sunk or non-countersunk attachments through holes in the glass.

1.05 QUALITY ASSURANCE

A. Pre-installation Conference and Inspection: After approval of submittals, but prior to beginning installation of Work of this Section, Contractor shall hold a meeting at the site attended by representatives of Owner, Architect, Contractor, structural steel fabricator and erector, sealant installer, and glass system installer to describe in detail the glazed system to be installed and to establish agreement, coordination and responsibilities among involved trades. The glazing procedure and schedule, including the method of delivering and handling glass and installing glazing materials, shall be reviewed. The chemical compatibility of all glazing materials and framing sealants with each other and with like materials used in glass fabrication shall be established. The Contractor shall prepare a detailed memo of this meeting and furnish copies to the Owner’s Representative and all involved trades. The installation Subcontractor shall inspect the substrates to receive Work of this Section and report defective conditions to the Owner’s Representative and Contractor for correction. Starting installation of Work of this Section indicates installation Subcontractor’s approval of substrates and waiver of claim that substrates are defective as pertains to required warranty.

B. Installer Qualifications: Provide installation by an installer acceptable to the glass system provider. The installer shall be responsible for supplying and erecting the complete structural glazing system, coordinating and maintaining tolerances between structure and glazing system with individual component suppliers and manufacturers, and installation of the glazing system.

C. Quality Standards: In addition to Code, provide Work of this Section designed so that glass installation conforms with ANSI Z 97.1 and Federal Safety Standard 16 CFR 1201 for Category II materials.

1.06 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer’s instruction for receiving, handling, storing and protecting glass & glazing materials.

B. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

D. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coating on glass.

1.07 PROJECT / SITE CONDITIONS

A. Environmental Requirements: Installation of glass products at ambient air temperature below 40 degrees F (4.4 degrees C) is prohibited.

B. Field Measurements: When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products.

1.08 WARRANTY

A. Manufacturer Warranty:

1. Provide a five (5) year warranty for the design integrity, weatherability and durability of the Structural Glazing System components.

B. Installer Warranty:

1. Warrant the installation for a period of five years for installation and repairs or failures. Prove written requirements for notification of installer and terms for maintaining warranty provisions in accordance with owner's rights in Division 1 of the specifications.

C. Provide manufacturers and installer's certificates that all work is in accordance with approved shop drawings and specifications and is free from defects in materials and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer is used in this section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced standards.

1. Oldcastle BuildingEnvelope.

2. Paragon.

2.02 MATERIALS

A. Glass:

1. All glass shall be engineered for sufficient thickness and strength to meet the loading and deflection specifications made herein.

a. Minimum Thickness: 13/16 inch or greater as determined by engineering.

2. Interlayer for laminated glass shall be a minimum .060". Interlayer to be Solutia PVB or DuPont SentryGlas®, specifically approved by its manufacturer as allowed for exposed edge conditions. Cast resin is not an acceptable as an interlayer material.

3. All tempered glass shall be horizontally tempered to eliminate tong marks.

4. All edgework, holes and notches in the tempered glass panels will be completed before tempering and shall comply with the requirements of ASTM C1048.

a. Dimensional tolerance on panel size will be +/- 3/32 inch of the theoretical dimension required.

b. Squareness of each panel will be within 1/8 inch.

c. Bow allowance will be per ASTM C1048 Table 2.

d. Refer to Drawings for locations of 3/8-inch structural silicone joints.

e. Notch glass as necessary for steel post canopy supports and other components; refer to Drawings.

B. Fittings:

1. Spider fittings and articulated bolt fittings shall be predominately manufactured from stainless steel Grade 316. Type of fitting and spiders will be as shown on the drawings.

2. The glass system designer shall demonstrate that the stresses induced in the glass by these fittings are compatible with the strength of the glass and meets the performance criteria of this Section.

3. The finish of all fittings will be brushed stainless steel

4. Spider fittings shall be designed to meet system requirements. The design shown on the shop drawings shall be compatible with the performance requirements
5. The spider fittings shall incorporate oversize holes or slots which will provide the capability to allow for the glass fabrication tolerances and the full range of movements shown below.
    a. Thermal movements of the system occurring as a result of differential coefficients of thermal expansion of the wall components within the range specified. The components used with the system shall withstand noiselessly all thermal movements without any buckling, distortion, cracking, and failure of joint seals or undue stress on the glass or fixing assemblies.
    b. Deflection of edge beams due to loading applied after erection to magnitude specified.
    c. Maximum side sway of structure due to wind load or seismic activity of the magnitude specified.
    d. Deflection due to self-weight of the structural glass system.
    e. Inward and outward movement due to the design wind loads specified.
    a. The selection of articulated or axial adjustment mounting fittings will be in accordance with the design criteria, the system engineer and the approved shop drawings.

C. Sealants
1. Provide products distributed by GE Silicones or Dow Corning which meet the following requirements:
    a. Compatibility: Select glazing sealants that are compatible with other materials they will contact, including glass products and gaskets, under conditions of service and application, including joint size and movement, as demonstrated by sealant manufacturer based on testing and field experience. See submittal requirements above.
    b. Suitability: Comply with sealant manufacturer's written instructions for selecting glazing sealants suitable for applications indicated / reasonably anticipated, and for conditions existing at time of installation.
    a. Color: To be determined

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the area and conditions where the structural glass system is to be installed. Report in writing to the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

3.02 INSTALLATION

A. Do not install component parts that are defective in any way, including warped, bower dented abraded and broken members. Remove and replace members that have been damaged during installation or thereafter before the time of final acceptance.

B. Do not cut, trim, weld or braze components parts during erection, in any manner that would damage the finish, decrease the strength, or result in visual imperfection or failure in performance of the construction.

C. Install component parts level, plumb, true to line, and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers. Use erection equipment that will not mar or stain finished surfaces in any way.

D. Clean debris, dust and other substances from behind and adjacent to the structural glass system work as it is erected, and provide temporary closures to prevent the accumulation of such substances in the void spaces behind the glazed structural wall system.

3.03 ERECTION TOLERANCES

A. Provide installed structural glass system components conforming with the following erection tolerances except where more stringent tolerances are required by the structural glass system manufacturer to comply with design/performance requirements.

B. Erect framing components plumb level and in true planes within the following tolerances. The allowable tolerances stated are not cumulative and deviation shall be offsetting. Correct construction that shows unsightly or noticeable incorrect alignment as determined and directed by the Owner or Architect, even though individual members may meet allowable tolerances are to be replaced at no extra cost to the Owner.

1. Maximum deviation from true plumb, horizontal, dimensioned angle, or line of 1/8” per 12-feet in length of any member and maxim ¼” in total run in any line. 1/8” maximum in story height of 13 ft and ¼” maximum.

2. Maximum 1/16” offset from true and flush alignment between end-to-end connections of members in line. Maximum offset from true alignment between to abutting glass lites shall be 1/32”.

3. Deviation from theoretical position in plan or elevation, including deviation from plumb level or dimensioned angle, not exceeding 1/8” total in any location; change in deviation not exceeding 1/8”for any 12-foot run in any direction.

3.04 ASSEMBLY AND ANCHORAGE

A. Anchor components parts securely in place, by bolting, welding or other permanent mechanical attachment system that will comply with performance requirements and expected movement of adjacent parts.

B. Install components in accordance with the approved Shop Drawings using tools recommended by component manufacturer.

C. Plate to plate joints shall be sealed with silicone sealant. Construct completely waterproof assemblies. Joint dimensions shall be designed to be compatible with sealant properties and live load movement of the structure.

D. Maintain a minimum temperature of 40 deg. F during glazing unless the manufacturer of the glazing material specifically agrees to application of his material at lower temperature. If job progress or other conditions require glazing work when temperature is below 40 deg. F consult the manufacturer to establish provisions required to ensure satisfactory work.

E. Clean glazing connectors receiving glazing materials of deleterious substances that might impair the work. Remove protective coatings that might fail in adhesion or interfere with the bond of the sealants. Comply with sealant manufacturer’s instruction for final wiping of surfaces immediately before application of primer and glazing sealants.

F. Inspect each lite of glass immediately prior to installation. Glass that has impact damaged edges, scratches or abrasion of faces, or any other evidence of damage shall not be installed.

G. Prime surfaces to receive glazing sealants in accordance with sealant manufacturer’s recommendations using recommended primers.

H. Locate setting blocks, if required by the shop drawings, at the quarter points of sill, but no closer than 6” to the corners of the glass. Use setting block of proper sizes to support the glass in accordance with the manufacturer’s recommendations.

I. Set glass in a manner that produces greatest possible degree of uniformity in appearance. Use masking tape or other suitable protection to limit coverage of glazing materials to the

surfaces intended for sealants. Tool exposed sealants. Clean excess sealant from glass and support members immediately after application, using solvents or cleaners recommended by the manufacturers.

J. Cure sealants in accordance with the manufacturer's instructions to attain maximum durability and adhesion to the glass.

K. Aluminum channels, flashings and peripheral details shall be installed by persons experienced in the trade and in strict compliance with appropriate shop drawings.

3.05 FIELD QUALITY CONTROL

A. Inspection: Shop and field materials and workmanship may be inspected by the Owner's Representative at any time. Such inspection does not relieve the Contractor from the obligation to provide materials and construction conforming to the Contract Documents and approved submittals, and Contractor shall correct all deficiencies reported and shall effect quality control measures and procedures for materials, whether or not inspected.

B. Field Water Tests: To the extent directed, perform field water tests on the completed and glazed parts of Work of this Section according to AAMA 501.2 (modified to exclude appearance of any water at the interior). If tests result in uncontrolled leakage, eliminate the causes of the leakage at no extra cost to the Owner and retest the repaired areas. Remedial measures shall maintain quality and performance standards all subject to approval. Furnish powered scaffolds, hoses, water and personnel as required to perform the tests

3.06 CLEAN UP

A. Removal of Debris: All debris caused by or incidental to the installation work shall be promptly removed from the job sit as the work progresses.

B. Protection and Cleaning: Sub-Contractor shall remove from the installed work all mastic spears or other unsightly marks caused by his workmen that would not be readily removed by normal final cleaning by others with mild soap and water. Do not use harsh cleaning agents, abrasives, or caustics for cleaning.

END OF SECTION

SECTION 08 55 00- WOOD WINDOWS

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. Aluminum Clad Wood Ultimate Awning Window complete with glazing, weather strip, hardware, simulated divided lite, and standard or specified anchors; refer to Window Schedule on Drawings for additional requirements.

B. Design and Performance Requirements:

Standard Product	Air Tested to psf	Water Tested to psf	Structural Tested to psf	Certification Rating	Design Pressure (DP)	Max Overall Width	Max Overall Height
Wood Ultimate Awning (Full Frame and Replacement)	1.57	7.5	75	LC-PG50-AP	50	40”	48 1/16”

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings under the provisions of Division 1.

B. Product Data: Submit catalog data.

C. Samples:

1. Include glazing system, quality of construction and specified finish

D. Quality Control Submittals: Certificates: submit manufacturer’s certification indicating compliance with specified performance and design requirements.

1.3 QUALITY ASSURANCE

A. Requirements: consult local code for IBC International Building Code adoption year and pertinent revisions for information on:

1. Egress, emergency escape and rescue requirements
2. Basement window requirements
3. Windows fall prevention and/or window opening control device requirements

1.4 DELIVERY

A. Deliver in original packaging and protect from weather

1.5 STORAGE AND HANDLING

A. Prime and seal wood surfaces, including to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation

B. Store window units in an upright position in a clean and dry storage area above ground to protect from weather.

1.6 WARRANTY

A. Clear insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass is warranted against stress cracks caused by manufacturing defects from ten (10) years from the original date of purchase.

B. Factory applied interior finish is warranted to be free from finish defects for a period of five (5) years from the original date of purchase.

C. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from the original date of purchase.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Basis-of-Design: Factory-assembled Wood Ultimate Awning, an aluminum-clad top pivoting awning as manufactured by Marvin Windows and Doors, Warroad, Minnesota.

2.2 FRAME DESCRIPTION

A. Frame Interior:

1. Non finger-jointed Vertical Grain Douglas Fir
2. Kiln-dried to moisture content no greater than 12 percent at the time of fabrication
3. Water repellant, preservative treated in accordance with ANSI/WDMA I.S.4.

B. Frame exterior aluminum clad with 0.050 inches (1.3mm) thick extruded aluminum.

C. Frame thickness: 1-3/16” (30mm)

D. Frame depths for full frame units have an overall 4 9/16” (116mm) jamb depth from the nailing fin plane to the interior face of the frame for new construction

E. Frame depth for replacement frame units have an overall 3 ¼” (83mm) jamb for replacement application and 2-3/16” (56mm) jamb depth from the nailing fin plane to the interior face of the frame for new construction.

F. Frame bevel: Standard is no bevel

2.3 SASH DESCRIPTION

A. Sash Interior:

1. Interior: Non finger-jointed Vertical Grain Douglas Fir
2. Kiln-dried to moisture content no greater than twelve (12) percent at the time of fabrication
3. Water repellant preservative treated with accordance with WDMA I.S.4.

B. Sash Exterior: Aluminum clad with 0.050” (1.3mm) thick extruded aluminum

A. Sash thickness: 1-5/8” and 1-7/8”

B. Stiles and Rails: 2-1/16” (52mm)

C. Sash Options: Optional tall bottom rail: 3-9/16” (90mm)

D. Interior Sash Sticking

1. Standard is: Ogee

2.4 GLAZING

A. Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E2190.

B. Glazing method: Insulating glass

C. Glazing seal: Silicone bedding at interior and exterior

D. Insulating glass will be altitude adjusted with capillary tubes for higher elevations. Argon gas is not available for elevations that require capillary tubes

E. Glass Type: Clear, Low E2 with Argon.

2.5 FINISH

A. Interior: Treated bare wood

2. Prime: Factory-applied enamel primer.

B. Exterior: Exterior: Aluminum clad. Fluoropolymer modified acrylic topcoat over a primer. Meets or exceeds AAMA 2605 requirements.

1. Prime: Aluminum clad color options: Custom colors to match existing window sashes.

2.6 HARDWARE

A. Awning hardware:

1. Hinges: Two hinges that connect the stiles of the sash to the jambs of the frame. Hinges are steel coated with E-Gard and the hinge track is stainless steel. Hinges designed to support up to a 210 lb sash.

2. Handles: The standard operating handle is a folding handle, zinc painted with the standard folding cover being molded plastic. Unlacquered brass (plated)

3. Locks: Uses a multipoint sequential concealed locking system in both jambs. Lock handles are removable, non-handed and are available in the same finishes as the handles. Standard tie bars and cams – steel coated with E-Gard. Standard keepers – steel coated with E-Gard. Keeper features a roller for reduce average lock force and dies not easily disengage with the cam even under severe loading.

2.7 WEATHER STRIP

A. Weather strip at the frame is a hollow foamed material bent around 90 degree corner to allow for seamless corner joints

1. Color: Beige

B. Sash weather strip: Bulb shaped glass filled material

C. Color: Beige.

2.8 JAMB EXTENSION

A. Jamb extensions are available for various wall thickness factory-applied up to a 12” (305mm) wide

B. Finish: Match interior frame finish

2.9 INSECT SCREEN

A. Screen mesh: High Transparency Mesh (Hi-Tran) Charcoal Fiberglass

B. Optional Wood Screen Surround with Hi-Tran Fiberglass Screen. Species will match unit species.

2.10 SIMULATED DIVIDED LITES (SDL)

A. 5/8” (16mm) wide with internal spacer bar.

B. Exterior muntins: 0.055” (1.4mm) thick extruded aluminum.

C. Interior Muntins: Vertical Grain Douglas Fir

D. Muntins adhere to glass with closed-cell copolymer acrylic foam tape

E. Sticking:

1. Standard: Ogee

F. Pattern: Rectangular

G. Finish: Match panel finish

2.11 ACCESSORIES AND TRIM

A. Installation Accessories:
   1. Factory installed vinyl nailing/drip cap
   2. Installation brackets: 6 3/8” (162mm), 9 3/8” (283mm), 15 3/8” (390mm)
   3. Masonry brackets: 6” (152mm), 10” (254mm)

B. Exterior Aluminum Extrusions/Moulding:
   1. Profile: Field applied to match existing.
   2. Finish: Match exterior frame finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions. Report frame defects or unsuitable conditions to the General contractor before proceeding.

B. Acceptance of Condition: Beginning on installation confirms acceptance of existing conditions

3.2 INSTALLATION

A. Assemble and install window/door unit(s) according to manufacturer’s instruction and reviewed shop drawing.

B. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants. Do not use expansive foam sealant.

C. Install accessory items as required.

D. Use finish nails to apply wood trim and mouldings.

3.3 FIELD QUALITY CONTROL

A. Remove visible labels and adhesive residue according to manufacturer’s instruction.

B. Unless otherwise specified, air leakage resistance tests shall be conducted at a uniform static pressure of 75 Pa (~1.57 psf). The maximum allowable rate of air leakage shall not exceed 2.3 L/sm^2 (~0.45 cfm/ft^2).

C. Unless otherwise specified, water penetration resistance testing shall be conducted per AAMA 502 and ASTM E1105 at 2/3 of the fenestration products design pressure (DP) rating using “Procedure B” – cyclic static air pressure difference. Water penetration shall be defined in accordance with the test method(s) applied.

3.4 CLEANING

A. Remove visible labels and adhesive residue according to manufacturer’s instruction.

B. Leave windows and glass in a clean condition. Final cleaning as required in Division 1.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

END OF SECTION

SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Everything necessary for and incidental to the execution and completion of all door hardware work, as indicated on the drawings and specified herein.
2. Extent of door hardware is shown on the drawings and in the schedules. Door hardware includes all items known commercially as "Builders Hardware" required for swinging doors, except special types of unique and non-matching hardware specified in the same section as the door and doorframe.
3. Knox box.

1.2 REFERENCES

A. The publications listed below, including the amendments, addenda and designated changes, form a part of this specification to the extent referenced.

1. Federal Specifications (FS): FF-H-111C-74 Hardware, Builders Shelf and Miscellaneous.
2. National Fire Protection Association (NFPA):

a. Standard 70, National Electric Code.
b. Standard 80, Fire Doors and Windows.
c. Standard 101, Life Safety Code.
d. Standard 252, Standard Methods of Fire Tests of Door Assemblies.

3. American National Standards Institute (ANSI):

a. A156.6, Architectural Door Trim.
b. A156.18, Materials and Finishes.

4. International Building Code (IBC).
5. Americans with Disabilities Act (ADA): Standards for Accessible Design.
6. Door and Hardware Institute (DHI):

a. Keying Systems and Terminology.
b. Abbreviations and Symbols.
c. Recommended Locations for Builder's Hardware for Custom Steel Doors and Frames.

7. Underwriters Laboratories, Inc. (UL): UL-BMD, Building Materials Directory.

1.3 SUBMITTALS

A. Supplier's Hardware Schedule: Submit a door hardware schedule in accordance with Division 01 in the manner and format prescribed and used herein, complying with the actual construction progress. Hardware schedules are intended for coordination of the work. Review and acceptance by the Architect or Owner does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.

1. Hardware Schedule Content: Based on hardware indicated, organize hardware schedule into Sets or sets showing complete designations of every item required for each door opening. Schedule shall be vertical layout similar to the format used herein. Lines shall be double spaced with pages numbered and dated.

a. For doors of different sizes or where hinges, locks or closers are different, a separate heading shall be used. No labeled openings shall be combined with non- labeled openings. Horizontal hardware schedules are not acceptable. Include the following:

1) Number, location, hand, fire rating, size and material of each door opening (hands and swings to be determined in relation to key side of opening).
2) Type, style, function, size, finish and quantity of each hardware item.
3) Name and manufacturer of each item.
4) Fastening requirements.
5) Explanation of abbreviations used (use nomenclature consistent with DHI's "Abbreviations and Symbols" wherever possible).Special mounting locations and instructions.

b. Combined submittals are not acceptable. Do not combine hardware schedules with door and frame shop drawings.
c. Schedules not adhering to these parameters will not be reviewed.

B. Hardware Schedule Index: Furnish an index cross referencing Contract Document door number and Hardware Set, and supplier's hardware set.

C. Product Data: Submit copies of manufacturers' specifications, maintenance and keying manuals, and installation instructions for each item of door hardware.

1. Include photographs, catalog cuts, marked templates and other data as may be required to show compliance with these Specifications.

D. Samples: Submit full size hardware samples as requested by Architect.

1. Items shall remain on file in the Architect's office until all other similar items have been installed in the project. At that time, items on file will become Owner Maintenance Stock.

E. Informational Submittals:

1. Qualification Data: Submit door hardware Supplier and Installer qualifications verifying years of experience and hardware manufacturers' certifications; include list of completed projects having similar scope of work identified by name, location, date, reference names and phone numbers.
2. Templates: Provide necessary templates and/or physical hardware to all trades or factories requiring them so they may cut, reinforce or otherwise prepare their material or product to receive the hardware item. If any manufacturer requires physical hardware, ship to them such hardware via prepaid freight in sufficient time to prevent any delay in the execution of their work.
3. Wiring Diagrams: Details of electrified door hardware. Include fire alarm and/or access control system interface where applicable.

a. Diagrams shall be complete by opening and shall indicate connections between all components affected. Manufacturers' standard line diagrams are not acceptable. Include the following:

1) System schematic.
2) Point-to-point wiring diagram.
3) Riser diagram.
4) Elevation of each door.

b. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

4. Keying Schedule: Detailed keying system schedule, indicating Owner's approved keying system, for Government review and approval. Include the following:

a. Schematic keying diagram
b. Index identifying each key set to unique door designations.
c. Bitting list.

F. Closeout Submittals:

1. Operations and Maintenance Data: Furnish two copies of the Operation and Maintenance manual. Coordinate delivery with the post-installation job site meeting. The manual shall consist of a hard cover and three-ring binder with the project name on the front. Include the following:

a. Maintenance instructions for each item of hardware supplied.
b. Copy of the final Door Hardware Schedule.
c. Catalog cuts for all items scheduled.
d. Names and phone numbers of the factory representatives for each item supplied.
e. Copy of the final Keying Schedule.
f. Include any specialized tools needed to maintain the hardware.

2. Warranty: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Contractor: Assign the installation of hardware to tradesmen experienced in the installation of commercial door hardware.

B. Installer Qualifications: An experienced Installer who has completed 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.

1. Hardware Installers shall be trained and certified by the Lock, Door Closer, and Exit Device Manufacturers.

C. Supplier Qualifications: Recognized architectural door hardware supplier, with warehousing facilities in Project's vicinity, who has been furnishing hardware in the Project's vicinity for a period of not less than two years.

1. Supplier must employ an Architectural Hardware Consultant who shall be available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware.
2. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

a. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

3. Scheduling Responsibility: Preparation of door hardware and keying schedules.

D. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1. Electrified Door Hardware Consultant Qualifications: Experienced in providing consulting services for electrified door hardware installations.

E. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.

F. Accessibility for Disabled Persons: Special hardware requirements for knurling, slow acting closers or other barrier free opening requirements shall be provided as indicated in the Door Hardware Sets and as required to comply with the U.S. Department of Justice's "ADA Standards for Accessible Design".

G. Hardware for Fire Doors and Exit Doors: Hardware for fire doors shall conform to NFPA 80; hardware for exit doors shall conform to NFPA 101. Other requirements specified shall also apply. Such hardware shall comply with the applicable UL standards for the intended use specified and be listed in UL BMD, or be labeled and listed by another testing laboratory deemed acceptable by the Owner and Architect.

1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

a. Test Pressure: After five minutes into the test, neutral pressure level in furnace shall be established at 40" or less above the sill.

H. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

I. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01. In addition to the Contractor's Project Manager and Superintendent and the Owner, conference participants shall also include Hardware Subcontractor as well as any others requested by the Owner.

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.

J. Pre-Installation Conference: Conduct conference at Project site. Review methods and procedures related to electrified door hardware including, but not limited to, the following:

1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
2. Review sequence of operation for each type of electrified door hardware.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required testing, inspecting, and certifying procedures.

K. Reference Standards: Except as otherwise required by governing authorities or Contract Documents, comply with applicable provisions of Door and Hardware Institute.

1.5 PRODUCT DELIVERY

A. Deliver door hardware to the Contractor. Direct factory shipments (drop shipments) to the job site are not acceptable.

1. Deliver items of hardware at the proper times to the proper locations (shop or project site) in their original individual containers, complete with necessary appurtenances including screws, keys, manufacturers' printed instructions, and where necessary, installation templates for manufacturer's suggested installation. Mark each individual container with the manufacturer's name and catalog number as they appear in the hardware schedule.

B. Representatives of the Contractor and the Hardware Supplier shall jointly inventory the door hardware. Replace items damaged in shipment promptly and with proper material without additional cost to the Contractor. Handle all hardware in a manner to eliminate marring, scratching or damage.

C. Keys and Cores:

1. Supply construction master keys and cores to Contractor when cylinders are delivered, for use during construction.
2. Prior to the scheduled completion of the project, manufacturer shall ship all permanent keys and cores, including permanent control keys, directly to the Owner via Registered Mail, Return Receipt Requested or other pre-approved means. Under no circumstance shall any permanent keys or cores be furnished direct to the Contractor.

D. Key Cabinet: Deliver key cabinet prior to building occupancy.

1.6 WARRANTIES

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of operators and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Periods:

a. Hinges: Life of the Building.
b. Manual Closers: Ten years from date of Substantial Completion.
c. Continuous Hinges: Ten years from date of Substantial Completion.
d. Exit Devices:

1) Mechanical: Five years from date of Substantial Completion
2) Electrified: Three years from date of Substantial Completion.

e. Locksets:

1) Mechanical: Five years from date of Substantial Completion

f. Electrified: Three years from date of Substantial Completion. All other hardware items: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. Template Hardware: Hardware to be applied to metal or pre-finished doors and frames shall be made to template. Coordinate hardware locations to prevent interference with other hardware items.

B. Identification: All hardware items shall be clearly and permanently marked by the manufacturer where it will be visible after installation.

2.2 HARDWARE ITEMS

A. Refer to schedule on Drawings.

B. Cylinders and Keying: Best Access Systems.

1. Provide cylinders for locksets, deadlocks, exit devices, and all other locking devices indicated in Hardware Sets.
2. Description:

a. Cylinders shall be 7-pin, CORMAX™ Small Format Interchangeable Core with cores removable by special control key.
b. Cylinder parts manufactured from brass, bronze, stainless steel, or nickel silver.

c. Equip all cylinders with brass color-coded, temporary cores for use during construction and for testing the hardware; plastic cores are prohibited.
d. Include all necessary extensions, cams, tail pieces and hardened collars required for a complete installation.

3. Key Control System Software: Multiple-index system for recording and reporting key-holder listings, tracking keys and key history, and printing receipts for transactions. Include instruction manual.

C. Key Control System: Lund Key Cabinets, MMF Industries or TELKEE, Inc.

1. Wall-mounted metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150% of the number of cylinders required herein.

a. Equip cabinet with hinged-panel door, key-holding panels, and pin-tumbler cylinder door lock.
b. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook. Set up by Key Control System Manufacturer.
c. Place keys on markers and hooks in the cabinet as determined by the final keying schedule.

D. Special Tools: Provide any necessary special tools (e.g. spanner and socket wrenches, dogging keys, etc.) required to service and adjust hardware items.

2.3 KEYING

A. General: Key system shall be as directed by the Owner.

1. Provide the type of system required (e.g. master, grand master, great grand master). Nomenclature and layout shall be consistent with DHI "Keying Systems and Terminology".

a. Manufacturer’s standard (most common) keyway will not be accepted.

2. Keying is the responsibility of the Contractor; and shall be performed by the cylinder manufacturer.
3. Key System Summary, Cover Sheet, and Letter of Authorization shall accompany Keying Schedule and Purchase Order sent to Factory.

B. Keys: Provide keys of nickel silver only in the following quantities:

1. Grand Master Keys: Two.
2. Master Keys: Five per set.
3. Change Keys: Three for each cylinder.
4. Construction Master Keys: Fifteen.
5. Control Keys: Four construction and six permanent.

C. Identification:

1. Stamp all change keys with keyset symbol (VKC), but do not stamp with key section or bitting number.
2. Stamp master keys and grand master keys "PROPERTY OF U.S. GOVERNMENT. DO NOT DUPLICATE".
3. Stamp all cores with concealed keyset symbol (CKC), but do not stamp with key section or bitting number.

2.4 FASTENERS

A. Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping or sheet metal screws except as specifically indicated.

1. Furnish screws for installation with each hardware item. Provide Phillips flat head or oval head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such work as closely as possible, except as otherwise indicated.

a. Where wood screws are required they shall be full thread (to the head) type. Combination wood/machine screws, in lieu of wood screws, are not acceptable.

2. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard manufactured units of the type specified are available with concealed fasteners. Do not use through bolts for installation except where it is not possible to adequately reinforce the work, to accept machine screws or concealed fasteners or another standard type, to satisfactory avoid the use of through bolts. Grommet nuts and cealnuts are not acceptable.
3. Furnish fasteners which are compatible with both the unit fastened and the substrate, and which will not cause corrosion or deterioration of hardware, base material reinforcement or fastener. Furnish wall stops with "Toggler" anchors and wood screws. Furnish thresholds and floor stops with lead anchors and 1/4-20 stainless steel or brass machine screws.

2.5 KNOX BOX

A. Provide a KNOXVAULT 4400, Single Lock, Recess Mount by Knox Company.

B. Color and location to be provided by Architect/Engineer.

PART 3 - EXECUTION

3.1 STORAGE AND HANDLING

A. Representatives of the Contractor and the Hardware Supplier shall jointly inventory the door hardware. Replace items damaged in shipment promptly and with proper material without additional cost to the Contractor. Handle all hardware in a manner to eliminate marring, scratching or damage.

1. A dry, locked storage space complete with adequate shelving shall be set aside for the purpose of unpacking, sorting out, checking and storage. Control the handling and installation of hardware items, whether immediately replaceable or not, so completion of the work will not be delayed by losses before or after installation.
2. Tag each item or package separately, with identification related to the final approved hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of thickness, profile, swing, security and similar requirements indicated as necessary for proper installation and function.

3.2 COORDINATION

A. Coordinate Door Hardware Schedule submission and hardware ordering to insure delivery of all items as directed by the Contractor.

1. Prior to ordering any hardware, examine the shop drawings and details of doors and frames and other substrate suppliers to determine that the proper type and size pieces of hardware are being furnished. No extra for material or labor will be allowed for any corrections that should have been eliminated by proper prior coordination.

B. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that

adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, and access control system.

D. Concrete, reinforcement, and formwork requirements are specified in Division 03.

3.3 EXAMINATION

A. Examine doors and frames, 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. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 INSTALLATION

A. Install each hardware item in accordance with final approved Hardware Schedule and manufacturer's instructions.

1. Set hardware level, plumb and true to line and location.
2. Adjust and reinforce attachment substrate as required for proper installation and operation of hardware.
3. Drill and countersink units which are not factory-prepared for anchorage fasteners; space fasteners and anchors uniformly, in accordance with industry standards.

B. Hardware Mounting Heights:

1. Provide heights as indicated on Drawings, except as otherwise required for compliance with governing regulations.
2. Where heights are not indicated, comply with mounting requirements of DHI "Recommended Locations for Builder's Hardware" on custom steel doors and frames.

C. Fire Doors and Exit Doors: Hardware for labeled fire doors shall be installed in accordance with the requirements of NFPA 80. Hardware for listed exit doors shall be installed in accordance with the requirements of NFPA 101.

D. Hinges: Install steel doors and wood doors to comply with reference standards, as specified in door sections.

1. Where shimming is required to comply with tolerances, provide metal shims only.

E. Electrified Hardware:

1. Pre-wire and make field connections between all electrically operated and monitored hardware items including, but not limited to, locks, exit devices, power transfers and magnetic door contacts.
2. All wiring must be 18 gauge or thicker.

F. Closers:

1. Do not install parallel arm closers until after seals have been installed on head frame (where seals are scheduled).
2. Do not cut seals for attachment of closer brackets or shoes.
3. Adjust closers to control door swing and to provide positive latching of doors.

a. Adjust closers not to exceed following manual opening forces:

1) Interior doors (non-fire-rated): Maximum 5-pound opening force.
2) Fire-rated doors: As required to close and latch each leaf.

b. After HVAC system has been balanced, make final adjustment of all closers.

G. Door Stops: Install stops for maximum degree of door opening swing allowed by conditions of installation.

1. Locate floor stops so as not to create a tripping hazard.
2. Locate wall stops centered on spindle of lever handles.

H. Sound Seals:

1. Install continuous around door heads and jambs, and meeting stiles of pairs of doors.
2. Install automatic door bottoms for full width of door.
3. Do not cut seals for attachment of closer brackets or shoes.

I. Cylinder Cores:

1. When notified by the Owner, remove construction cores and install permanent cores in the presence of the Owner's designated representative.
2. Prior to installing permanent cores, verify that all locking components (e.g. collars, tailpieces, etc.) are still intact.
3. It is the Contractor's responsibility to return the construction cores and keys to the manufacturer. Construction cores and keys remain the property of the Cylinder Manufacturer.

J. Key Cabinet:

1. Install in accordance with manufacturer's instructions in location as directed. Instruct the Owner in the use of the key control system.
2. Keys shall be tagged, neatly installed within the key cabinet, and delivered to the Property Manager or designated representative. Submit documentation of keying compliance including copies of signed transmittals for all building keys and cabinet provided by the Hardware Supplier.

K. Coordination with Adjacent Finishes:

1. If cutting and fitting are required to install hardware onto or into surfaces that are later painted or finished in another way, install each item completely and then remove and store in secure place during finish application.
2. After completion of finishes, reinstall each item.
3. Do not install surface mounted items until finishes are complete on substrate.

3.5 ADJUST AND CLEAN

A. General: To insure proper operation and function of every unit, adjust and check each operating item of hardware and each door. Lubricate moving parts with type lubrication recommended by the manufacturer (graphite-type if no other recommended). Replace unit that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

1. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Verify that the Owner has been supplied with manufacturers' installation and maintenance manuals, catalogs, and any special adjusting tools normally supplied by the manufacturer.

B. Continuity Testing: Inspect all connections between electrically operated and monitored hardware items including, but not limited to, electrified locks and exit devices, power transfers and power supplies. Upon completion of inspection, furnish the Architect with itemized report indicating any problems found and steps taken to repair anomalies.

C. Final Adjustment: When hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and perform a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate as necessary to restore proper function and finish of hardware and doors.

1. Prior to acceptance of any electrical hardware system, an operational test shall be performed to determine if devices are functioning as intended by the specifications. Wiring shall be tested for correct voltage, current-carrying capacity, and proper grounding. Stray voltages in lock wiring shall be eliminated to prevent locking devices from releasing in critical situations.

D. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:

1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.
5. Deliver Operations and Maintenance Manuals and any other special tools needed to maintain the hardware.

END OF SECTION

SECTION 087113.73
AUTOMATIC DOOR OPERATORS - HEAVY DUTY LOW ENERGY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes power door operators for swinging doors; heavy duty low energy power.

B. Provide interface operation to automatically open swinging doors with activation of fire alarm system.

C. Coordinate solid backing for door opening controls mounted over ACM panel, at interior-side of door.

1.2 DEFINITIONS

A. AAADM: American Association of Automatic Door Manufacturers.

B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.

C. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.

D. For automatic door terminology, see BHMA A156.19 for definitions of terms.

1.3 PERFORMANCE REQUIRMENTS

A. Provide automatic door operators that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer’s corresponding standard systems.

B. Provide automatic door operators capable of withstanding loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

C. Operating Range: Minus 30 deg F (Minus 34 deg C) to 130 deg F (54 deg C).

D. Opening-Force Requirements for Egress Doors: In the event power failure to the operator, swinging automatic entrance doors shall open with a manual force, not to exceed 30 lbf (133 N) applied at 1” (25 mm) form the latch edge of the door.

E. Break Away Requirements: Automatic door operators shall breakaway with no more than 30 lbf (133 N) applied at 1” (25 mm) from the latch edge of the door.

1.4 COORDINATION

A. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing automatic door operators.

B. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.

F. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies.

G. System Integration: Integrate automatic door operators with other systems as required for a complete working installation.

1. Provide electrical interface control capability for activation of automatic door operators by secure activation system on doors with electric locking.
2. Where indicated to install both push plates and secure activation system, automatic door operators shall be configured to operate; by secure activation system when secured; by push plate when not secured.

3. Where required for proper operation, provide a time delay relay to signal automatic door operator to activate only after electric lock system is released.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For automatic door operators.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Indicate locations of activation and safety devices.
4. Include diagrams for power, signal, and control wiring.
5. Include plans, elevations, sections, and attachment details for guide rails.

C. Samples: For each exposed product and for each color and texture specified, manufacturer's standard size.

1.7 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For automatic door operators, safety devices, and control systems, to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project and who employs a Certified Inspector.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

H. Certified Inspector Qualifications: Certified by AAADM.

I. Power Operated Door Standard: ANSI/BHMA A156.19.

J. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

K. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for swinging automatic entrance doors serving as a required means of egress.

1.2 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Faulty or sporadic operation of automatic door operator, including controls.

b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain automatic door operators, including activation and safety devices, from single source from single manufacturer.

2.2 SWINGING DOOR OPERATORS

A. General: Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

B. Configuration: Operator to control single swinging door.

1. Traffic Pattern: Two way.
2. Operator Mounting: Surface.

C. Operation: Power opening and spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19.

1. Wind Force Dampening: The operator electromechanically counteracts wind forces, slowing down the door movement to safely open or close the door.

D. Operating System: Electromechanical.

E. Battery Convenience Mode: Operator to maintain continuous operation by battery power during power failure. Battery is continuously monitored and provides a warning signal if the battery is not working properly.

F. Microprocessor Control Unit: Solid-state controller.

G. Electromechanical Operators: Self-contained unit powered by a fractional horsepower, permanent-magnet DC motor; through a high torque reduction gear system.

1. Operation: Power opening and spring closing.
2. Operator Type: Low energy; readily convertible to full energy.
3. Capacity: Rated for door panels weighing up to 350 lb (159 kg).
4. Mounting: Visible
5. Features:

a. Adjustable opening and closing speeds.
b. Adjustable opening and closing force.
c. Adjustable back-check.
d. Adjustable hold-open time between 0 and 30 seconds.
e. Reverse on obstruction.
f. Optional Switch to open/Switch to close operation.
g. Optional push to activate operation.

H. Field Adjustable Spring Closing Operation: The operator shall close the door by spring energy employing the motor, as a dynamic brake to provide closing speed control. The closing spring shall be a helical compression spring or clock spring, adjustable for positive closing action.

I. Independent Adjustable Closing and Latching Speed Control: The operator shall employ a rheostat module to allow for independent field adjustment of closing and latching speeds using the motor as a dynamic brake.

J. Field Adjustable Open Stop: The operator shall provide a field adjustable open stop to accommodate opening angles from 80 to 135 degrees without the need for additional components.

K. Quiet Performance: The operator shall be designed to output audible noise ratios less than or equal to 50dba.

L. Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power. The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open.

M. Electrical service to door operators shall be provided under Division 16 Electrical. Minimum service to be 120 VAC, 5 amps.

2.3 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extrusions: ASTM B 221.
2. Sheet: ASTM B 209.

B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness, in manufacturer's standard thickness.

C. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.4 ELECTRICAL CONTROLS

A. Electrical Control System: Electrical control system shall include a microprocessor controller and position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position. Systems utilizing external magnets and magnetic switches are not acceptable.

B. Performance Data: The microprocessor shall collect and store performance data as follows:

1. Counter: A non-resettable counter to track operating cycles.
2. Event Reporting: Unit shall include event and error recording including number of occurrences of events and errors, and cycle count of most recent events and errors.
3. LED Display: Display presenting the current operating state of the controller.

C. Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation:

1. Automatic Reset Upon Power Up.
2. Main Fuse Protection.
3. Electronic Surge Protection.
4. Motor Protection, over-current protection.

D. Soft Start/Stop: A “soft-start” “soft-stop” motor driving circuit shall be provided for smooth normal opening and recycling.

E. Obstruction Recycle: Provide system to recycle the swinging panels when an obstruction is encountered during the closing cycle.

F. Control Switch: Automatic door operators shall be equipped with a three position function switch to control the operation of the door. Control switch shall provide three modes of operation, Automatic, Off, and Hold-Open.

G. Power Switch: Automatic door operators shall be equipped with a two position On/Off switch to control power to the door.

2.5 ACTIVATION DEVICES

A. Push Plates: Provide 4 3/4 inch (121 mm) square push plates with UL recognized SPDT switch. Face plates and mounting studs shall be stainless steel. Face plates shall be engraved with the international symbol for accessibility and “Push To Open”.

1. Interior push plates shall be wall mounted in electrical boxes and hardwired to door operator controls.
2. Exterior push plates shall be post mounted and hardwired to door operator controls.
3. Where mounting posts are required provide 6 1/4 inch by 4 1/4 inch (159 mm by 108 mm) steel tube, black ABS plastic cap, and SS mounting plate. Post finish shall be powder coat inside and out. Post shall be 42 inch (1067 mm) high configured for switch mounting.

B. Activation Control Module: Provide microprocessor controlled module as required for timed sequencing of door activation based on signal from push plates. Module shall comply with the following:

1. Power Supply: 12-24 VAC/VDC.
2. Inputs: 4 Dry Contacts, 1 Wet @ 5-24 VAC/VDC.
3. Outputs: 2 Dry Relays @ 3 A, 1 Dry Relay @ 1 A, 1 Wet Relay @ 1 A
4. Units shall be suitable for mounting in automatic door operators headers.
5. Provide activation control module to sequence the activation of vestibule doors.
6. Provide activation control module for timed activation of operators on doors with electric locking.
7. Activation control module shall be equal to or better than BEA Br3.

C. Provide interface operation to automatically open swinging doors with activation of fire alarm system.

2.6 FABRICATION

A. Factory fabricate automatic door operators to comply with indicated standards.

B. Form aluminum shapes before finishing.

C. Fabricate exterior components to drain condensation and water passing joints within operator enclosure to the exterior.

D. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

E. Provide metal cladding, completely covering visible surfaces before shipment to Project site. Fabricate cladding with concealed fasteners and connection devices, with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion, and with allowance for thermal expansion at exterior doors.

2.7 ACCESSORIES

A. Signage: As required by cited BHMA standard for type of door and its operation.

1. Application Process: Operator manufacturer's standard process.
2. Provide sign materials with instructions for field application when operators are installed.

2.8 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

A. Dark bronze anodized matching aluminum door finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of automatic door operators.

B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.

C. Examine roughing-in for compressed-air piping systems to verify actual locations of piping connections before automatic door operator installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install automatic door operators according to manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.

1. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.
2. Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.

B. Controls: Install activation and safety devices according to manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel. Connect control wiring.

C. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

3.3 FIELD QUALITY CONTROL

A. Certified Inspector: Owner will engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and inspect each automatic door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

C. Automatic door operators will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust automatic door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

1. Adjust operators on exterior doors for weathertight closure.

B. After completing installation of automatic door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.

C. Read adjust automatic door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of automatic door operator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
2. Perform maintenance, including emergency callback service, during normal working hours.
3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION

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SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds and accessories.

D. Existing Window Glazing Restoration/Retrofit:

1. Safety film to be added to Window W101; refer to Section 08 87 53.

2. Provide tempered glass to replace screens in all existing first floor window screen panels for energy efficiency standards.

3. Provide additional tempered glass panel to be to interior jamb of existing #W103 and #W104 in stair hall for safety at staircase.

4. Provide insulating glass units within existing openings as indicated on Drawings.

5. Refer to Window Schedule on Drawing A1.0 for additional requirements.

1.2 SUBMITTALS

A. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

B. Certificate: Certify that products of this section meet or exceed specified requirements.

C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM) and GANA (LGRM) for glazing installation methods.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.4 MOCK-UPS

A. Locate within framing set in masonry mockup.

1.5 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.6 WARRANTY

A. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Glass Manufacturers:

1. AGC Glass North America, Inc: www.agcglass.com.

2. Cardinal Glass Industries: www.cardinalcorp.com.

3. Guardian Glass, LLC: www.guardianglass.com.

4. Pilkington North America Inc: www.pilkington.com/na.
5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com.

B. Fire-Protection-Rated Glass: Provide products as required to achieve indicated fire-rating period.

1. Manufacturers:
   a. SAFTIFIRST, a division of O'Keeffe's Inc: www.safti.com.
   b. Technical Glass Products: www.fireglass.com.
   c. Vetrotech North America: www.vetrotechusa.com.

2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.

1. Design Pressure: Calculated in accordance with ASCE 7.
2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7
4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
5. Glass thicknesses listed are minimum.

B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.

1. In conjunction with vapor retarder and joint sealer materials described in other sections.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:

1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.3 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.

1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.4 INSULATING GLASS UNITS

A. Insulating Glass Units:

1. Durability: Certified by an independent testing agency to comply with ASTM E2190.

2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Warm-Edge Spacers: Flexible silicone with polyisobutylene (PIB) primary seal.
    a. Spacer Width: As required for specified insulating glass unit.
    b. Spacer Height: 0.27 inch.
    c. Manufacturers:
        1) Quanex IG Systems, Inc; Super Spacer TriSeal: www.quanex.com/#sle.
        2) JEBerkowitz; JEB 3Seal: www.jeberkowitz.com.
4. Spacer Color: Black.
5. Edge Seal:
    a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.
    b. Color: Black.
6. Purge interpane space with dry air, hermetically sealed.

B. Insulating Glass Units: Vision glass, double glazed.
1. Space between lites filled with air.
2. Outboard Lite: Fully tempered safety glass, 1/4 inch thick, minimum.
    a. Tint: Clear.
    b. Coating: Low-E (solar control type), on #2 surface.
3. Inboard Lite: Fully tempered safety glass, 1/4 inch thick, minimum.
    a. Tint: Clear.
4. Total Thickness: 1 inch.

2.5 GLAZING UNITS

A. Monolithic Interior Vision Glazing:
1. Applications: Interior glazing unless otherwise indicated.
2. Glass Type: Fully tempered safety glass.
3. Tint: Clear.
4. Thickness: 1/4 inch, nominal.

B. Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve fire-doors indicated fire-rating period as indicated on drawings.
1. Applications:
    a. Glazing in fire-rated door assembly.
    b. Glazing in fire-rated window assembly.
2. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
3. Safety Glazing Certification: 16 CFR 1201 Category II.
4. Fire-Rating Period: As indicated on drawings.
5. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code and authorities having jurisdiction

a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.

b. "OH" - meets fire window assembly criteria including hose stream test of NFPA 257, or UL 9 fire test standards.

c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.

d. "XXX" - placeholder that represents fire-rating period, in minutes.

6. Manufacturers:

a. Technical Glass Products; Firelite Plus: www.fireglass.com/#sle.

2.6 GLAZING COMPOUNDS

A. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

2.7 ACCESSORIES

A. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option I. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compoundwith integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color. Complying with ASTM C 1281 and AAMA 800 for products as follows:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

D. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal. Complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.

2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; color black.

F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

3.2 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.5 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

F. Carefully trim protruding tape with knife.

3.6 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

E. Place glazing tape on free perimeter of glazing in same manner described above.

F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

G. Carefully trim protruding tape with knife.

3.7 FIELD QUALITY CONTROL

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.8 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.9 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 87 53
SAFETY AND SECURITY FILMS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes security and safety film placed on glass surfaces for increased security protection; safety film to be added to Window W101.

1.2 SUBMITTALS

A. Samples: Submit one 12 x 12 inches sample of film installed on 1/4-inch thick clear plate glass.

B. Test Reports: Submit test reports from approved independent testing laboratory, certifying film's compliance with specified requirements.

C. Closeout Submittals:

1. Provide operation and maintenance data for window film for incorporation into manual specified in Division 1.

2. Follow manufacturers written instructions for care and maintenance of security and safety film.

3. Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of security film.

1.3 DELIVERY, STORAGE AND HANDLING

A. Provide and maintain dry, off-ground weatherproof storage.

B. Store rolls of film flat on cross supports. Do not stand rolls of film on end.

C. Remove from storage, in quantities required for same day use.

D. Store materials in accordance with manufacturers written instructions.

E. Waste Management and Disposal: Place materials defined as hazardous or toxic waste in designated containers.

1.4 WARRANTY

A. Contractor hereby warrants that Security and Safety Film will stay in place without delaminating, peeling or blistering for 10 years.

B. Ensure warranty includes items as follows:

1. Maintaining adhesion properties without blistering, bubbling or delaminating from glass surface.

2. Maintaining appearance without discolouration.

3. Removing, replace and reapply defective materials.

4. In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. Security Film - General: Optically clear microlayered polyester film, nominally 8 mils (0.008 inch) thick, with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is clear and does not contain dyed polyester. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film is microlayered with both plastic and ductile polyester layers for tear resistance.

1. Physical / Mechanical Performance Properties (nominal):
    a. Film Color: Clear.
    b. Film Thickness (excluding coatings or adhesive liner): Nominal 8 mils
    c. Tensile Strength (ASTM D882):
        1) Base Film: 32,000 psi (MD) / 32,000 psi (TD).
        2) Coated Film: 32,000 psi (MD) / 32,000 psi (TD).
    d. Break Strength (ASTM D882):
        1) Base Film: 250 lb/in (MD) / 250 lb/in (TD).
        2) Coated Film: 245 lb/in (MD) / 265 lb/in (TD).
    e. Percent Elongation at Break (ASTM D882):
        1) Base Film: 115 % (MD) / 115 % (TD).
        2) Coated Film: 132 % (MD) / 130 % (TD).
    f. Yield Strength:
        1) Base Film: 12,000 psi (MD).
        2) Coated Film: 15,000 psi (MD).
    g. Percent Elongation at Yield (ASTM D882):
        1) Base Film: 7% (MD).
        2) Coated Film: 9% (MD).
    h. Graves Tear Resistance (ASTM D1004):
        1) Maximum Force (lbs):
            a) Base Film: 40 (MD) / 40 (TD).
            b) Coated Film: 40 (MD) / 40 (TD).
        2) Maximum Extension (in):
            a) Base Film: 0.45 (MD) / 0.65 (TD).
            b) Coated Film: 0.50 (MD) / 0.57 (TD).
        3) Graves Area Tear Resistance (lbs%):
            a) Base Film: 1,100 (MD) / 1,300 (TD).
            b) Coated Film: 1,100 (MD) / 1,300 (TD).
    i. Puncture Propagation Tear Resistance (ASTM D2582):
        1) Coated Film: 9 lbf (MD) / 10 lbf (TD).
    j. Puncture Strength (ASTM D4830):
        1) Material Properties (as supplied).
        2) Coated Film: 185 lbf.
2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.
4. Identification: Labeled as to Manufacturer as listed in this Section.

5. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
    a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
    b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
6. Impact Resistance and Pressure Cycling: Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/ 75 psf Design Pressure with use of 3M Impact Protection Adhesive. Film applied to 1/4-inch tempered glass.
7. Basis-of-Design: 3M; Product Ultra S800.

B. Installation Materials: Installation to be complete 3M Impact Protection Profile Attachment System (Basis-of-Design).
1. Description: Gasket-style attachment that bonds the filmed glass and frame by incorporating 3M VHB Tape.

2.2 FABRICATION

A. Shop installation of security film to glass panels:
1. Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.
2. Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems.
    a. Install security film to glass panels ensuring no blisters, bubbles, scratches, edge defects or distortions.
    b. Cut film edges straight and square installed into the glazing channel.
    c. Deliver glass panels complete with security film installed and labels intact and legible to site.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean glass before beginning installation using neutral cleaning solution.

B. Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.

C. Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

D. Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate or cause vision transparency or distortion problems. Report findings to Architect.

E. Proceed with Work only after receipt of written approval from Architect.

3.2 INSTALLATION

A. Apply and attach film to glass in accordance with manufacturer's written instructions.

B. Splicing:
1. Splice film only when glass is greater in width than film.
2. Splice film only after receipt of written approval from Architect.
3. Use butt or overlapped factory edges as tested and approved by manufacturer.

B. Install units with the 3M Impact Protection Profile system.

3.3 INSTALLER'S INSPECTION

A. Remove and replace glass panel that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 5 feet minimum after 30 day period.

3.4 FINAL CLEANING

A. Wash interior and exterior of each glass panel and film using cleaning solution recommended by film manufacturer.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Shaft wall system.

C. Fire rated area separation walls.

D. Acoustic insulation.

E. Gypsum sheathing.

F. Gypsum wallboard.

G. Impact- resistant gypsum wallboard.

H. Moisture and mold resistant wallboard.

I. Exterior Sheathing and Soffit board.

J. Joint treatment and accessories.

K. Acoustic (sound-dampening) wall and ceiling board.

1.2 SUBMITTALS

A. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

B. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories and joint finishing system.

C. Product Schedule: For each product submitted, indicate which wall type or types it will be used in.

D. Submit drawings indicating proposed location of control joints for Architect's review; locations to be approved by Architect and may be adjusted for aesthetic reasons.

1.3 QUALITY ASSURANCE

A. Maintain one copy of all installation standards at project site.

B. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

1. Maintain one copy of standards at project site.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:

1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.

2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:

1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.2 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Continental Building Products: www.continental-bp.com.
3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
4. National Gypsum Company: www.nationalgypsum.com/#sle.
5. USG Corporation: www.usg.com/#sle.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Regular Type:
   a. Application: Use for vertical surfaces, unless otherwise indicated.
   b. Edges: Tapered.
2. Fire Resistant Type: Complying with Type X requirements; UL or WH rated.
   a. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
   b. Edges: Tapered.
3. Ceiling Board: Special sag-resistant type.
   a. Application: Ceilings, except areas with showers or otherwise indicated.
   b. Thickness: 5/8 inch.
   c. Edges: Tapered.

C. Impact Resistant Wallboard:

1. Application: High-traffic areas indicated.
2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
5. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
7. Type: Fire resistance rated Type X, UL or WH listed.
8. Thickness: 5/8 inch.
9. Edges: Tapered.
10. Paper-Faced Products:
    a. American Gypsum Company; M-Bloc IR Type X.
    b. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech.
    c. Continental Building Products; Protecta HIR 300 Type X with Mold Defense.
    d. National Gypsum Company; Gold Bond HI-Impact XP Gypsum Board.

D. Moisture and Mold Resistant Wallboard: Wallboard installed at building perimeter, and any wallboard furred to concrete or masonry construction.

1. Characteristics:

a. ASTM C 1396 (Section 5) regular type except where Type X fire-resistant type is indicated or required by to meet UL assembly types.

b. Edges: Tapered.

c. Resists the growth of mold when tested, as manufactured, according to ASTM D 3273.

2. Available Products:

a. SHEETROCK® Brand Mold Tough® Gypsum Panels by USG.

b. Gold Bond® BRAND XP® Wallboard by National Gypsum.

c. Mold Defense Products by Continental Building Products.

d. M2Tech Mold and Moisture Resistant Gypsum Board Type X by CertainTeed.

E. Exterior Gypsum Sheathing Board and Soffit Board: Sizes to minimize joints in place; ends square cut.

1. Application: Exterior sheathing, unless otherwise indicated.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.

4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.

5. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.

6. Core Type: Type X.

7. Type X Thickness: 5/8 inch.

8. Edges: Square.

9. Glass Mat Faced Products:

a. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing.

b. Continental Building Products; Weather Defense Platinum Sheathing Type X.

c. Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing.

d. National Gypsum Company; Gold Bond eXP Sheathing.

10. Basis-of-Design Finish for Exterior Soffits: G-P Setting Compound followed by G-P Finish Coat.

F. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.

1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

3. Glass Mat Faced Products:

a. CertainTeed Corporation; GlasRoc Shaftliner Type X.

b. Continental Building Products; Mold Defense Shaftliner Type X.

c. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant).

d. National Gypsum Company; Gold Bond Brand eXP Shaftliner.

e. United States Gypsum; Sheetrock Brand Gypsum Liner Panels Mold Tough.

2.3 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 inches.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.

D. Water-Resistive Barrier: As specified in Section 07 25 00.

E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.

1. Types: As detailed or required for finished appearance.

2. Available products include the following:

a. Grabber Construction Products: No-Coat Prefinished Corners.

b. US Gypsum Company; Beadex Paper-Faced Metal Drywall Bead and Trim.

F. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fry Reglet Corp.

b. Gordon, Inc.

c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.

3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

G. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Fiberglass Tape (exterior): 2 inch wide, coated glass fiber tape for joints and corners.

2. Joint Compound: Setting type, field-mixed.

H. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

I. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.

1. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Exterior Gypsum Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

1. Cut boards at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

a. Install boards with a 3/8-inch setback where non-load-bearing construction abuts structural elements.

b. Install boards with a 1/4-inch setback where they abut masonry or similar materials that might retain moisture, to prevent wicking.

2. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.

3. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.

4. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.

5. Screw-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.

F. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.

1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.

2. Fasten with corrosion-resistant screws.

3. Seal other penetrations and openings.

4. Prepare for specified finish according to manufacturer's instructions.

G. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

H. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as follows:

1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materialsand as indicated.

D. Aluminum Trim: Install in locations indicated.

3.6 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish, markerboard paint or wallcovering, murals and other areas specifically indicated.

2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.

4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.

5. Level 0: Temporary partitions.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.7 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal secondary framing, furring and carrying members.

B. Metal ceiling and soffit framing.

C. Framing accessories.

1.2 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members.

B. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.3 SUBMITTALS

A. Shop Drawings:

B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts and limitations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:

1. CEMCO: www.cemcosteel.com/#sle.

2. ClarkDietrich Building Systems: www.clarkdietrich.com/#sle.

3. Marino: www.marinoware.com/#sle.

4. The Steel Network, Inc: www.SteelNetwork.com/#sle.

5. Telling Industries: www.buildstrong.com.

B. Grid Suspension System for Gypsum Board Ceilings and Bulkheads:

1. Armstrong World Industries, Inc.; Drywall Grid Systems.

2. Chicago Metallic Corporation; Drywall Furring System.

3. USG Corporation; Drywall Suspension System.

2.2 FRAMING MATERIALS

A. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

B. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.

C. Fasteners: ASTM C1002 self-piercing tapping screws.

D. Sheet Metal Backing: 0.036 inch thick, galvanized.

E. Anchorage Devices: Powder actuated.

F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.

PART 3 EXECUTION

3.1 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

D. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.

G. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.

H. Laterally brace suspension system.

I. Contractor Option - Grid Suspension System for Gypsum Board Ceilings and Bulkheads: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

3.2 TOLERANCES

A. Maximum Variation from True Position: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Cementitious backer board as tile substrate.

D. Ceramic trim.

E. Waterproofing and crack isolation membrane.

1.2 SUBMITTALS

A. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, ceramic accessories and setting details.

C. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Tile: 2 percent of each size, color, and surface finish combination, but not less than one box of each type.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.4 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.6 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

1.7 EXTRA MATERIALS

A. Furnish quantity of one full box of each tile type and color selected.

B. Turn over any cut tile exceeding 50 percent of a full tile, as extra materials.

PART 2 PRODUCTS

2.1 TILE

A. Glazed Wall Tile, Type CT: ANSI A137.1, standard grade.

1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
2. Edges: Cushioned.
3. Surface Finish: High gloss.
4. Selections: As indicated on Finish Schedule for specific locations.
5. Trim Units: Matching bead, bullnose, cove and base shapes in sizes coordinated with field tile.

B. Porcelain Tile:

1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
2. Edges: Cushioned.
3. Surface Finish: Matte glazed.
4. Selections: As indicated on Finish Schedule for specific locations.
5. Trim Units: Matching bullnose and cove base shapes in sizes coordinated with field tile.

C. Glass Tile, Type GT: ANSI A137.2, standard grade.

1. Selections: As indicated on Finish Schedule for specific locations.

2.2 TRIM AND ACCESSORIES

A. Ceramic Trim: Matching bullnose, double bullnose, cove base and cove ceramic shapes in sizes coordinated with field tile.

1. Applications:
   a. Open Edges: Bullnose.
   b. Inside Corners: Jointed.
   c. Floor to Wall Joints: Cove base.
2. Manufacturers: Same as for tile.

2.3 SETTING MATERIALS

A. Latex-Portland Cement Mortar Bond Coat - Thin Set and Medium Bed: ANSI A118.4.

1. Products:
   a. ARDEX Engineered Cements.
   b. Custom Building Products.
   c. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com.
   d. Bonsal American, Inc .
   e. Bostik Inc .
   f. MAPEI Corporation.
2. Medium Bed Locations: Where required to produce slope; product that is approved by manufacturer for application thickness of 5/8 inch (16 mm).

B. Glass Tile Mortar with Polymer - Tile Type 2 and Tile Type 5 Locations: White specialty mortar/grout for glass tile application.

1. Basis-of-Design: MAPEI Corporation; Adesilex P10 Mosaic and Glass Tile.

2.4 GROUTS

A. Manufacturers:

1. ARDEX Engineered Cements: www.ardexamericas.com.
2. Bonsal American, Inc: www.sakrete.com

3. Bostik Inc: www.bostik-us.com.
4. Custom Building Products: www.custombuildingproducts.com.
5. LATICRETE International, Inc: www.laticrete.com.
6. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com.
7. MAPEI Corporation. (Basis-of-Design)

B. High Performance Grout:
1. Basis-of-Design: MAPEI Corporation; Flexcolor CQ.
2. Color(s): As selected by Architect from manufacturer's full line.

2.5 ACCESSORY MATERIALS

A. Waterproofing and Crack Isolation Membrane: Fluid-applied acrylic-based membrane with reinforcing mesh, complying with ANSI A118.10.
1. Basis-of-Design: Mapei Corporation; Mapelastic HPG with Fiberglass Mesh.
2. Equivalent product of listed setting and grouting material manufacturers.
3. Location: All tile floors; full coverage.

B. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
1. Product: Durock Brand Cement Board manufactured by United States Gypsum Company.
2. Location: Wet walls and high-humidity areas.

C. Tile Backer Panel:
1. Mold-resistance: Passes ASTM D 3273.
2. Compliance with Standards: Meets ASTM C 1278 and meets or exceeds the physical requirements of ASTM C 630 and ASTM c 1178.
3. Use: Approved by manufacturer for use as tile backer panel.
4. No paper face.
5. Basis-of-Design: Fiberock Brand Aqua-Tough Interior Panel manufactured by United States Gypsum Company.
6. Contractor Option: DensShield Tile Backer manufactured by Georgia-Pacific.
7. Location: Walls not requiring cementitious backer board as specified.

D. Metal Edge Strips:
1. Open Edge of Tile with Adjacent Finish of Similar Height:
a. General: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
b. Basis-of-Design: 1.1 Schluter-SCHIENE Edge-protecting Profile; stainless steel.
2. Open Edge of Tile with Adjacent Finish of Different Height:
a. General: ADA-compliant profile, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
b. Basis-of-Design:
1) 1.2 Schluter-RENO-U Reducer Profile, where tile surface is higher than adjacent finish; stainless steel.

3. Open Edge of Tile - Vertical Outside Corners (Walls):
    a. Basis-of-Design: 2.3 Schluter-Jolly; brushed nickel anodized aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
    1. Test as Follows:
        a. Alkalinity (pH): ASTM F710.
        b. Internal Relative Humidity: ASTM F2170.
        c. Moisture Vapor Emission: ASTM F1869.
    2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

3.3 INSTALLATION - GENERAL

A. Install tile, thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19 , manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control and expansion joints free of mortar, grout, and adhesive.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated. Seal grout joints.

K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

A. Provide specified waterproofing and crack isolation membrane for all tile floor areas; install in accordance with TCA Method F122, with latex-portland cement grout.

3.5 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244.

B. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.6 CLEANING

A. Clean tile and grout surfaces.

3.7 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

B. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

C. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

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SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.2 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

C. UL (FRD) - Fire Resistance Directory.

1.3 SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items; show the following:

1. Ceiling suspension system members.

2. Method of attaching suspension system hangers to building structure.

3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.

4. Minimum Drawing Scale: 1/8 inch = 1 ft.

B. Product Data: Provide data on suspension system components.

C. Samples: Submit two full size samples illustrating material and finish of acoustical units.

1.4 QUALITY ASSURANCE

A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.

1.5 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.6 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units equal to 12 cases.

2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

A. Basis-of-Design: Refer to Finish Schedule on Drawings.

B. Acoustical Units - General: ASTM E1264, Class A.

1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly as part of suspension system.

2.2 SUSPENSION SYSTEM(S)

A. Manufacturers:

1. Armstrong World Industries, Inc: www.armstrong.com.
2. CertainTeed Corporation: www.certainteed.com.
3. USG: www.usg.com.
4. Rockfon: www.rockfon.com.

B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings and hold down clips as required.

C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.

1. Basis-of-Design: Armstrong Silhouette XL 1/8-inch Reveal, or equivalent of other named manufacturers.
2. Finish: White painted.

2.3 EXTRUDED PERIMETER TRIM

A. Manufacturers:

1. Armstrong World Industries, Inc; Product Axiom: www.armstrong.com.
2. Rockfon; www.rockfon.com.
3. USG; Product Compasso: www.usg.com.
4. CertainTeed Ceilings, Cloud Perimeter Trim

B. Location:

1. Edge trim system for transitions between drywall and suspended ceilings.
2. Boundry trim system for isolated hung areas of suspended ceilings.

C. Components:

1. Extruded aluminum alloy 6063 trim channel.
2. Attachment to grid system is provided by tee-bar connection clips which lock into bosses on the trim channel and are screw-attached to the web of the intersecting suspension system members.
3. Sections of trim are joined together using the splice plate.

2.4 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.

1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580 and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.

1. Install in bed of acoustical sealant.
2. Use longest practical lengths.
3. Overlap and rivet corners.

K. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.2 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:

1. Cut to fit irregular grid and perimeter edge trim.
2. Make field cut edges of same profile as factory edges.
3. Double cut and field paint exposed reveal edges.

H. Where round obstructions occur, provide preformed closures to match perimeter molding.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.3 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

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SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.2 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

B. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

C. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.

D. Concrete Sub-floor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports for record.

E. Certification: Submit written certification by manufacturer declaring products do not contain asbestos.

F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Flooring Material: 200 square feet of each type and color.

2. Extra Wall Base: 20 linear feet of each type and color.

1.3 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 RESILIENT FLOORING

A. High Performance Luxury Vinyl Tile: Basis-of-Design: Interface; LVT Studio Set.

1. ASTM F1700 Class: Class III Printed Vinyl Plank.

2. Wear Layer Thickness: Minimum 22 mil.

3. Backing: Acoustical.

4. Total Thickness: Minimum 4.5 mm.

5. Finish: Abrasion resistant ceramic bead.

6. Sustainability:

a. Offset GHG emissions associated with entire life cycle of product.

b. Provide Environmental Product Declaration.

c. NSF/ANSI 332 Sustainability Assessment: Silver.

2.2 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.

1. Manufacturers:

a. Burke Flooring: www.burkeflooring.com/#sle.

b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.

c. Interface.

d. Roppe Corp: www.roppe.com/#sle.

e. Nora Systems, Inc.: www.nora.com.

f. NPlus: www.nplusrubber.com.

2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.

3. Height: 4 inch.

4. Thickness: 0.125 inch.

5. Finish: Satin.

6. Length: Roll.

7. Color: To be selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

A. Subfloor Filler: Cementitious; type recommended by adhesive material manufacturer.

B. Primers, Adhesives and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

C. Moldings, Transition and Edge Strips: Metal.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.

C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

D. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

E. Verify that concrete sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:

1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.

2. Alkalinity: pH range of 5-9.

F. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Repair all subfloor conditions that are not acceptable to the flooring or adhesive manufacturer or that do not meet the conditions described in the Examination portion of this specification.

B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is fully cured.

D. Clean substrate.

E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:

1. Spread only enough adhesive to permit installation of materials before initial set.

2. Fit joints and butt seams tightly.

3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.

2. Resilient Strips: Attach to substrate using adhesive.

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

G. Install flooring in recessed floor access covers, maintaining floor pattern.

H. At movable partitions, install flooring under partitions without interrupting floor pattern.

3.4 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

C. Apply protective floor sealer to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes as recommended in writing by manufacturer.

1. Use commercially available product acceptable to manufacturer.

2. Coordinate selection of floor sealer with Owner's maintenance service; first application by Contractor.

3. Buff floors to an even luster with an electric polishing machine; final seal coat application must be completed minimum 48 hours prior to Owner's occupancy.

3.6 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

B. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

C. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.2 SUBMITTALS

B. Shop Drawings: Indicate layout of joints.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Submit two, 12 inch long samples of edge strip.

G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed, with a minimum of 1 full box of each type, color, and pattern.

1.3 INSTALLER QUALIFICATIONS

A. Company specializing in performing Work of this Section with minimum five years' experience.

B. Installers trained, accepted and certified by the carpet manufacturer, or FCIB, IFCI or CRI certified carpet installers.

1.4 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design - Interior: Interface Let It Bee Collection; Honey Don'T.

1. Color System: 100 percent Solution Dyed.

2. Yarn System: Post-consumer content nylon.

3. Construction: Tufted texture loop.

4. Indoor Air Quality: CRI Green Label Plus.

B. Basis-of-Design - Entrance: Interface Step Repeat SR799 Colorline.

1. Soil Retention: 4 lbs.

2. Yarn System: Type 6 Nylon.

3. Classification: Severe.

4. Warranty: 15 years.

2.2 MATERIALS

A. General:

1. Carpet: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or Carpet and Rug Institute's (CRI) Green Label Plus (GLP).

B. Basis-of-Design Selections: Refer to Finish Schedule.

2.3 ACCESSORIES

A. Sub-Floor Filler: Cementitious type; type recommended by flooring material manufacturer.

B. Edge Strips: Rubber, color as selected by Architect.

C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

B. Vacuum clean substrate.

3.3 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.

C. Install carpet tile in accordance with manufacturer's instructions and CRI 104.

D. Blend carpet from different cartons to ensure minimal variation in color match.

E. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

F. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

G. Locate change of color or pattern between rooms under door centerline.

H. Fully adhere carpet tile to substrate.

I. Trim carpet tile neatly at walls and around interruptions.

J. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 84 00
ACOUSTICAL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Modular design acoustical panels and mounting accessories.

1.2 SUBMITTALS

A. Product Data: Manufacturer's printed data sheets for products specified.

B. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.

C. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.

D. Verification Samples: Fabricated samples of each type of panel and color specified; showing construction, edge details, and fabric covering.

1.3 QUALITY ASSURANCE

A. Warranty Period: 2 years.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical panels from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until panels are needed for installation.

B. Store panels flat, in dry, well-ventilated space; do not stand panels on end.

C. Protect panel edges from damage.

PART 2 PRODUCTS

2.1 FABRIC-COVERED ACOUSTICAL PANELS

A. Basis-of-Design: ecoustic Foliar by unika vaev.

B. Content:

1. Face: 100% PET (>50% recycled content).

2. Back: 100% Polycarbonate-Base.

C. NRC Rating: 0.80 including manufacturer’s infill.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install acoustical panels in locations indicated, following installation recommendations of panel manufacturer. Position panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.

3.2 CLEANING

A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

B. Remove surplus materials, trimmed portions of panels, and debris resulting from installation.

3.3 PROTECTION

A. Provide protection of installed acoustical panels until completion of the work.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

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SECTION 09 91 13
EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.

B. At existing brick including, but not limited to, existing chimney, use chemical paint stripper (following testing to confirm no harm) to remove paint; no not use sandblast or other abrasive means. Repointing to be performed and cured prior to repainting.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Indicate VOC content.

B. Sustainable Design Submittals:

1. Product Data: For paints and coatings, indicating VOC content.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

E. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.3 MAINTENANCE MATERIAL

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Behr Process Corporation.
2. Benjamin Moore & Co.
3. International Paint LLC.
4. McCormick Paints.
5. PPG Paints.
6. Sherwin-Williams Company (The).

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

C. Colors: As selected by Architect from manufacturer's full range.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Portland Cement Plaster: 12 percent.
6. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:

1. SSPC-SP 11.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete, Stucco, Cement Plaster and Masonry (Other than Concrete Masonry Units):

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer: Moore’s Acrylic Masonry Sealer #066.
2) First and Second Coats: SuperSpec Acrylic Latex Semigloss #170.
3) First and Second Coats: 170Ultra Spec EXT Satin (448)

b. Behr Process Corporation:

1) Primer: Premium Plus Interior / Exterior Multi-Surface Primer, 436
2) First and Second Coats: Behr Pro e600 Exterior Semi-Gloss Paint, 670

c. PPG Paints:

1) Primer: 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer.
2) First and Second Coats: Speedhide Exterior Semi-Gloss Latex, 6-900XI Series.

d. Sherwin-Williams Company:

1) Primer: Loxon Concrete & Masonry Primer, LX02 Series.
2) First and Second Coats: A-100 Exterior Gloss Latex A8 Series.

e. International Paint LLC:

1) Primer: Devcryl 1440.
2) First and Second Coats: Devcryl 1448.

f. McCormick Paints:

1) Primer: Acrylok Interior/Exterior 100% Acrylic Masonry Primer 06451.
2) First and Second Coats: State House Exterior Lustre 100% Acrylic Latex House Paint 27 Series.

B. Concrete Masonry Units:

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Block Filler (New CMU): Ultra Spec Hi-Build Masonry Block Filler 571.
2) First and Second Coats: Ultra Spec EXT Gloss 449.

b. Behr Process Corporation:

1) Block Filler (New CMU): Behr Pro Block Filler Primer, 50
2) First and Second Coats: Behr Pro e600 Exterior Semi-Gloss Paint, 670

c. PPG Paints:

1) Block Filler (New CMU): Speedhide Latex Block Filler, 6-15XI.
2) First and Second Coats: Speedhide Exterior Semi-Gloss Latex, 6-900XI Series.

d. Sherwin-Williams Company:

1) Block Filler (New CMU): Prep Rite Blockfiller B25W25.
2) First and Second Coats: A-100 Exterior Gloss Latex A8 Series.

e. International Paint LLC:

1) Primer: Tru-Glaze-WB 4015.
2) First and Second Coats: Devcryl 1448.

f. McCormick Paints:

1) Block Filler (New CMU): Interior/Exterior Latex Block Filler 01015.
2) First and Second Coats: State House Esterior Lustre 100% Acrylic Latex House Paint 27.

C. Mineral Fiber Reinforced Cement Panels:

1. Benjamin Moore & Co.:

a. Primer: Fresh Start Multi-Purpose Latex Primer (023).
b. First and Second Coats: Ultra Spec EXT Acrylic Latex Flat Finish N447.

2. Behr Process Corporation:

a. Primer: Premium Plus Interior / Exterior Multi-Surface Primer, 436
b. First and Second Coat: Behr Pro e600 Exterior Flat Paint, 610

3. PPG Paints:

   a. Primer: Perma-Crete Alkali Resistant Primer, 4-603.
   b. First and Second Coats: Speedhide Exterior Flat Latex, 6-610XI Series.

4. Sherwin-Williams Company:

   a. Primer: Loxon Concrete and Masonry Primer, A24W8300.
   b. First and Second Coats: A-100 Exterior Latex Flat A6 Series, or Loxon Self Cleaning Acrylic LX13

5. International Paint LLC:

   a. Primer: Devcryl 1440.
   b. First and Second Coats: Devcryl 1440.

6. McCormick Paints:

   a. Primer: Acrylok Interior/Exterior 100% Acrylic Masonry Primer 06451.
   b. First and Second Coats: State House Exterior Flat Acrylic Latex House Paint 19 Series.

D. Exterior Gypsum Soffit Board:

1. Benjamin Moore & Co.:

   a. Primer: Fresh Start Multi-Purpose Latex Primer (023).
   b. First and Second Coats: Ultra Spec EXT Acrylic Latex Flat Finish N447.

2. Behr Process Corporation:

   a. Primer: Premium Plus Interior / Exterior Multi-Surface Primer, 436
   b. First and Second Coat: Behr Pro e600 Exterior Flat Paint, 610

3. PPG Paints:

   a. Primer: 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer.
   b. First and Second Coats: Speedhide Exterior Flat, 6-610XI Series.

4. Sherwin-Williams Company:

   a. Primer: Multi-Purpose Latex Primer B51-450.
   b. First and Second Coats: A-100 Exterior Latex Flat A6 Series.

5. International Paint LLC:

   a. Primer: Devcryl 1440.
   b. First and Second Coats: Devcryl 1440.

6. McCormick Paints:

   a. Primer: State House Exterior Acrylic Latex Primer 06438.
   b. First and Second Coats: State House Exterior Flat Acrylic Latex House Paint 19 Series.

E. Smooth Wood (Painted):

1. Low-Luster, Satin, or Eggshell Sheen:

   a. Benjamin Moore & Co.:

      1) Primer (Unfinished Surfaces): SuperSpec #169 Latex Exterior Primer.
      2) First and Second Coats: Ultra Spec EXT Acrylic Latex Satin Finish N448.

b. Behr Process Corporation:

1) Primer (Unfinished Surfaces): Premium Plus Int/Ext Multi-Surface Primer, 436
2) First and Second Coats: Behr Pro e600 Exterior Satin Paint, 640

c. PPG Paints:

1) Primer (Unfinished Surfaces): 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer.
2) First and Second Coats: Speedhide Exterior Latex Satin Finish 6-2045XI Series.

d. Sherwin-Williams Company:

1) Primer (Unfinished Surfaces): Exterior Latex Wood Primer B42W8041.
2) First and Second Coats: A-100 Exterior Latex Satin A82-100 Series.

e. International Paint LLC:

1) Primer: Devcryl 1440.
2) First and Second Coats: Devcryl 1440.

f. McCormick Paints:

1) Primer: State House Exterior Acrylic Latex Primer 06438.
2) First and Second Coats: State House Exterior Satin 100% Acrylic Latex House Paint 20.

2. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unfinished Surfaces): SuperSpec Latex Exterior Primer #169.
2) First and Second Coats: Ultra Spec EXT Gloss 449.

b. Behr Process Corporation:

1) Primer (Unfinished Surfaces): Premium Plus Int/Ext Multi-Surface Primer, 436
2) First and Second Coats: Behr Pro e600 Exterior Semi-Gloss Paint, 670

c. PPG Paints:

1) Primer (Unfinished Surfaces): 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer.
2) First and Second Coats: Speedhide Exterior Semi-Gloss Latex, 6-900XI Series.

d. Sherwin-Williams Company:

1) Primer (Unfinished Surfaces): Exterior Latex Wood Primer .B42W8041.
2) First and Second Coats: A-100 Exterior Gloss Latex A8 Series.

e. International Paint LLC:

1) Primer: Devcryl 1440.
2) First and Second Coats: Devcryl 1448.

f. McCormick Paints:

1) Primer: State House Exterior Acrylic Latex Primer 06438.
2) First and Second Coats: State House Exterior Lustre 100% Acrylic Latex House Paint 27.

F. Ferrous Metal:

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unpainted Surfaces): Ultra Spec HP Acrylic Metal Primer HP04.
2) First and Second Coats: Ultra Spec EXT Gloss 449.

b. Behr Process Corporation:

1) Primer (Unfinished Surfaces): Premium Plus Int/Ext Multi-Surface Primer, 436
2) First and Second Coats: Direct To Metal Int/Ext Semi-Gloss Paint, 3200

c. PPG Paints:

1) Primer (Unpainted Surfaces): Pitt-Tech Plus 4020 PF.
2) First and Second Coats: Pitt Tech Plus 4216HP Semi-Gloss DTM Enamel.

d. Sherwin-Williams Company:

1) Primer (Unpainted Surfaces): Pro-Cryl Universal Primer, B66-1310 Series.
2) First and Second Coats: Pro Industrial Acrylic Coating S/G B66-650 Series; or
3) First and Second Coats: Pro Industrial DTM Acrylic Coating S/G B66-1100 Series.

e. International Paint LLC:

1) Primer: Devcryl 1440.
2) First and Second Coats: Devcryl 1448.

f. McCormick Paints:

1) Primer: 1st Step Interior / Exterior White Metal Rust Inhibitive Alkyd Primer 06453.
2) First and Second Coats: Interlok Interior/Exterior Acrylic Semi-Gloss Urethane DTM 45 Series.

G. Zinc-Coated (Galvanized) Metal:

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer: Ultra Spec HP Acrylic Metal Primer HP04.
2) First and Second Coats: Ultra Spec EXT Gloss 449.

b. Behr Process Corporation:

1) Primer (Unfinished Surfaces): Premium Plus Int/Ext Multi-Surface Primer, 436
2) First and Second Coats: Direct To Metal Int/Ext Semi-Gloss Paint, 3200

c. PPG Paints:

1) Primer: Pitt-Tech Plus 4020 PF.
2) First and Second Coats: Pitt Tech Plus Semi-Gloss DTM Industrial Enamel 4216 HP.

d. Sherwin-Williams Company:

1) Primer: Pro-Cryl Universal Primer, B66-1310 Series.
2) First and Second Coats: Pro Industrial Acrylic Coating Semi-Gloss B66-650 Series.

e. International Paint LLC:

1) Primer: Devcryl 1440.
2) First and Second Coats: Devcryl 1448.

f. McCormick Paints:

1) Primer: Underlok Interior/Exterior Acrylic Latex Multi-Purpose Primer 06452.
2) First and Second Coats: Interlok Interior/Exterior Acrylic Semi-Gloss Urethane DTM 45 Series.

H. Wood Panel Substrates (Satin): Including plywood siding, fascias and soffits.

1. Benjamin Moore & Co.:

a. Primer: Fresh Start 100% Acrylic Primer Sealer 023 (49 g/l).
b. Top Coat: Ultra Spec EXT Gloss 449.

2. Behr Process Corporation:

a. Primer: Premium Plus Interior/Exterior Multi-Surface Primer, 436
b. Top Coat: Behr Pro e600 Exterior Satin Paint, 640

3. PPG Architectural Coatings; PPG Paints:

a. Primer: 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer.
b. Top Coat: SPEEDHIDE 6-900XI series Exterior Semi-Gloss 100% Acrylic Latex.

4. Sherwin-Williams Company:

a. Primer: A-100 Exterior Latex Wood Primer B42W41.
b. Top Coat: A-100 Exterior Latex Satin (A82-100 Series).

5. International Paint LLC:

a. Primer: Devcryl 1440.
b. Top Coat: Devcryl 1440.

6. McCormick Paints:

a. Primer: State House Exterior Acrylic Latex Primer 06438.
b. First and Second Coats: State House Exterior Lustre 100% Acrylic Latex House Paint 27 Series.

I. Dimension Lumber Substrates, Traffic Surfaces: Including lumber decking and stairs.

1. Benjamin Moore & Co.:

a. Primer: Acrylic Latex Floor & Patio Enamel 122.
b. Top Coat: Acrylic Latex Floor & Patio Enamel 122.

2. Behr Process Corporation:

a. Primer: Porch & Patio Floor Paint, Low Lustre, 6050
b. Top Coat: Porch & Patio Floor Paint, Low Lustre, 6050

3. PPG Paints:

a. Primer: Breakthrough Satin Waterborne Acrylic V51-410.
b. Top Coat: Breakthrough Satin Waterborne Acrylic V51-410.

4. Sherwin-Williams Company:

a. Primer: ArmorSeal Tread-Plex Primer B90 Series.
b. Top Coat: ArmorSeal Tread-Plex Acrylic Floor Coating B90 Series.

5. McCormick Paints:

   a. Primer: Cabot Solid Color Decking Stain 1800 Series.
   b. First and Second Coats: Cabot Solid Color Decking Stain 1800 Series.

3.7 EXTERIOR PAINTING SCHEDULE - EXISTING AREAS

A. Wherever alterations and changes occur as a result of Work under the Contract, paint affected areas as specified under the Standard Painting Applications listed in this Section; painted from natural break to natural break.

B. Paint on existing building to be repainted with one coat.

C. Generally, paint color in altered areas will match the adjoining surfaces as closely as possible.

D. All doors and frames within “Limits of Contract” will be painted on both sides as required by the applicable Master Specifications; new Work, all required coats.

E. When painting existing surfaces, Contractor bears the responsibility of assuring compatibility of new paint materials with existing.

END OF SECTION

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SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete masonry unites (CMU).
2. Steel.
3. Galvanized metal.
4. Wood.
5. Gypsum board.
6. Cotton or canvas insulation coverings.
7. Exposed PVC piping.

1.2 DEFINITIONS

A. Gloss Ranges:

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 REFERENCE STANDARDS

A. ASTM D 3359 - Standard Test Methods for Mearsuring Adhesion by Tape.

B. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings.

1.4 SUBMITTALS

A. Product Data: Provide data for each type of product submitted.

B. Samples for Initial Selection: Submit each type of topcoat product indicated.

C. Samples for Verification: Submit each type of paint system and each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, minimum 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Submit each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

E. Maintenance Materials: Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 2 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings 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.

1.6 MOCK-UP

A. Benchmark Samples (Mock-ups): Provide benchmark finish sample (all coats) for each coating type and substrate.

1. Architect will select several rooms or surfaces to represent surfaces and conditions, for application of each paint system type and substrate; colors will be provided for Benchmark Samples.

a. Wall Surfaces: Complete minimum 100 square feet.

b. Small Areas and Items: Apply systems to items designated by the Architect.

2. Complete Benchmark Samples per the requirements of this Section.

a. Provide required sheen, color and texture for each surface.

b. Architect-accepted Benchmark Samples to establish level of quality for remainder of Work.

3. Architect to provide final color approvals from Benchmark Samples and intermediate coat wall colors; refer to subsection 3.3 of this Section.

4. Benchmark samples to be prepared by individuals performing the remaining Work for this Project.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F and a maximum 90 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Benjamin Moore & Co.

B. Behr Process Corporation.

C. PPG Paints.

D. Sherwin-Williams Company.

E. McCormick Paints.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors:

1. As selected by Architect from manufacturer's full range.

2. Different colors may be used in the same room.

3. Colors of frames may be different than doors.

4. Colors for ceilings and trim may be different from walls, and walls may be more than one color or striped.

5. Dark tints may be used on metal frames that may require more coats than that indicated on paint schedule for proper coverage; apply as many coats as necessary for complete hide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.

2. Masonry (Clay and CMU): 12 percent.

3. Wood: 15 percent.

4. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions [and compatibility with existing finishes and primers].

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. Use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

C. Seal surfaces that might cause bleed through or staining of topcoat.

D. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

E. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.

F. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

G. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Passivated Galvanized Steel: Clean with a water-based industrial strength cleaner, and/or “Brush Blast” in accordance with SSPC-SP7. After the surface has been prepared, apply recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the “cross-hatch adhesion tape test” method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.

J. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.

2. Sand surfaces that will be exposed to view, and dust off.

3. Prime edges, ends, faces, undersides, and backsides of wood.

4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

L. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 COLOR COORDINATION

A. Tint intermediate coats for wall surfaces to match color sample selections.

B. Architect will visit the Project within 7 days after notification, to review primed walls for final color coordination.

C. Allow 3 week days in schedule for Architect to change final wall colors between intermediate coat and remaining coat(s).

D. Allow time to order final paint colors; do not order final paint colors until obtaining final color approvals.

3.4 APPLICATION

A. 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.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Wall Surfaces: Receive final color approvals following Architect's review of Intermediate Coats, before proceeding.

3. Omit primer over metal surfaces that have been shop primed and touchup painted.

4. 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 that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

B. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

5. Finish doors on tops, bottoms, and side edges the same as faces.

C. Block Fillers:

1. Apply two coats of block filler to concrete masonry block at a rate to ensure complete coverage with pores filled.

2. Perform a squeegee operation on second coat to fill all crevices and produce a smooth surface; do not remove filler material from surface with the squeegee operation.

D. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. 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.

1. Wall Surfaces: Tint Prime Coat a lighter shade to facilitate identification; tint Prime Coat to match color of finish coat, but provide sufficient difference in shade to distinguish Prime Coat from Intermediate Coat used for final color selections.

2. Other Surfaces: Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

F. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

G. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

H. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

1. Mechanical Work:
    a. Uninsulated metal piping.
    b. Uninsulated plastic piping.
    c. Pipe hangers and supports.
    d. Tanks that do not have factory-applied final finishes.
    e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
    f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
2. Electrical Work:
    a. Switchgear.
    b. Panelboards.
    c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
    d. Exposed wiremold and conduit in all finished spaces to match color of wall.

I. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory-finished components:
    a. Architectural woodwork.
    b. Acoustical wall panels.
    c. Metal toilet enclosures.
    d. Metal lockers.
    e. Elevator entrance doors and frames.
    f. Elevator equipment.
    g. Finished mechanical and electrical equipment.
    h. Light fixtures.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    a. Foundation spaces.
    b. Furred areas.
    c. Ceiling plenums.
    d. Utility tunnels.
    e. Pipe spaces.
    f. Duct shafts.
3. Finished metal surfaces include the following:
    a. Anodized aluminum.
    b. Stainless steel.
    c. Chromium plate.
    d. Copper and copper alloys.
    e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:
    a. Valve and damper operators.
    b. Linkages.
    c. Sensing devices.
    d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
6. Items indicated to receive other finishes.
7. Items indicated to remain unfinished.
8. Floors, unless specifically so indicated.
9. Ceramic and other tiles.
10. Acoustical materials, unless specifically so indicated.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINT SCHEDULE

A. Concrete and Masonry Other Than Concrete Masonry Units:
    1. Semi-Gloss Sheen:
        a. Benjamin Moore & Co.:
            1) Primer (Unpainted Surfaces): Ultra Spec Masonry Int/Ext Acrylic Sealer (608).
            2) First and Second Color Coats: Ultra Spec 500 Waterborne Zero VOC Semi-Gloss N539.
        b. Behr Process Corporation:
            1) Primer: Premium Plus Interior All-In-One Primer & Sealer, 75
            2) First and Second Color Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370
        c. PPG Paints:
            1) Primer (Unpainted Surfaces): Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.
            2) First and Second Color Coats: Speedhide Zero Interior Flat Latex, 6-4510XI.
        d. Sherwin-Williams Company:
            1) Primer (Unpainted Surfaces): Loxon Concrete and Masonry Primer LX02 Series.
            2) First and Second Color Coats: ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2650 Series.

e. McCormick Paints:

1) Primer (Unpainted Surfaces): Acrylok Interior/Exterior 100% Acrylic Masonry Primer 06451.

2) First and Second Color Coats: McCormick Total Advantage Zero VOC Professional Coating Semi-Gloss 10 Series .

B. Concrete Masonry Units:

1. Satin or Eggshell Sheen:

a. Benjamin Moore & Co.:

1) Block Filler (Unfinished Surfaces) - 2 coats: Ultra Spec Hi-Build Masonry Block Filler (571).

2) First and Second Color Coats: Ultra Spec 500 Waterborne Zero VOC Eggshell N538.

b. Behr Process Corporation:

1) Block Filler (Unfinished Surfaces) - 2 coats: Behr Pro Block Filler Primer, 50

2) First and Second Color Coats: Behr Pro i300 Interior Eggshell Paint, 330

c. PPG Paints:

1) Block Filler (Flat) - 2 coats: 6-15XI Speedhide Latex Block Filler.

2) First and Second Color Coats: Speedhide Zero Int. Eggshell Latex, 6-4310XI Series.

d. Sherwin-Williams Company:

1) Block Filler (Unfinished Surfaces) - 2 coats: PrepRite Latex Block Filler B25W25.

2) First and Second Color Coats: ProMar 200 Zero VOC Interior Latex Eggshell, B20-2650 Series.

e. McCormick Paints:

1) Block Filler (Unfinished Surfaces) - 2 coats: McCormick Interior/Exterior Latex Block Filler 01015.

2) First and Second Color Coats: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series .

C. Gypsum Board:

1. Flat Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unpainted Surfaces): Ultra Spec 500 Waterborne Zero VOC Primer Sealer N534.

2) First and Second Color Coats: Ultra Spec 500 Waterborne Zero VOC Flat N536.

b. Behr Process Corporation:

1) Primer (Unpainted Surfaces) Interior Drywall Primer & Sealer, 73

2) First and Second Color Coats: Behr Pro i300 Interior Flat Paint, 310

c. PPG Paints:

1) Primer (Unpainted Surfaces): Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.

2) First and Second Color Coats: Speedhide Zero Interior Flat Latex l, 6-4110XISeries.

d. Sherwin-Williams Company:

1) Primer (Unpainted Surfaces): ProMar 200 Zero VOC Interior Latex Primer, B28W2600.

2) First and Second Color Coats: ProMar 200 Zero VOC Interior Latex Flat, B30-2650 Series.

e. McCormick Paints:

1) Primer (Unpainted Surfaces): McCormick 1st Step Interior Vinyl Primer Sealer 06431.

2) First and Second Color Coats: McCormick Total Advantage Zero VOC Professional Coating Flat 08 Series.

2. Low-Luster, Satin or Eggshell Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unfinished Surfaces): Ultra Spec 500 Waterborne Interior Primer Sealer N534.

2) First and Second Color Coats: Ultra Spec 500 Waterborne Zero VOC Eggshell Enamel N538.

b. Behr Process Corporation:

1) Primer (Unpainted Surfaces) Interior Drywall Primer & Sealer, 73

2) First and Second Color Coats: Behr Pro i300 Interior Eggshell Paint, 330

c. PPG Paints:

1) Primer (Unfinished Surfaces): Speedhide Zero Latex Quick Drying Primer/Sealer, 6-4900XI.

2) First and Second Color Coats: Speedhide Zero Interior Eggshell Latex 6-4310XI Series.

d. Sherwin-Williams Company:

1) Primer (Unfinished Surfaces): ProMar 200 Zero VOC Interior Latex Primer, B28W2600.

2) First and Second Color Coats: ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-2650 Series.

e. McCormick Paints:

1) Primer (Unpainted Surfaces): McCormick 1st Step Interior Vinyl Primer Sealer 06431.

2) First and Second Color Coats: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series.

3. Full Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unfinished Surfaces): Ultra Spec 500 Waterborne Zero VOC Primer Sealer N534.

2) First and Second Color Coats: Ultra Spec 500 Waterborne Zero VOC Gloss N540.

b. Behr Process Corporation:

1) Primer (Unpainted Surfaces) Interior Drywall Primer & Sealer, 73

2) First and Second Color Coats: Premium Plus Int/Ext Hi-Gloss Enamel, 2-8050

c. PPG Paints:

1) Primer (Unfinished Surfaces): Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.

2) First and Second Color Coats: Breakthrough Gloss Waterborne Acrylic V71-610.

d. Sherwin-Williams Company:

1) Primer (Unfinished Surfaces): ProMar 200 Zero VOC Interior Latex Primer, B28W2600.

2) First and Second Color Coats: Pro Industrial Acrylic Coating Gloss, B66-600 Series.

e. McCormick Paints:

1) Primer (Unpainted Surfaces): McCormick 1st Step Interior Vinyl Primer Sealer 06431.

2) First and Second Color Coats: McCormick Interlok Interior/Exterior Acrylic Gloss Urethane DTM 42 Series.

D. Woodwork and Hardboard - Painted:

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Undercoat (Unfinished Surfaces): Fresh Start 100% Acrylic Superior Primer 023.

2) First and Second Color Coats: Ultra Spec 500 Waterborne Interior Zero VOC Semi-Gloss 539.

b. Behr Process Corporation:

1) Primer (Unpainted Surfaces) Interior All-In-One Primer & Sealer, 75

2) First and Second Color Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370

c. PPG Architectural Coatings; PPG Paints:

1) Undercoat (Unfinished Surfaces): 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer

2) First and Second Color Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.

d. Sherwin-Williams Company:

1) Undercoat (Unfinished Surfaces): Multi-Purpose Waterbased Acrylic-Alkyd Primer B79-450.

2) First and Second Color Coats: ProMar 200 Zero VOC Interior Latex S/G, B31-2600 Series; or Pro Industrial Acrylic Coating S/G B66-650 (Doors & Frames).

e. McCormick Paints:

1) Undercoat (Unpainted Surfaces): McCormick 1st Step Interior Latex Enamel Undercoater and Primer Sealer 06441.

2) First and Second Color Coats: McCormick Total Advantage Zero VOC Professional Coating Semi-Gloss 10 Series.

E. Mechanical and Electrical Items: Use 3-coat system best suited to substrate, satin finish. Use heat resistant materials where required.

F. Ferrous Metal:

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unfinished Surfaces): Ultra Spec HP Acrylic Metal Primer HP04.

2) First and Second Color Coats: Ultra Spec 500 Waterborne Interior Semi-Gloss 539.

b. Behr Process Corporation:

1) Primer (Unfinished Surfaces): Premium Plus Multi-Surface Primer, 436

2) First and Second Color Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370

c. PPG Paints:

1) Primer (Unfinished Surfaces): Pitt Tech Plus 4020 PF

2) First and Second Color Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.

d. Sherwin-Williams Company:

1) Primer (Unfinished Surfaces): Pro-Cryl Universal Primer, B66-1310 Series.

2) First and Second Color Coats: ProMar 200 Latex Gloss, B11-2200 Series; or Pro Industrial Acrylic Coating S/G, B66-650 (Doors & Frames).

e. McCormick Paints:

1) Primer (Unfinished Surfaces): Corotech Acrylic Metal Primer V110.

2) First and Second Color Coats: McCormick Interlok Interior/Exterior Acrylic Semi-Gloss Urethane DTM 45 Series.

G. Zinc-Coated (Galvanized) Metal:

1. Semi-Gloss Sheen:

a. Benjamin Moore & Co.:

1) Primer (Unfinished Surfaces): Ultra Spec HP Acrylic Metal Primer HP04.

2) First and Second Color Coats: Ultra Spec 500 Waterborne Interior Semi-Gloss 539.

b. Behr Process Corporation:

1) Primer (Unfinished Surfaces): Premium Plus Multi-Surface Primer, 436

2) First and Second Color Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370

c. PPG Paints:

1) Primer (Unfinished Surfaces): Pitt Tech Plus 4020PF

2) First and Second Color Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.

d. Sherwin-Williams Company:

1) Primer (Unfinished Surfaces): ProCryl Universal Primer, B66-1310 Series.

2) First and Second Color Coats: ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series.

e. McCormick Paints:

1) Primer (Unfinished Surfaces): McCormick Underlok Interior/Exterior Acrylic Latex Multi Purpose Primer 06452.

2) First and Second Color Coats: McCormick Interlok Interior/Exterior Acrylic Semi-Gloss Urethane DTM 45 Series.

H. Overhead Exposed Construction (Deck, Joists, Steel): One coat flat dry fallout coating system to cover formulated for compatibility with all substrates by any paint manufacturer specified in this Section. Use 100 percent acrylic, flash-rust-resistance dryfall.

1. Benjamin Moore & Co.: Benjamin Moore Latex Dry Fall- Flat (395).
2. Behr: Behr Pro Dryfall Paint Flat, 890
3. PPG Paints: Speedhide Super Tech WB Interior 100% Acrylic Dry-Fog Latex 6-724XI, 6-725XI.
4. Sherwin-Williams Company: Pro Industrial Waterborne Acrylic Dryfall Flat, B42W00181.
5. McCormick Paints: Interior Waterborne Acrylic Dry Fall 01219.

I. Wood Fiber Acoustical Panels (Eggshell): One coat.

1. Benjamin Moore & Co.: Benjamin Moore Latex Dry Fall Eggshell (396).
2. Behr: Behr Pro i300 Interior Eggshell Paint, 330
3. PPG Architectural Coatings; PPG Paints: Speedhide Zero Interior Eggshell Latex Enamel, 6-4310XI Series.
4. Sherwin-Williams Company: Pro Industrial Waterborne Acrylic Dryfall Eg-Shel, B42W00082.
5. McCormick Paints: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series .

J. Cotton or Canvas Insulation-Covering Substrates, Including Pipe and Duct Coverings:

1. Benjamin Moore & Co.:
   a. Primer: Ultra Spec 500 Interior Zero VOC Latex Primer N534.
   b. First and Second Color Coats: Ultra Spec 500 Interior Zero VOC Latex Eggshell, N538.
2. Behr Process Corporation:
   a. Primer: Kilz 2 Interior/Exterior Water-Base Primer, 2000
   b. First and Second Color Coats: Behr Pro i300 Interior Eggshell Paint, 330
3. PPG Paints:
   a. Primer: Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.
   b. First and Second Color Coats: Speedhide Zero Interior Eggshell Latex Enamel, 6-4310XI Series.
4. Sherwin-Williams Company:
   a. Primer: Multi-Purpose Latex Primer B51-450
   b. First and Second Color Coats: ProMar 200 Zero VOC Latex Eg-Shel, B202600 Series.
5. McCormick Paints:
   a. Top Coat: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series.

K. Exposed PVC Piping:

1. Benjamin Moore & Co.:
   a. Bond Coat: STIX Waterborne Bonding Primer SXA-110; Insl-X.
   b. First and Second Color Coats: Ultra Spec 500 Interior Zero VOC Latex Eggshell, 538.

2. Behr Process Corporation:
    a. Primer: Kilz Adhesion Interior/Exterior Water-Base Bonding Primer, 2111
    b. First and Second Color Coats: Behr Pro i300 Interior Eggshell Paint, 330
3. PPG Paints:
    a. Bond Coat: SEAL GRIP 17-921 Interior/Exterior 100% Acrylic Universal Primer/Sealer.
    b. First and Second Color Coats: Speedhide Zero Interior Eggshell Latex Enamel, 6-4310XI Series.
4. Sherwin-Williams Company:
    a. Bond Coat: Zero VOC Multi Purpose Primer B 51-450 Series.
    b. First and Second Color Coats: ProMar 200 Zero VOC Latex Eg-Shel, B202600 Series.
5. McCormick Paints:
    a. Prime Coat: McCormick Underlok Interior/Exterior Acrylic Latex Multi Purpose Primer 06452.
    b. First and Second Color Coats: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series.

3.7 INTERIOR PAINTING SCHEDULE - EXISTING AREAS

A. Wherever alterations and changes occur as a result of Work under the Contract in any room of existing building, except as specifically indicated on Drawings, paint affected ceiling and wall areas as specified under the Standard Painting Applications listed in this Section; the wall or ceiling in which the alterations occur will be painted from natural break to natural break.

B. Generally, paint color in altered areas will match the adjoining surfaces as closely as possible.

C. All doors and frames within “Limits of Contract” will be painted on both sides as required by the applicable Master Specifications; new Work, all required coats.

D. When painting existing surfaces, Contractor bears the responsibility of assuring compatibility of new paint materials with existing.

END OF SECTION

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SECTION 09 93 00
STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes surface preparation and the application of wood finishes on the following substrates:

1. Interior Substrates:

a. Dressed lumber (finish carpentry).

b. Exposed wood panel products.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated

C. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.

1. Submit Samples on representative samples of actual wood substrates, 8 inches square.

2. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.4 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Benjamin Moore & Co.

B. Cabot.

C. PPG Paints.

D. Sherwin-Williams Company.

E. Behr Process Corporation.

2.2 MATERIALS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

B. Stain Colors: Match Architect's samples.

C. Interior wet-applied paints and coatings: Comply with low-emitting requirements in Division 01 Section “Sustainable Design Requirements - LEED.”

D. Prohibit Methylene chloride and perchloroethylene in paints and coatings.

2.3 WOOD FILLERS

A. Wood Filler Paste: As recommended by finish manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

1. Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.

3. Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.

4. Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION

A. Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.

B. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

3. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.

C. Apply wood filler paste to open-grain woods, to produce smooth, glasslike finish.

3.3 APPLICATION

A. Apply in accordance with manufacturer's instructions.

1. Use applicators and techniques suited for finish and substrate indicated.

2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Wood trim.

1. Water-Based Varnish over Stain System:

a. Stain Coat: Stain, semitransparent, for interior wood.

1) Old Masters Water-Based Wood Stain; Old Masters.

2) DFT 300 Deft Interior Water Based Wood Stain; PPG Architectural Coatings, PPG Paints.

3) Minwax Performance Series 250 V.O.C. Compliant WoodFinish Interior Penetrating Stain 7250 Series; Sherwin-Williams Company.

b. Intermediate Coat: Water-based varnish matching topcoat.

c. Topcoat: Varnish, water based, clear, satin.

1) Benwood Stays Clear Acrylic Polyurethane Low Lustre 423; Benjamin Moore & Co.

2) Old Masters Water-Based Polyurethane Satin; Old Masters.

3) DFT 159 Deft Polyurethane Interior Water Based Satin; PPG Architectural Coatings, PPG Paints.

4) WoodClassics Waterborne Polyurethane Varnish - Gloss A68V91 (first coat)/Satin A68F90 (second coat); Sherwin-Williams Company.

d. Topcoat: Varnish, water based, clear, semi-gloss.

1) Old Masters Water-Based Polyurethane Semi-Gloss; Old Masters.

2) DFT 158 Deft Polyurethane Interior Water Based Semi-Gloss; PPG Architectural Coatings, PPG Paints.

e. Topcoat: Varnish, water based, clear, gloss.

1) Old Masters Water-Based Polyurethane Gloss; Old Masters.

2) DFT 157 Deft Polyurethane Interior Water Based Gloss; PPG Architectural Coatings, PPG Paints.

END OF SECTION

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SECTION 09 96 00
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:

1. Exterior Substrates:

a. Exposed steel canopy structure and other rooftop structures.

b. Exposed angle lintels and hung plates.

2. Architecturally exposed structural steel within glass-enclosed hoistway.

3. All substrates listed in the schedule at the end of this section may not be required for this project.

1.2 DEFINITIONS

A. Gloss Ranges:

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.

2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.

3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.

4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of finish-coat product indicated.

C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.

1. Submit Samples on rigid backing, minimum 8 inches square.

2. Step coats on Samples to show each coat required for system.

3. Label each coat of each Sample.

4. Label each Sample for location and application area.

D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings 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.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.

B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Benjamin Moore & Co.

B. Tnemec Company, Inc.

C. International Paint LLC.

D. PPG Paints.

E. Sherwin-Williams Company.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. Provide products of same manufacturer for each coat in a coating system.

B. Prohibit Methylene chloride and perchloroethylene in paints and coatings.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

4. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

D. Steel Substrates: Remove rust and loose mill scale.

1. Clean using methods recommended in writing by coating manufacturer.

2. Blast clean according to SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3.3 COLOR COORDINATION

A. Tint intermediate coats for wall surfaces to match color sample selections.

B. Architect will visit the Project within 7 days after notification, to review primed walls for final color coordination.

C. Allow 3 week days in schedule for Architect to change final wall colors between intermediate coat and remaining coat(s).

D. Allow time to order final paint colors; do not order final paint colors until obtaining final color approvals.

3.4 APPLICATION

A. Apply in accordance with manufacturer's instructions.

B. 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.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Omit primer over metal surfaces that have been shop primed and touchup painted.

3. If undercoats 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 that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques suited for coating and substrate indicated.

2. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

3. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.

4. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

D. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. 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.

E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

F. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

G. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

H. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

3.5 CLEANING

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 HIGH-PERFORMANCE COATING SCHEDULE

A. Steel Substrates: Exposed structural canopy steel, angle lintels and hung plate substrates.

1. Pigmented Polyurethane over Zinc-Rich Primer System:

a. Benjamin Moore & Company:

1) Prime Coat: Corotech Organic Zinc Rich Primer V170.

2) Intermediate Coat: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.

3) Corotech Aliphatic Acrylic Urethane Coating Gloss V500.

b. Devoe Coatings:

1) Prime Coat: Cathacoat 302H.

2) Intermediate Coat: Bar-Rust 231 Series.

3) Topcoat - Semi-Gloss: Devthane 378 Series.

4) Topcoat - Gloss: Devthane 379.

c. International Paint LLC:

1) Prime Coat: Cathacoat 302H.

2) Intermediate Coat: Bar-Rust 231 Series.

3) Topcoat - Semi-Gloss: Devthane 378 Series.

4) Topcoat - Gloss: Devthane 379 Series.

d. PPG Paints:
   1) Prime Coat: Amercoat 68HS VOC Zinc Rich Epoxy Primer.
   2) Intermediate Coat: Amerlock 2 VOC Epoxy Coating.
   3) Topcoat: Amershield VOC Acrylic Polyurethane.

e. Sherwin-Williams Company:
   1) Prime Coat: S-W Zinc Clad XI WB Inorganic Zinc-Rich Coating.
   2) Intermediate Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy B73-300 Series.
   3) Topcoat: S-W Acrolon Waterbased Acrolon 100 WB Urethane Gloss Enamel.

f. Tnemec Company, Inc.:
   1) Prime (Shop) Coat: Series 94H2O Hydro Zinc. Refer to applicable Division 05 Section.
   2) Intermediate Coat: Series 27 W.B. Typoxy.
   3) Topcoat - Semi-Gloss: Gold Standard Fluoropolymer Series 1071V.
   4) Topcoat - Gloss: Gold Standard Fluoropolymer Series V1070.

B. Galvanized-metal substrates should not be chromate passivated if primers are field applied. If galvanized metal is chromate passivated, consult manufacturers for appropriate surface preparation and primers.

C. Galvanized-Metal Substrates:
   1. Pigmented Polyurethane over Epoxy Primer System:
      a. Benjamin Moore & Company:
         1) Prime Coat: Corotech Waterborne Bonding Primer V175.
         2) Intermediate Coat: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
         3) Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
      b. International Paint LLC:
         1) Prime Coat: Devran 203.
         2) Intermediate Coat: Devthane 379 Series.
         3) Topcoat: Devthane 379 Series.
      c. PPG Paints:
         1) Prime Coat: Amerlock 2 VOC.
         2) Intermediate Coat: Amerlock 2 VOC.
         3) Topcoat: Amershield VOC Acrylic Polyurethane.
      d. Sherwin-Williams Company:
         1) Prime Coat: Pro Cryl Universal Primer B66-1310 or, for high abrasion areas: DTM Wash Primer B71Y00001.
         2) Intermediate Coat: Pro Industrial Waterbased Catalyzed Epoxy B73-300 Series.
         3) Topcoat: S-W Acrolon Waterbased Acrolon 100 WB Urethane Gloss Enamel.

e. Tnemec Company, Inc.:
   1) Prime Coat: Series 27 W.B. Typoxy.
   2) Intermediate Coat: Series 27 W.B. Typoxy.
   3) Topcoat - Semi-Gloss: 1081 Endura-Shield.
   4) Topcoat - Gloss: 1080 Endura-Shield.

END OF SECTION

SECTION 10 00 05
MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes equipment and specialties not specified in other sections of the Project Manual.

B. Furnish labor, materials, tools, equipment, services and supervision required to complete Work, including all incidental and complementary Work shown, specified or necessary to complete Work.

C. Section includes:

1. Postal Specialties.

2. Wood Shutters.

3. Dedication plaque.

1.2 SUBMITTALS

A. Shop Drawings: Indicate locations, construction and anchorage details, dimensions and rough-in opening sizes.

B. Product Data: Submit data for furnishings describing size, color and finish, details of function and attachment methods.

C. Samples:

1. When directed by the Architect, furnish samples showing full color range and other features of the product.

2. Where applicable, furnish one of each type wall clip or anchoring device to install product to the building construction.

D. Certify in writing that each product meets the specifications and can be installed in building where scheduled; certifications shall be produced and submitted following verification of site conditions.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.4 PROJECT CONDITIONS

A. Verify measurements in field as required for Work fabricated to fit job conditions.

B. Before ordering items or fabrication of Work, examine Drawings, job conditions, to assure good fit, neat installation.

C. Multipurpose Construction Adhesives applied within the interior: VOC content not to exceed 70 g/L.

PART 2 - PRODUCTS

2.1 POSTAL SPECIALTIES

A. Basis-of-Design: Auth Florence aluminum mail slot, liner and drop box Model AFLDSYS.

B. Characteristics:

1. USPS Approved Mail Box/Drop.

2. Finish: Bronze anodized.

3. Letter Slot
4. Angled Wall Liner
5. Collection Box with lock
6. Engraving: US MAIL
7. Angled Liner
8. Anodized Aluminum Letter Slot Frame: 6-3/8”H x 14-1/8” W
9. Anodized Aluminum Collection Box: 19-1/8” H x 13-9/16” W x 6-7/8” D

2.2 WOOD SHUTTERS

A. Existing wood louver shutters shall be remain, shall be painted, and shall be installed with working hardware. Provide jamb pintels and tapered strap hinges as required for installation of operable shutters. Provide shutter lock 30108, small Belmont lag mounted tiebacks 35901, copper shutter capping 57102 and bullet catch 55101 for complete installation.

2.3 DEDICATION PLAQUE

A. Available Plaque Manufacturers:
   1. A. R. K. Ramos.
   2. Gemini Incorporated.
   3. Matthews International Corporation; Bronze Division.
   4. Metal Arts; Div. of L&H Mfg. Co.
   5. Nelson-Harkins Industries.

B. Bronze Castings: ASTM B 584, Alloy UNS No. C86500 (No. 1 manganese bronze).

C. Cast Plaque: Provide castings free of pits, scale, sand holes, and other defects, as follows:
   1. Plaque Material: Bronze.
   2. Background Texture: Manufacturer's standard pebble or leatherette texture.
   3. Border Style: Projected single line wide bevel.
   4. Mounting: Concealed studs, noncorroding for substrates encountered.
   5. Thickness: 3/4 inch.

D. Cast-Bronze Plaque Finishes: Exposed surfaces free of porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
   1. Raised Areas: Hand-tool and buff borders and raised copy to produce manufacturer's standard satin finish.
   2. Background Finish: Dark oxidized.
   3. Clear Protective Coating: Coat exposed surfaces of copper alloys with manufacturer's standard, clear organic coating specially designed for coating copper-alloy products.

E. Plaque Schedule: One plaque.
   1. Plaque Size: Refer to Drawings.
   2. Text Style: As selected by Architect from manufacturer’s standards.
   3. Text: Will be provided by Architect.
   4. Location: As indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Order items in ample time so as not to delay job progress with delivery at job site coordinated with other Work.

B. Install in a thorough, workmanlike manner, in strict accordance with manufacturer’s printed instructions and subject to inspection by the Architect.

C. Assembly:

1. Deliver factory-built units completely assembled in one piece without joints, whenever possible.

2. Where dimensions exceed unit size, provide two or more pieces of equal length as acceptable to Architect and Owner.

3. When overall dimensions require delivery in separate units, prefit at factory, disassemble for delivery, and make final joints at site.

4. Use splines at joints to maintain surface alignment.

D. Install units in locations and mounting heights as shown on Drawings, keeping perimeter lines straight, plumb and level.

E. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.

F. Coordinate job-assembled units with grounds, trim and accessories; join all parts with neat, precision fit.

G. Verify accessories required for each unit properly installed and operating units properly functioning.

H. Cast-Metal Plaque: Mount plaque using standard fastening methods to comply with manufacturer's written instructions for type of wall surface indicated.

1. Concealed Mounting: Mount plaque by inserting threaded studs into tapped lugs on back of plaque. Set in predrilled holes filled with quick-setting cement.

3.2 CLEANUP

A. Remove temporary protective cover at completion.

END OF SECTION

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SECTION 10 11 00
VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Markerboards and Tackboards.

1.2 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard 2016.

B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling 2018.

C. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board 2012 (Reapproved 2017).

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2019b.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim and accessories.

B. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

1. Include dimensions indicating location of boards in relation to other items in the room.

C. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering and trim.

D. Test Reports: Show compliance to specified surface burning characteristics requirements.

E. Maintenance Data: Include data on regular cleaning and stain removal.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.5 WARRANTY

A. Provide five year warranty for chalkboard and markerboard to include warranty against discoloration due to cleaning, crazing or cracking and staining.

B. Provide ten year warranty for tackboards to include repair or replacement of tackboards that fail in materials or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Tackboards and Markerboards:

1. ASI Visual Display Products.

2. Marsh Industries, Inc.

3. Claridge Products and Equipment, Inc; LCS Markerboard Series 1.

4. AJW Architectural Products.

5. MooreCo, Inc.

2.2 VISUAL DISPLAY BOARDS

A. Markerboards: Porcelain enamel on steel, laminated to core.

1. Steel Face Sheet Thickness: 24 gage, 0.0239 inch.

2. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.

3. Backing: Manufacturer’s standard vapor barrier, laminated to core.
4. Frame: Extruded aluminum, with concealed fasteners.
5. Frame Profile: As indicated on drawings
6. Frame Finish: Anodized, natural.
7. Accessories: Provide chalk tray and map rail.
    a. Provide continuous chalk tray; match length of markerboard.
    b. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.

B. Tackboards:
1. Basis-of-Design: Forbo Bulletin Board.
2. Surfacing Thickness: Minimum 0.24 inch.
3. Color: As selected from manufacturer's full range.
4. Backing: Hardboard, minimum 1/4 inch thick, laminated to tack surface.
5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
6. Size: As indicated on drawings.
7. Frame: Same type and finish as for chalkboard.
    a. Exception: Tackboards mounted on doors to be provided with solid wood frame coordinated with species of door.
8. Frame Finish: Anodized, natural.

C. Combination Units and Units Made of More Than One Panel: Factory-assembled chalkboards, markerboards and tackboards in a single frame, of materials specified above.
1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
3. Configuration: As indicated on drawings.
4. Units Too Large to Ship Assembled: Fully assembled in factory, then disassembled for shipping.

2.3 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.

B. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
1. Core for markerboards.

C. Fiber Board: ASTM C208, cellulosic fiber board.
1. Core for tackboards.

D. Aluminum Sheet Backing: Manufacturers standard thickness.

E. Adhesives: Type used by manufacturer.

2.4 ACCESSORIES

A. Tack Strips: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.

B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.
1. Provide two map hooks for every 48 inches of map rail or fraction thereof.

C. Chalk Tray: Aluminum, manufacturer's standard profile, one piece full length of chalkboard, molded ends, concealed fasteners, same finish as frame.

D. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.2 INSTALLATION (TACKBOARD)

A. Install boards in accordance with manufacturer's instructions.

B. Secure units level and plumb.

C. Butt Joints: Install with tight hairline joints.

3.3 CLEANING

A. Clean surfaces in accordance with manufacturer's instructions.

END OF SECTION

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SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Room and door signs.

1.2 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.3 DESIGN REQUIREMENTS - INTERIOR SIGNS

A. Permanent Rooms and Spaces:

1. Provide signs identifying each room at each door.
2. Type Styles:
    a. Must be upper case and sans serif.
    b. Must have a width to height ratio of between 3:5 and 1:1.
    c. Must have a stroke width to height ratio of between 1:5 and 1:10.
3. Tactile and Braille Characters: Characters raised a minimum of 1/32 inch and accompanied by Grade 2 braille.
4. Character Height: Tactile characters must be between 5/8 inch and 2 inches in height.
5. Pictograms (Symbols), if specified:
    a. Minimum of a 6 inch high field or background; must be supplemented by upper case tactile descriptive verbiage and Grade 2 braille below pictogram.
    b. No other graphic can invade the pictogram field.
    c. Pictogram itself is not required to be tactile.
    d. Provide pictogram and descriptive verbiage accompanied by Grade 2 braille at locations required.
6. Finish and Contrast:
    a. Matte (non-glare) characters and background; minimum contrast of 70 percent.
    b. Light characters on dark background or dark characters on light background are acceptable.
7. Mounting Conditions:
    a. Mount 60 inches from finish floor to baseline of highest tactile letter on latch side of door.
    b. Where no wall space is provided at the latch side of the door, place on nearest adjacent wall so that a person can approach to within 3 inches of signage without protrusions or swing of door.

B. Direction and Informational:

1. Type Styles:
    a. May be upper and lower case and sans serif.
    b. Shall have a width to height ratio of between 3:5 and 1:1.
    c. Shall have a stroke width to height ratio of between 1:5 and 1:10.
2. Tactile and Braille Characters: Not required for Type 2 signage.

3. Character Height: Characters shall be sized on viewing distance.
4. Pictograms (Symbols), if specified:
    a. No tactile requirement.
    b. Provide pictogram at locations designated in Signage Schedule and Drawings.
5. Finish and Contrast:
    a. Matte (non-glare) characters and background; minimum contrast of 70 percent.
    b. Light characters on dark background or dark characters on light background are acceptable.
6. Mounting Conditions:
    a. Mount 60 inches from finish floor to baseline of highest tactile letter on latch side of door.
    b. Where no wall space is provided at the latch side of the door, place on nearest adjacent wall so that person can approach to within 3 inches of signage without protrusions or swing of door.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.4 SUBMITTALS

A. Shop Drawings: Indicate materials, sign types, lettering font, tactile designations, foreground and background colors, locations, overall dimensions of each sign and method of attachment.

B. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
    1. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule along with the room number that will appear on the sign.

C. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

D. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips of the manufacturers full range of colors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled in name groups.

C. Store tape adhesive at normal room temperature.

PART 2 PRODUCTS

2.1 SIGNAGE FABRICATION

A. Available Manufacturers:
    1. Best Sign Systems, Inc.: www.bestsigns.com/#sle.
    2. Mohawk Sign Systems, Inc.: www.mohawksign.com/#sle.
    3. Bayuk Graphic Systems, Inc., Parkesburg, Pennsylvania.
    4. Digital Color Graphics, Pittsburgh, Pennsylvania.
    5. Supersine Company.
    6. Adcorp Signs, Inc.

B. Fabrication Methods:

1. Plaque assembly to be plastic laminate construction; plastic laminate to be impervious to most acids, alkalies, alcohol, solvents, abrasives and boiling water; plastic laminate to be non-static, fire-retardant, and self extinguishing.

2. Approximately 0.080-inch thick non-glare matte acrylic face laminated to approximately 0.080-inch thick acrylic back plate with filler to create windows for inserts, if so indicated.

3. Non-tactile graphics to be subsurface or second surface applied signs; surface-applied graphics are not acceptable.

4. Painted surfaces will not be accepted.

5. Polycarbonate (0.03 inch thick) window inserts, if applicable; painted subsurface to match sign.

6. Tactile Copy Options:

a. Option 1: Individual plastic letters or characters of one solid color and chemically bonded by the use of a high strength solvent within a matched routed depression in sign face to create graphics which are raised a minimum of 1/32 inch from the face of sign; tactile characters 5/8 inch to 2 inches in height as required by Architect.

b. Option 2: Produced by blasting the laminate assembly removing the background material, and raising the characters and braille; the characters and braille are part of the original outer laminate color and do not require painting.

7. Braille (if applicable): Grade 2 braille engraved into face of sign.

8. Mechanically fasten plaque assembly to wall by use of a backplate, which will be secured to the outer assembly.

9. Corners as indicated; sides can be beveled or flat.

10. Colors to be selected by Architect, which include custom fabrications based on manufacturer’s capabilities.

2.2 ACCESSORIES

A. Exposed Screws: Chrome plated; tamper-proof.

B. Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions after surfaces are finished.

B. Install neatly, with horizontal edges level, plumb and true, and in correct relation to adjoining Work.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

1. If no location is indicated obtain Owner's instructions.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

3.3 CLEANING

A. Wash surfaces following installation.

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial toilet accessories.

B. Baby changing stations.

C. Utility room accessories.

1.2 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2015a (Reapproved 2019).

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.

C. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium 2017.

D. ASTM C1036 - Standard Specification for Flat Glass 2016.

E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.

1.3 SUBMITTALS

A. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

1.4 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. AJW Architectural Products: www.ajw.com/#sle.

B. American Specialties, Inc: www.americanspecialties.com/#sle.

C. Bradley Corporation: www.bradleycorp.com/#sle.

D. Provide products of each category type by single manufacturer.

2.2 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

1. Grind welded joints smooth.

2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide Three keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

F. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

G. Adhesive: Two component epoxy type, waterproof.

H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

2.4 COMMERCIAL TOILET ACCESSORIES AND BABY CHANGING STATIONS

A. The design for each accessory is based on products indicated on the Drawings.

2.5 UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.

1. Location: Provide a minimum of one unit in each janitorial space.

2. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.

3. Length: Manufacturer's standard length for number of holders/hooks.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

D. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.2 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers.

1.3 SUBMITTALS

A. Product Data: Provide extinguisher operational features.

B. Shop Drawings: Indicate locations of cabinets, cabinet physical dimensions, rough-in measurements for recessed cabinets and accessories required for complete installation.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Fire Extinguishers, Fire Extinguisher Cabinet and Accessories:

1. Ansul, a Tyco Business: www.ansul.com.
2. Amerex Corporation.
3. Potter-Roemer.
4. Activar Construction Products Group - JL Industries.
5. Whitehall Manufacturing (Basis-of-Design)

2.2 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Dry Chemical Type Fire Extinguishers: Steel tank, with pressure gage.

1. Class Multi-purpose 4-A:80-B:C.
2. Size 10 pounds.
3. Finish: Baked enamel, color as selected.

2.3 LIGATURE-RESISTANT RECESSED FIRE EXTINGUISHER CABINETS

A. Description:

1. Fire-Rated Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.
2. Recessed Cabinet is designed with sloping edges that protrude 3/4" from the surface.
3. Door and Trim to be minimum 20 gage steel; cabinet doors to be attached with a continuous hinge and equipped with a cylinder lock. Door to be full flush door.
4. Tub to be constructed of 20 gage steel.
5. Finish: Powder coated with an electrostatically-applied, thermally-fused, re-coatable white polyester finish.

B. Basis-of-Design: Whitehall Manufacturing; BestCare Model #WH1704-FS-ANTL.

2.4 ACCESSORIES

A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure rigidly in place.

C. Place extinguishersand accessories in cabinets.

END OF SECTION

SECTION 10 51 16
SOLID WOOD LOCKERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. 16-inch wide single and double-tier solid oak wood lockers.

1.2 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Shop Drawings: Prepared specifically for this project; show dimensions of lockers and interface with other products.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall have a Quality System in place to ensure and be able to substantiate that manufactured units conform to requirements and match the approved design and must be ISO 9001:2015 certified.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging, in a dry, ventilated area until ready for installation.

B. Locker components shall be stored flat, if shipped unassembled, until assembly. All finishes shall be protected from soiling and damage during handling.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.5 WARRANTY

A. Manufacturer's standard warranty to repair or replace components of locker products that fail in materials or workmanship within 3 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design: Salsbury Industries; Solid Oak Executive Wood Lockers.

2.2 LOCKERS

A. Constructed of industrial grade particleboard and covered with solid oak raised panel doors; includes a standard cylinder lock for security. Lockers to be fully assembled units only and require minor assembly.

2.3 INTERIOR EQUIPMENT

A. ADA Compliant Lockers:

1. Additional shelf at maximum 48 inches off the floor for unobstructed forward and side reach.

2. Handicapped Locker Compartment Bottom: Minimum of 15 inches off the floor or an extra shelf placed 15 inches off the floor for unobstructed forward and side reach.
3. Hooks and rods as specified.

B. Standard Hardware Features:

1. Single Tier Solid Oak Executive Wood Lockers:
   a. Cylinder lock.
   b. One top-mounted, two-pronged stainless steel coat hook.
   c. One full depth hat shelf.
   d. One 5 inch deep shelf.
   e. One 11-3/4 inch deep shoe shelf.
   f. Three heavy duty concealed door hinges.
2. Double Tier Solid Oak Executive Wood Lockers:
   a. Cylinder lock.
   b. One top-mounted, two-pronged stainless steel coat hook.
   c. One 5 inch deep shelf.
   d. Two heavy duty concealed door hinges.

2.4 ADDITIONAL EQUIPMENT

A. Bases: 4 inches (102 mm) high.

B. Solid oak raised side panels:

1. Single end side panels.

C. Coat rod (single-tier units only): Additional garment storage capability.

2.5 CONSTRUCTION

A. Locker Body: Tops, bottoms, sides, backs and shelves are precision machined:

1. Locker shall be fabricated using doweled and glued assembly process.
2. Tops and bottoms with three sides formed to 90 degrees, the front offset formed to be flush with horizontal frame member.
3. Shelves with four sides formed to 90 degrees.

B. Locker Doors: Doors are precision machined:

1. Door:
   a. Doors are constructed of solid oak.
   b. Include raised panels.
2. Single-point latching: Cylinder lock installed in door.

C. Fabricate locker parts square, rigid and without warp, with the finished faces flat and free of scratches and chips.

D. Fabricate corners and fillers as required for installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's installation instructions.

B. Anchor the units to the wall studs through the locker back and to the floor.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 11 30 13
APPLIANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Appliances.

B. UL (DIR) - Online Certifications Directory Current Edition.

1.2 SUBMITTALS

A. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

B. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.4 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.

C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.

D. Provide ten (10) year manufacturer warranty on tub and door liner of dishwashers.

PART 2 PRODUCTS

2.1 APPLIANCES

A. The design for each appliance is based on products indicated on the Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor built-in equipment in place.

3.3 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.4 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION

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SECTION 12 24 13

WINDOW SHADE SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes room darkening roller shades.

B. Provide manual roller shades in Classroom.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.

B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.

C. Samples for Initial Selection: For each colored component of each type of shade indicated.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification:

1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.

2. For the following products:

a. Shade Material: Not less than 3 inches square, with specified treatments applied. Mark face of material.

b. Fascia: Full-size unit, not less than 12 inches long.

E. Product Certificates: For each type of roller shade, signed by product manufacturer.

F. Qualification Data: For Installer.

G. Product Test Reports: For each type of roller shade.

H. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:

1. Methods for maintaining roller shades and finishes.

2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.

3. Operating hardware.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed installation of roller shades similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations:

1. Obtain roller shades through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Flame-Resistance Ratings: Passes NFPA 701.

E. Product Standard: Provide roller shades complying with WCMA A 100.1.

F. Products specified in this section shall comply with applicable provisions of the ADA Standards.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name and location of installation.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 specifications.

C. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

C. Installation: Provide roller shade installer’s warranty that installation shall be free of defects for a period of not less than 1 year.

D. In the event of a warranted product failure, the roller shade installer will, at no cost to Owner, facilitate acquisition and delivery of all necessary components to the Owner. Owner will provide roller shade dealer/installer with direct access to the work, during dealer/installer’s normal business hours.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Rollers Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed, or portion thereof.

PART 2 PRODUCTS

2.1 ROLLER SHADES

A. Basis-of-Design Products:

1. Vertical Shades: Subject to compliance with requirements, provide MechoShade by MechoShade Systems or comparable products by Draper, Hunter Douglas Contract, Nysan or SWF Contract.

B. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.

1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.

2. Shade band and Shade Roller Attachment:

a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch in diameter for manual shades are not acceptable.

b. Provide for positive mechanical engagement with drive / brake mechanism.

C. Access and Material Requirements:

1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.

2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.

3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

D. Shade Brackets: Provide shade hardware constructed of minimum 1/8-inch thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.

E. Manual Shade Bracket: Mecho/5 by MechoShade, Clutch Flexshade XD by Draper, unitized clutch of Nysan; SWF Contract Solar Shades or equivalent bracketed clutch of other named manufacturers.

F. Pocket Mounting: Provide manufacturers surface mounted pocket with end caps where units are not installed in ceilings or bulkheads.

G. Fascia: Provide at all locations where housing and shade are located below the ceiling surface.

1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.

2. Fascia shall be able to be installed across two or more shade bands in one piece.

3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.

4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.

H. Mounting: Wall extension brackets mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.

2.2 ROLLER SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design. Fabricate hem as follows:

1. Concealed hem tube (Translucent Shades).

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

2.3 MANUAL OPERATED CHAIN DRIVE HARDWARE AND BRACKETS

A. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.

B. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.

C. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.

D. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable

E. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.

F. Drive Bracket / Brake Assembly:

1. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.

2. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

G. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.5 SHADE CLOTH

A. Translucent Single-Fabric Shadecloth Basis-of-Design: MechoShade Systems, Inc., EcoVeil group.

1. Shading:

a. EcoVeil Screens "1550 Series", 3 percent open.

B. Colors: Selected from manufacturer’s standard colors, more than one color may be used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions. Allow clearances for window operation hardware.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades.

END OF SECTION

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SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Countertops for architectural cabinet work.

B. Wall-hung counters and vanity tops.

1.2 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard 2016.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2019b.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1 2016, with Errata (2018).

E. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

F. PS 1 - Structural Plywood 2009.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Specimen warranty.

B. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

C. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 COUNTERTOPS

A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.

1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.039 minimum thickness.

a. Manufacturers:

1) Formica Corporation: www.formica.com/#sle.

2) Lamin-Art, Inc: www.laminart.com/#sle.

3) Panolam Industries International, Inc. Nevamar: www.nevamar.com.

4) Panolam Industries International, Inc. Pionite: www.pionitelaminates.com.

5) Wilsonart: www.wilsonart.com/#sle.

b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.

c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.

d. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1) As selected by Architect from laminate manufacturer's full range in solid colors, wood grains, and patterns, including stone, marble and leathers.

2) Ten different colors may be selected by Architect for this Project.

2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.

a. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.

3. Back and End Splashes: Same material, same construction.

4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

C. Natural Quartz and Resin Composite Material: Sheet or slab of natural quartz and plastic resin over continuous substrate.

1. Flat Sheet Thickness: Nominal 1-1/4 inch, minimum.

2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.

a. Manufacturers:

1) Wilsonart: www.wilsonart.com.

2) Cosentino: www.silestoneusa.com.

3) Daltile: www.daltile.com.

4) LG Hausys: www.LGviateraUSA.com.

5) Meganite; www.meganite.com.

b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with the MIA Dimension Stone Design Manual.

c. Finish on Exposed Surfaces: Polished.

d. Edge: Eased.

3. Other Components Thickness: 3/4 inch, minimum.

4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.

5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

6. Skirts: As indicated on drawings.

2.2 MATERIALS

A. Wood-Based Components:

1. Wood fabricated from old growth timber is not permitted.

2. Composite Wood and Agrifiber Products: No added urea formaldehyde.

B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.

C. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.

D. Backer Sheet: Provide substrate with laminate backer sheet.

E. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

F. Cove Molding for Top of Splashes: Rubber with semi-gloss finish and T-spline to fit between splash and wall; 1/2 inch by 1/2 inch.

1. Color: As selected by Architect from manufacturer's full line.

2. No added urea formaldehyde for laminating adhesives.

G. Joint Sealant: Mildew-resistant silicone sealant, white.

2.3 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.

1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.

3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.

1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.

2. Height: 4 inches, unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

C. Seal joint between back/end splashes and vertical surfaces.

1. Where indicated use rubber cove molding.

2. Where applied cove molding is not indicated use specified sealant.

3.3 CLEANING AND PROTECTION

A. Clean countertops surfaces thoroughly.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 12 93 13
BICYCLE RACKS

Part 1 General

1.01 Summary
- A. Section Includes:
  1. Bike rack with cast aluminum body.

1.02 Submittals
- A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product data:
  1. Manufacturer's standard product literature.
  2. Shop drawings.
  3. Installation instructions.
  4. Maintenance instructions.
- C. Submit powdercoat finish samples for approval.

1.03 Quality Assurance
- A. Manufacturer Qualifications:
  1. Minimum 15 years experience in the manufacture of site furnishings and amenities.
  2. Provide reference list of at least ten major transportation authorities, municipalities, universities, or other high-use public environments currently using site furnishings and amenities fabricated by the manufacturer.

1.04 Delivery, Storage and Handling
- A. Handle products in accordance with manufacturer's instructions.
- B. Store products in manufacturer's original packaging until ready for installation.
- C. Protect products from impacts and abrasion during storage.

1.05 Warranty
- A. Provide manufacturer's standard warranty.
  1. Warranty terms: one year from date of invoice against defects in materials and workmanship.

Part 2 Products

2.01 Manufacturer
- A. Basis-of-design product: provide bike racks based on the product named:
  1. Bike Hitch

     Manufacturer Contact:
     Dero, A Playcore Company
     42 Northern Stacks Drive, Suite 100
     Minneapolis, MN 55421
     phone: 888-3376729
     email: daniel@dero.com
     website: www.dero.com

B. Bike Racks
   1. Materials:
      a. Body: 2” schedule 40 pipe.
      b. Ring: 1.5” OD 11 gauge tube
      c. Hardware: stainless steel.
   2. Finishes:
      a. Body: polyester powdercoat
         1) Standard colors from Dero Chart.
   3. Dimensions:
      a. 16.5" long x 2.375" wide x 35" high.
   4. Mounting:
      a. Surface mount with embedded anchors. Stainless steel anchors and tamper-resistant stainless steel screws are included.
   5. Number and Location:
      a. Provide 2 racks Refer to drawings for locations and layout.
      b. Attic Stock: Provide 1 extra bike rack and mounting hardware to Owner at substantial completion.

Part 3 Execution

3.01 Examination

A. Verify that substrates are stable and capable of supporting the weight of items covered under this section.

B. Verify that substrates have been adequately prepared to securely anchor those items that will be surface mounted.

3.02 Installation

A. Install according to the manufacturer’s installation instructions.

B. Install in conformance to applicable ADA guidelines and End User’s established Accessibility policies.

END OF SECTION

SECTION 12 93 23
TRASH AND RECYCLING RECEPTACLES

Part 1 General

1.01 Summary
- A. Section Includes:
  1. 45-gallon, split-stream, cast aluminum litter/recycling receptacles with two 20-gallon liners.

1.02 Submittals
- A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product data:
  1. Manufacturer's standard product literature.
  2. Shop drawings.
  3. Installation instructions.
  4. Maintenance instructions.
- C. Submit powdercoat finish samples for approval.

1.03 Quality Assurance
- A. Manufacturer Qualifications:
  1. Minimum 15 years experience in the manufacture of litter and recycling receptacles for public spaces.
  2. Provide reference list of at least ten major transportation authorities, municipalities, universities, or other high-use public environments currently using litter and recycling receptacles fabricated by the manufacturer.

1.04 Delivery, Storage and Handling
- A. Handle products in accordance with manufacturer's instructions.
- B. Store products in manufacturer's original packaging until ready for installation.
- C. Protect products from impacts and abrasion during storage.

1.05 Warranty
- A. Provide manufacturer's standard warranty:
  1. Warranty terms: one year from date of invoice against defects in materials and workmanship.

Part 2 Products

1. Manufacturer
- A. Basis-of-design product: provide cast aluminum litter and recycling receptacles based on the product named:
  1. Dispatch Litter and Recycling Receptacle by Forms+Surfaces.
  2. Manufacturer Contact:
     Forms+Surfaces
     30 Pine Street
     Pittsburgh, PA 15223
     phone: 800-451-0410
     fax: 412-781-7840
     email: sales@forms-surfaces.com
     website: www.forms-surfaces.com

B. Overall Dimensions:
   1. 45-gallon receptacles: 45.3" high x 26.8" wide x 22.9" deep.
C. Configuration Option:
   1. 45-gallon, split-stream litter/recycling receptacle with two 20-gallon liners: provide lid with an internal baffle plate to divide inserted waste materials into two streams.
D. Recycle Openings:
   1. Bottle & Can recycle openings: 4.5" diameter round hole.
E. Materials:
   1. Receptacle frame and body: cast aluminum.
   2. Lid: cast aluminum.
   3. Lid baffle (split-stream units only): aluminum plate.
   4. Hinge pins: stainless steel.
   5. Cam latch: stainless steel (provide lift lever as specified).
   6. Liners: black polyethylene, UL94HB fire rating.
   7. Attic Stock: provide 4 extra black polyethylene liners to Owner at substantial completion.
F. Finishes:
   1. Lid: polyester powdercoat
      a. Standard Texture from Forms+Surfaces Powdercoat Chart.
   2. Body: polyester powdercoat
      a. Standard Texture from Forms+Surfaces Powdercoat Chart.
G. Graphics:
   1. Provide two separate mechanically fastened aluminum sign plates to display litter and/or recycling graphics (graphics to be selected by Owner).
   2. Sign plate finish: stainless steel with Satin finish.
   3. Graphics: black applied vinyl logos or other as specified (graphics to be selected by Owner).
H. Installation Options:
   1. Surface mount: provide anchors and stainless steel mounting screws for installation on concrete slab/sidewalk.
I. Number and Location:
   1. (2 each) trash and recycling receptacles, as indicated on sheets L-1.1.

Part 1 Execution

3.01 Examination

A. Verify that substrates are stable and capable of supporting the weight of items covered under this section.
B. Verify that substrates have been adequately prepared to securely anchor those items that will be surface mounted.

3.02 Installation

A. Install according to the manufacturer's installation instructions.
B. Install in conformance to applicable ADA guidelines and End User's established Accessibility policies.

END OF SECTION

SECTION 142400
HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Hydraulic elevator:
   1. One (1) In-Ground Passenger Elevator –Install one (1) in-ground jack, hydraulic elevator in a glass hoistway that will attach to an existing historic structure. No changes to hoistway size, structural supports, or overhead are available. All bids must fit drawings.
   2. Coordination with Contractor for location of equipment and code compliance will be required.
   3. Paint all exposed hoistway equipment, equipment on car top and bottom in color as selected (dark bronze).
   4. Provide painted steel bevels for all projections due to glass hoistway construction (dark bronze).

B. Products Installed But Not Furnished Under This Section:
   1. Emergency Voice/Alarm Communication System Provisions
   2. Elevator related security devices, control unit, mounting brackets, wiring materials, logic circuits, security system interface terminals, boxes and relays.
   3. Car flooring
   4. Monitoring system interface

C. Related Requirements:
   1. Division 01 Section “Temporary Facilities and Controls” for temporary use of elevators for construction purposes.
   2. Division 03 Section “Cast-in-Place Concrete” for setting sleeves, inserts, and anchoring devices in concrete.

1.2 ALLOWANCE

A. Elevator Car Allowances: Not used.

B. Hoistway Door Allowances: Not used.

1.3 DEFINITIONS

A. Terms used are defined in the latest edition of the Safety Code for Elevators and Escalators, ASME A17.1.

1.4 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.

B. Accessibility Requirements: Comply with 2010 ADA standards for Accessible Design.

1.5 DOCUMENT AND SITE VERIFICATION

A. To discover and resolve conflicts or lack of definition which might create problems, Contractor must review Contract Documents and site conditions for compatibility with its product prior to submittal of quotation. Review existing structural, electrical, and mechanical provisions for compatibility with Contractor's products. Purchaser will not pay for change to structural, mechanical, electrical, or other systems required to accommodate Contractor's equipment.

1.6 SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems. Include product data for signal fixtures, lights, graphics, Braille plates, and details of mounting provisions.

B. Shop Drawings:
   1. Include plans, elevations, sections, and large-scale details indicating openings at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment.
   2. Include large-scale layout of car operating panel and standby power operation control panel.
   3. Indicate maximum dynamic and static loads imposed on building structure at points of support and maximum and average power demands.
   4. Power Confirmation Information: Include motor horsepower, code letter, starting current, full load running current, and demand factor. Provide engineered power consumption estimates based on 80 starts per hour. Provide maximum and average power consumption.

C. Samples for Initial Selection: For finishes involving surface treatment, paint or color selection.

D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes:
   1. Samples of sheet materials: 3" (75 mm) square.
   2. Running trim members: 4" (100 mm) lengths.

E. OSHPD submittals.

F. Operation and Maintenance Data:
   1. For elevators to include in emergency, operation, and maintenance manuals.
   2. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.

G. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

H. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard five-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options. Include running the elevators twice a year for hoistway glass clean downs (Fall/Spring). Coordinate with purchaser for early morning cleanings.

1.7 QUALITY ASSURANCE

A. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following codes, laws, and/or authorities, including revisions and changes in effect:
   1. Safety Code for Elevators and Escalators, ASME A17.1
   2. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2
   3. Elevator and Escalator Electrical Equipment, ASME A17.5
   4. National Electrical Code, NFPA 70
   5. Americans with Disabilities Act, ADA A117.1
   6. Local Fire Authority
   7. Requirements of most stringent provision of local authority having jurisdiction.
   8. Life Safety Code, NFPA101
   9. Maryland Field Directives

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver material in Contractor's original unopened protective packaging.

B. Store material in original protective packaging. Prevent soiling, physical damage, or moisture damage.

C. Protect equipment and exposed finishes from damage and stains during transportation and construction.

1.9 WARRANTY
   1. Manufacturer's Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
   2. Failures include but are not limited to: operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
   3. Warranty Period: One year from date of Substantial Completion.

1.10 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include twelve months full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
   1. Perform maintenance during normal working hours.
   2. Perform emergency callback service during normal working hours Include 24-hour-per-day, 7-day-per-week emergency callback service with response time of sixty minutes or less.
   3. Include running the car twice a year (Fall/Spring) to allow purchaser to clean hoistway glass under base contract and for future maintenance service contracts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide in-ground hydraulic products by one of the following available manufacturers offering products that may be incorporated into the Work include the following:
   1. KONE Inc.
   2. Minnesota Elevator, Inc.
   3. Mitsubishi Electric Corporation.
   4. Otis Elevator Company.
   5. Schindler Elevator Corporation.
   6. TK Elevator Corporation.

2.2 ELEVATORS

A. Elevator System, General: Manufacturer's standard elevator systems that will fix the space provided in the contract documents. Unless otherwise indicated, manufacturer's standard components shall be used, as included in standard elevator systems and as required for complete system. Provide custom fabrication where required to meet contract documents.

B. Passenger Elevator Description:
   Elevator Identification: Elevator 1
   1. Capacity: 2,100 lbs.
   2. Class of Loading: Class A
   3. Contract Speed: 100 fpm
   4. Machine: Hydraulic Pump
   5. Machine Location: Adjacent at bottom landing
   6. Operational Control, microprocessor-based: Selective collective
   7. Motor Control: Single speed AC with SCR soft start with closed transition
   8. Power Characteristics: 208 Volts, 3 Phase, 60 Hertz (field verify)
   9. Stops and Openings: 3 Front; 0 Rear
   10. Floors Served: Front: 3; Rear: 0
   11. Travel: 22'-7" ±
   12. Minimum Clear Inside Car: 5'-8" Wide X 4'-3" Deep
   13. Entrance Size: 3'-0" Wide X 7'-0" High
   14. Entrance Type: Single-speed, Side-opening
   15. Door Operation: High-speed, heavy-duty door weather resistant operator. Minimum Opening Speed: 2.5 fps.
   16. Door Protection: Waterproof Infrared full screen device with differential timing, nudging, and interrupted beam time
   17. Hydraulic Type: Direct plunger
   18. Guide Rails: Planed Steel Tees
   19. Buffers: Spring
   20. Car Enclosure with stainless steel shrouds maximum height that still meets code top and bottom and stainless-steel cladding of all visible external cab walls and return areas. Provide a professional cladding of standard cab, so that it appears to be a smooth flush stainless cab on the exterior and front:
       a. As specified, stationary returns.
       b. Clear height under canopy, 8'-0"

c. Car interior air ventilation system with battery backup.
d. Pad buttons and vinyl-covered pads.

21. Signal Fixtures: LED illumination. Contractor's standard design, vandal resistant assembly.
    a. Hall and Car Pushbutton Stations:
        1) Single hall pushbutton riser.
        2) Single car operating panel.
        3) Vandal resistant car and hall pushbuttons.
    b. Car Position Indicators:
        1) Digital in car station with car direction arrows.
    c. Car Direction Lanterns: All car entrance columns with volume adjustable electronic chime or tone. Sound twice for down direction. vandal resistant assembly.
22. Communication System:
    a. Self-Dialing, Vandal Resistant, Push to Call, Two-Way Communication System with Recall, Tracking, and Voiceless Communication.
23. Additional Features:
    a. Hoistway access switches, top and bottom floors.
    b. Hoistway door unlocking device, all floors
    c. Anti-nuisance feature.
    d. Individual floor lock off feature for floor 2.
    e. Sill support angles.
    f. Provide pit access ladder(s).
    g. System diagnostic means and instructions.
    h. Platform Isolation, Jack to Platen Connections.
    i. Hydraulic Pump Unit and Controller Sound Isolation.
    j. Jack hole, outer casing, and watertight PVC inner casing.

2.3 MATERIALS

A. Steel:
1. Sheet Steel (Furniture Steel for Exposed Work): Stretcher-leveled, cold-rolled, commercial quality carbon steel, complying with ASTM A366, matte finish.
2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568/A568M-03.
3. Structural Steel Shapes and Plates: ASTM A36.

B. Stainless Steel: Type 302 or 304 complying with ASTM A240, with standard tempers and hardness required for fabrication, strength, and durability. Apply mechanical finish on fabricated work in the locations shown or specified, Federal Standard and NAAMM nomenclature, with texture and reflectivity required to match Architect's sample. Protect with adhesive paper covering.
1. No. 4 Satin: Directional polish finish. Graining directions as shown or, if not shown, in longest dimension.
2. No. 8 Mirror: Reflective polish finish with no visible graining.
3. Textured: Provide 5WL 4LB as manufactured by Rigidized Metals or Windsor pattern 5-SM as manufactured by Rimex Metals or approved equal with .050 inches mean pattern depth with bright directional polish (No. 4 satin finish).

C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.

D. Plastic Laminate: ASTM E84 Class A and NEMA LD3.1, Fire-Rated Grade (GP-50), Type 7, 0.050" ±.005" thick, color and texture as follows:

1. Exposed Surfaces: Color and texture selected by Architect.
2. Concealed Surfaces: Contractor's standard color and finish.

E. Fire-Retardant Treated Particle Board Panels: Minimum 3/4" thick backup for natural finished wood and plastic laminate veneered panels, edged and faced as shown, provided with suitable anti-warp backing; meet ASTM E84 Class "I" rating with a flame-spread rating of 25 or less, registered with Local Authorities for elevator finish materials.

F. Natural Finish Wood Veneer: Standard thickness, 1/40" thoroughly dried conforming to ASME/HPMA HP-1983, Premium Grade. Place veneer, tapeless spliced with grain running in direction shown, belt, and polish sanded, book matched. Species and finish designated and approved by Architect.

G. Paint: Clean exposed metal parts and assemblies of oil, grease, scale, and other foreign matter and factory paint one shop coat of standard dark bronze rust-resistant primer. After erection, provide one finish coat of dark bronze industrial enamel paint.

H. Prime Finish: Clean all metal surfaces receiving a baked enamel paint finish of oil, grease, and scale. Apply one coat of rust-resistant primer followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of primer.

I. Baked Enamel Finish: Prime finish per above. Unless specified "prime finish" only, apply and bake three additional coats of enamel in the selected solid color.

J. Glass: Laminated safety glass, minimum 9/16" thick, conforming to ANSI Z97.1 and CPSC 16 CFR Part 1201.

2.4 CAR PERFORMANCE

A. Car Speed: ± 10% of contract speed under any loading condition. For standard hydraulic applications.

B. Car Capacity: Safely lower, stop and hold 125% of rated load.

C. Car Stopping Zone: ±1/4" under any loading condition.

D. Door Times: Seconds from start to fully open or fully closed:
1. Elevator 1: Door open: 2.1 seconds. Door close: 3.4 seconds.

E. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are 3/4 open (1/2 open for side opening doors) and car level and stopped at next successive floor under any loading condition or travel direction (11' typical floor height):
1. Elevator 1: 15.1 seconds.

F. Pressure: Fluid system components shall be designed, and factory tested for 500 p.s.i. Maximum operating pressure shall be 400 p.s.i.

G. Car Ride Quality:
1. Acceleration and Deceleration: Smooth constant and not less than 1.5 feet/second^2 with an initial ramp between 0.5 and 0.75 second.

2. Sustained Jerk: Not more than 6 feet/second^3.
3. Horizontal and vertical acceleration within car during all riding and door operating conditions. Not more than 15 mg peak to peak (adjacent peaks) in the 1-10 Hz range.
4. Measurement Standards: Measure and evaluate ride quality consistent with ISO 18738, using low pass cutoff frequency of 10 Hz and A95 peak-to-peak average calculations.

H. Noise and Vibration Control
1. Airborne Noise: Measured noise level of elevator equipment and its operation shall not exceed 55 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed. Limit noise level in the machine room relating to elevator equipment and its operation to no more than 80 dBA. All dBA readings to be taken 3'-0" off the floor and 3'-0" from the equipment using the “A” weighted scale.
2. Vibration Control: All elevator equipment provided under this contract, including power unit, controller, oil supply lines, and their support shall be mechanically isolated from the building structure and electrically isolated from the building power supply and to each other to minimize the possibility of objectionable noise and vibrations being transmitted to occupied areas of the building.

OPERATION

I. Collective Microprocessor-Based:
1. Operate car without attendant from pushbuttons in car and located at each floor. When car is available, automatically start car and dispatch it to floor corresponding to registered car or hall call. Once car starts, respond to registered calls in direction of travel and in the order the floors are reached.
2. Do not reverse car direction until all car calls have been answered, or until all hall calls ahead of car and corresponding to the direction of car travel have been answered.
3. Slow car and stop automatically at floors corresponding to registered calls, in the order in which they are approached in either direction of travel. As slowdown is initiated for a hall call, automatically cancel hall call. Cancel car calls in the same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer.
4. Answer calls corresponding to direction in which car is traveling unless call in the opposite direction is highest (or lowest) call registered.
5. Illuminate appropriate pushbutton to indicate call registration. Extinguish light when call is answered.
6. Car to return to basement level after each use. Provide any special software, etc., to meet this operational requirement.

J. Other Items:
1. Low Oil Control: In the event oil level is insufficient for travel to the top floor, provide controls to return elevator to the main level and park until oil is added.
2. Load Weighing: Provide means for weighing car passenger load. Control system to provide dispatching at main floor in advance of normal intervals when car fills to capacity. Provide hall call by-pass when the car is filled to preset percentage of rated capacity and traveling in down direction. Field adjustment range: 10% to 100%.
3. Anti-Nuisance Feature: If car loading relative to weight in car is not commensurate with number of registered car calls, or activation of door protection device is not commensurate with number of registered car calls, cancel car calls.
4. Independent Service: Provide controls for operation of each car from its pushbuttons only. Close doors by constant pressure on desired destination floor button or door close button. Open doors automatically upon arrival at selected floor.

K. Car-to-Lobby Feature: Provide the means in the main hall pushbutton station for automatic return to the Basement. Return car nonstop after answering pre-registered car calls, and park with doors open for an adjustable time period of 60-90 seconds. Upon expiration of time period, car shall automatically revert to normal operation and close its doors until assigned as next car or until the car is placed on manual control via in-car attendant or out-of-service switch.

L. Firefighters' Service: Provide equipment and operation in accordance with code requirements.

M. Automatic Car Stopping Zone: Stop car within 1/4" above or below the landing sill. Maintain stopping zone regardless of load in car, direction of travel, and distance between landings.

N. Motion Control: Microprocessor-based AC type with unit valve suitable for operation specified and capable of providing smooth, comfortable car acceleration and retardation. Limit the difference in car speed between full load and no load to not more than ±10% of the contract speed.

O. Door Operation: Automatically open doors when car arrives at main floor. At expiration of normal dwell time, close doors. Reopen doors when car is designated for loading.

P. Standby Lighting and Alarm: Car mounted battery unit with solid-state charger to operate alarm bell and car emergency lighting. Battery to be rechargeable with minimum five-year life expectancy. Include required transformer. Provide constant pressure test button in service compartment of car operating panel. Provide lighting integral with portion of normal car lighting system.

Q. Battery Lowering Feature: Upon loss of normal power, provide controls to automatically lower the car(s) to the nearest lower landing. Upon arrival at the lowest landing, the elevator doors shall open automatically and remain open until regular door time has expired. The elevator shall then become deactivated. The standby power source shall be provided via 12-volt D.C. battery units installed in machine room, including solid-state charger and testing means mounted in a common metal container. Battery to be rechargeable lead acid or nickel cadmium with a ten-year life expectancy. Upon restoration of normal power, the elevator shall automatically resume normal operation.

R. Battery Standby Power Pack for Air Ventilation: Upon loss of normal power, standby power source shall be provided via 12-volt D. C. battery units installed in machine room, including solid-state charger and testing means mounted in a common metal container. Battery to be rechargeable lead acid or nickel cadmium with a ten-year life expectancy. Standby power source shall provide minimum four hours operation.

S. Card/Proximity Reader Security System: Provide provisions inside Elevator 1 for reader unit. Mount reader unit as directed by Architect and cross connect from car pushbuttons to control module in machine room. Reader control unit, mounting brackets, wiring materials, logic circuits, etc., by Security Subcontractor. Provide a filler plate to match card slot size and car return panel finish, including direction of graining, where card slot or proximity reader cutout is not initially utilized. Elevator control systems shall facilitate system tracking of persons accessing secure floors via printout by passenger I.D. number, floor accessed, and time of entry.

2.5 MACHINE ROOM EQUIPMENT

A. Arrange equipment in spaces shown on drawings.

B. Pump Unit: Assembled unit consisting of positive displacement pump, induction motor, master-type control valves combining safety features, holding, direction, bypass, stopping, manual lowering functions, shut off valve, oil reservoir with protected vent opening, oil level gauge, outlet strainer, drip pan, muffler, all mounted on isolating pads. Provide oil thermal unit, oil cooling unit and oil temperature thermostat to maintain oil at operating temperature. Provide SCR soft start with closed transition. Design unit for 80 up starts/hour.

C. Landing System: Solid-state, magnetic, or optical type.

D. Controller: UL/CSA labeled.
   1. Compartment: Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame. Completely enclose equipment with covers. Provide means to prevent overheating.
   2. Relay Design: Magnet operated with contacts of design and material to insure maximum conductivity, long life, and reliable operation without overheating or excessive wear. Provide wiping action and means to prevent sticking due to fusion. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.
   3. Microprocessor-Related Hardware:
      a. Provide built-in noise suppression devices which provide a high level of noise immunity on all solid-state hardware and devices.
      b. Provide power supplies with noise suppression devices.
      c. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.
      d. Design control circuits with one leg of power supply grounded.
      e. Safety circuits shall not be affected by accidental grounding of any part of the system.
      f. System shall automatically restart when power is restored.
      g. System memory shall be retained in the event of power failure or disturbance.
      h. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.
   4. Wiring: CSA labeled copper for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
   5. Permanently mark components (relays, fuses, PC boards, etc.) with symbols shown on wiring diagrams.
   6. Provide controller or machine mounted auxiliary lockable “open” disconnect if mainline disconnect is not in sight of controller and/or machine.
   7. Provide control panel compliant with UL 508A SB.SCCR of 5000A required.

E. Muffler: Provide in discharge oil line near pump unit. Design shall dampen and absorb pulsation and noise in the flow of hydraulic fluid.

F. Piping and Oil: Provide piping, connections and oil for the system. Buried piping shall be secondarily contained with watertight Schedule 40 PVC sleeves between elevator machine room and pit. A minimum of two sound isolation couplings shall be provided between the pump unit and oil line and the oil line and jack unit. Provide isolated pipe stands or hangers as required.

G. Shut-Off Valve: manual valve on line adjacent to pump unit. Provide second valve in pit adjacent to jack unit.

2.6 HOISTWAY EQUIPMENT

A. Paint all hoistway equipment after installation in dark bronze as selected by Architect.

B. Guide Rails: Planed steel T-sections for car of suitable size and weight for the application, including brackets for attachment to building structure. Provide rail backing to meet code requirements. No additional structural points of rail attachment, other than those shown on the Contract Documents, will be provided.

C. Buffers: Spring type with blocking and support channels.

D. Hydraulic Jack Assembly:
   1. Cylinders: Seamless steel pipe. Design head to receive unit-type packing and provide means to collect oil at cylinder head and return automatically to oil reservoir. Cylinder stabilizer bracketing between guide rails is not allowed.
   2. Plungers: Polished seamless steel tubing or pipe. If plunger length exceeds 24'-0", provide two or more sections not exceeding 16'-0" in length, or coordinate installation of longer unit at the jobsite. Join sections by internal threaded couplings. Multiple section jack units shall be factory polished while assembled and marked for proper future reassembly. Isolate plunger from car frames.

E. Jack Support and Fluid Shut-Off Valves: Provide steel pit channels to support jack assembly and transmit loads to building structure. Provide intermediate stabilizers as required. Provide manual on/off valves in oil lines adjacent to pump unit and jack units in pit.

F. Well Hole Casing:
   1. Well hole is to be provided by Elevator Contractor. No additional compensation will be allowed for unforeseen conditions of any kind or spoil removal.
   2. Install steel outer casing minimum 18" diameter. Install watertight sleeve over jack assembly for secondary containment prior to insertion into the outer casing. Extend PVC sleeve through pit floor slab to underside of jack support beams and seal with non-permeable membrane. Seal well opening at the pit floor with hydraulic quick setting cement. Provide PVC vision/access ports.

G. Terminal Stopping: Provide normal and final devices.

H. Electrical Wiring and Wiring Connections:
   1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control compartments, or junction boxes. Provide 10% spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room.
   2. Conduit: Galvanized steel conduit, EMT, or duct. Flexible conduit length not to exceed 3'-0". Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
   3. Traveling Cables: Flame and moisture-resistant outer cover. Prevent traveling cable from rubbing or chafing against hoistway or equipment within hoistway.
      a. Provide five pair of shielded wires of minimum 18 gauge for card reader.
      b. Provide four pair of spare shielded communication wires in addition to those required to connect specified items.

c. Tag spares in machine room. Provide cables from controller to car top.

4. Auxiliary Wiring: Provide conduit, wiring and connections for fire alarm initiating devices, emergency two-way communication system, firefighters' phone, paging speaker, and card reader interface terminals and relays, intercom, and announcement speaker and/or background music from the machine room junction box to each car controller in machine room.

I. Entrance Equipment:
1. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
2. Door Tracks: Bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
3. Door Interlocks: Operable without retiring cam. Paint interlock box flat black.
4. Door Closers: Spring, spirator, or jamb/strut mounted counterweight type. Design and adjust to insure smooth, quiet mechanical close of doors.
5. Hoistway Door Unlocking Device: Provide unlocking device with escutcheon in door panel at all floors, with finish to match adjacent surface.
6. Hoistway Access Switches: Mount in entrance frame side jamb at top and bottom floors. Provide switch without faceplate.

J. Floor Numbers: Stencil paint 4" high floor designations in contrasting color on inside face of hoistway doors or hoistway fascia in location visible from within car. Back side of door shall be field painted dark bronze as selected by Architect.

2.7 HOISTWAY ENTRANCES

A. After installation, paint all entrance equipment in the hoistway dark bronze as selected by the Architect.

B. Complete entrances bearing fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction.

C. Frames: 14-gauge hollow metal at all floors. Bolted and lapped. Clad frames with finish material indicated in finish schedule Item 2.7 I. at all floors. Provide Arabic floor designation/Braille plates, centered at 60" above finished floor, on both side jambs of all entrances. Provide plates at main egress landing with "Star" designation. For designated emergency car, provide "Star of Life" designation plates at height of 78"-84" above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide cast floor designation/Braille plates as manufactured by SCS Elevator Products, Inc. or Vision Mark.

D. Door Panels: 16-gauge steel, sandwich construction without binder angles. Provide leading edges of center-opening doors with rubber astragals. Provide a minimum of two gibs per panel, one at leading and one at trailing edge with gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs. Architectural metal cladding shall wrap around leading and trailing edge of panel and return a minimum of 1/2" on rear side of leading edge of panel at all floors. Back side of doors shall be dark bronze as selected by Architect.

E. Sight Guards: 14-gauge, same material and finish as hoistway entrance door panels. Construct without sharp edges.

F. Sills: Extruded nickel silver.

G. Sill Supports: Structural or formed steel designed to support door sill based upon car loading classification. Mount to eliminate need for grout under the sill.

H. Fascia, Toe Guards and Hanger Covers: 14-gauge furniture steel with dark bronze enamel finish as selected by Architect. Provide hoistway width fascia, toe guards, and hanger covers for Elevator 1.

I. Struts and Headers: Provide for vertical support of entrances and related material. Provide door open bumpers on entrances equipped with vertical struts. (painted dark bronze)

J. Finish of Frames and Doors:
   1. Elevator 1: Floors B, 1 – 2 – Color as selected by Architect.

K. Hoistway Access:
   1. Hoistway Door Unlocking Device: Provide unlocking device with escutcheon tubes in door panel at all floors, with finish to match adjacent surface.
   2. Hoistway Access Switches: Mount in entrance frame side jamb at top bottom floor. Provide switch without faceplate.

2.8 SEISMIC EQUIPMENT

A. Not used.

2.9 CAR EQUIPMENT

A. After installation, paint all car equipment dark bronze as selected by Architect.

B. Frame: Welded or bolted, rolled or formed steel channel construction to meet load classification specified. Field paint in color as selected.

C. Platform: Isolated type, constructed of steel, or steel and wood which is fireproofed on underside. Design and construct to accommodate load classification requirements. Provide Class “A” construction for passenger elevators, Class A.

D. Platform Apron: Minimum 14-gauge steel, reinforced and braced to car platform front with dark bronze enamel finish as selected.

E. Guide Shoes: Roller type with three or more spring dampened, sound-deadening rollers per shoe. Maximum roller rotation speed, 350 rpm.

F. Finish Floor Covering: Provided.
   1. Elevator: Porcelain tile, 3/8” thick, color selected by Architect, over 3/4” thick marine plywood sub-floor. Design for ease of replacement from within cab.

G. Sills: One piece extrusion with extruded extension between car entrance columns to face of car front return. Extruded extension to match finish of sill.
   1. Elevator 1: Nickel silver.

H. Door Panels: 16-gauge steel, sandwich construction without binder angles. Provide leading edges of center-opening doors with rubber astragals. Provide a minimum of two gibs per panel, one at

leading and one at trailing edge with gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs. Architectural metal cladding shall wrap around leading and trailing edge of panel and return a minimum of 1/2" on rear side of leading edge of panel. Paint exterior of car floor in field in dark bronze color as selected.

I. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.

J. Door Track: Bar or formed, cold-drawn removable steel track with smooth roller contact surface.

K. Door Header: Construct of minimum 12-gauge steel, shape to provide stiffening flanges.

L. Door Electrical Contact: Prohibit car operation unless car door is closed. Provide car door interlock to prevent opening of car doors outside the unlocking zone.

M. Door Clutch: Heavy-duty clutch, linkage arms, drive blocks and pickup rollers or cams to provide positive, smooth, quiet door operation. Design clutch so car doors can be closed, while hoistway doors remain open.

N. Restricted Opening Device: Provide car-door interlock to prevent opening of car doors outside unlocking zone.

O. Door Operator: High-speed, heavy-duty door operator capable of opening doors at no less than 2.5 fps. Accomplish reversal in no more than 2½" of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Provide a minimum of four controller-activated motion profiles, per floor, per door, to maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure. Acceptable closed-loop door operators:
   1. KONE: AMD 2.0
   2. Otis: PGlide
   3. Schindler: QKS 15 Heavy Duty
   4. Thyssenkrupp: HD91 StarTrac
   5. G.A.L.: MOVFE
   6. Mitsubishi: LV4K

P. Door Control Device:
   1. Infrared Reopening Device:
      a. Black, fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7'-0" above finished floor. Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open:
      b. Acceptable Infrared Reopening Device:
         1) Cegard/MAX-154 by CEDES
         2) Gatekeeper by Adams
         3) Optiguard by Otis
         4) Magic Edge by Tri-Tronics
         5) Microscan E by T.L. Jones
         6) Pana40 Plus by Janus

2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0-25.0 seconds), warning signal shall sound, and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.
3. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0-1.5 seconds after beams are reestablished.
4. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.
    a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
    b. Hall Call: Hold open time adjustable between 5.0 and 8.0 seconds. Use hall call time when car responds to coincidental calls.

Q. Car Operating Panel:
1. One car operating panel with faceplate, consisting of a metal box containing vandal resistant operating fixtures, mounted behind the car swing front return. Car operating panel will be constructed of #4 stainless-steel, brushed finish.
2. Provide Exposed Pushbuttons to Initiate:
    a. Car call registration.
    b. Alarm.
    c. Door open.
    d. Door close.
    e. Emergency push-to-call communication.
3. Pushbuttons:
    a. Provide minimum 3/4" diameter raised floor pushbuttons which illuminate to indicate call registration.
    b. Provide brushed stainless, vandal resistant buttons with illuminated LED lighting.
    c. Locate operating controls no higher than 48” above the car floor, no lower than 35” for emergency push-to-call button and alarm button.
    d. Identify buttons with flat stainless tactile symbols outlined in black and rear mounted.
4. Locked Firefighters’ Emergency Operation Panel:
    a. Openable by the same key which operates the Fire Operation switch.
    b. Provide panel with solenoid operated key switch which automatically opens in the event of Firefighters’ Emergency Operation Phase I activation.
    c. Include the following features:
        1) Phase II fire access switch.
        2) Firefighters’ visual indication.
        3) Call cancel button.
        4) Stop switch, manually operated.
        5) Door open button.
        6) Door close button.
        7) Fire communication jack.
5. Service Compartment:
    a. Provide lockable service compartment with recessed flush door.
    b. Door material and finish to match car operating panel faceplate.
    c. Include integral flush window for displaying the elevator operating permit on inside surface of door.
    d. Include the following controls in lockable service cabinet with function and operating positions identified by permanent signage or engraved legend:

1) Access switch.
2) Light switch.
3) Four-position exhaust blower switch.
4) Independent service switch.
5) Constant pressure test button for battery pack emergency lighting.
6) 120-volt, AC, GFCI protected electrical convenience outlet.
7) Stop switch. Arrange switch to sound main control panel distress signal when actuated. Mark device to indicate “run” and “stop” positions.
8) Switch to select either floor voice annunciation, floor passing tone, or chime.
9) Car lighting dimmer switch.

6. Provide black paint filled (except as noted), engraved, or approved etched signage as follows with approved size and font:
   a. Phase II firefighters’ operating instructions on inside face of firefighters’ compartment door.
   b. Engrave filled red firefighters’ operation on outside face of compartment door.
   c. Building identification car number on main car operating panel.
   d. “No Smoking” on main car operating panel.
   e. Car capacity in pounds on service compartment door.
7. Provide “door open” button to stop and reopen doors or hold doors in open position.
8. Provide “door close” button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car or hall call has expired, except firefighters’ operation.
9. Provide firefighters’ Phase II key switch with engraved instructions filled red. Include light jewel, audible signal, and call cancel button.
10. Emergency Audible Signal: Provide on top of elevator. Activation of Alarm Button or Emergency Stop switch will cause Emergency Audible Signal. Provide auxiliary power supply to provide 1-hour power in the event of loss of normal power.

R. Communication System:
   1. Hands-Free Phone System:
      a. Two-way communication instrument in car with automatic dialing, tracking, and recall features with shielded wiring to car controller in machine room.
      b. Provide dialer with automatic rollover capability with minimum two numbers:
         1) Actuate two-way communication via “Help” button.
         2) Adjacent light jewel shall illuminate and flash when call is acknowledged.
         3) Button shall match car operating panel pushbutton design.
         4) Provide “Help” button tactile symbol, engraved signage, and tactile marking adjacent to button mounted integral with car front return panel.
   2. Emergency Personnel Communication:
      a. Communication system shall be provided allowing emergency personnel to establish communications with each elevator individually.
      b. Emergency Personnel Communication shall override any existing connection outside of building.
      c. Adjacent light jewel shall illuminate and flash when call is acknowledged.
      d. Provide operating instructions.
      e. On the same car operating panel as the phone push button, provide capability to communicate with and obtain responses from passengers.
      f. Provide display video capability for entrapment assessment.
   3. Communication for Deaf, Hard of Hearing and Speech Impaired: Device is located on the same car operating panel as the phone pushbutton. Provide shielding twisted pair wiring to communicate to machine network box.

S. Car Top Control Station:
1. Mount to provide safe access and utilization while standing on car top.
2. Operating device shall contain Up and Down direction buttons, a Run button, an Inspection/Automatic switch and Emergency Stop switch.
3. Operating device shall contain an audible and visible indicator that fire recall has been initiated.
4. This station shall be fixed to the car crosshead or may be portable provided the extension cord and housing is permanently attached to the car crosshead.
5. The car will be operated by constant pressure on the appropriate directional button and the Run button simultaneously.
6. Normal operating devices will be inoperative while this device is in use.

T. Work Light and Duplex Plug Receptacle:
1. GFCI protected outlet at top and bottom of car.
2. Include on/off switch and lamp guard.
3. Provide additional GFCI protected outlet on car top for installation of car CCTV display.

2.10 CAR ENCLOSURE

A. Passenger Elevator: Provide complete as specified herein and detailed on architectural drawings. The exterior of the elevator will be clad in stainless steel. In addition, include stainless steel shrouds top and bottom of cab. Please note additional pit and overhead is not available.
1. Shell: Reinforced 14-gauge furniture steel formed panels with baked enamel interior finish as selected. Apply sound-deadening mastic to exterior. Provide concealed ventilation cutouts.
2. Canopy: Reinforced 12-gauge stainless steel formed panels with lockable, contacted, hinged emergency exit. Interior finish white color reflective baked enamel.
3. Front Return Panels: Reinforced 14-gauge furniture steel clad with minimum 16-gauge satin finish stainless steel with cutouts for applied car operating panel(s) and other equipment.
4. Transom: Reinforced 14-gauge furniture steel clad with minimum 16-gauge satin finish stainless steel full width of enclosure.
5. Car Door Panels: Reinforced minimum 16-gauge furniture steel clad with minimum 18-gauge satin finish stainless steel. Same construction as hoistway door panels. Cladding shall wrap leading and trailing edge of panel a minimum of 1/2" on rear side.
6. Base: Satin finish stainless steel.
7. Interior Wall Finish: Removable panels, faced and edged, with satin textured finish stainless steel.
8. Ventilation: Forced ventilation, 3-speed fan or blower mounted to car canopy. Exhaust blower shall meet noise and vibration criteria.
9. Lighting: Provide LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements
10. Ceiling: Six-section mirror finish stainless steel panels with lighting cutouts in each panel.
11. Handrails/Guardrails: Two lines. Top handrail line minimum 1½" diameter stainless steel grab bar with backing plates and captive nuts. Lower guardrail line 4" x 3/8" solid stainless steel flatstock bars mounted on both sides rear of the car. Locate bottom guardrail line at 8" above car floor and handrail line at 32" above the car floor. Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C. Return handrail/guardrail ends to car walls.
12. Pads and Buttons: Three-piece removable pads. Two pads covering side walls and adjacent front returns and one covering rear wall. Provide cutouts to access main car operating panel.

13. Auxiliary power for ventilation.

2.11 HALL CONTROL STATIONS

A. Pushbuttons: Provide one (1) riser with flush mounted faceplates. Include pushbuttons for each direction of travel that illuminate to indicate call registration. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency as part of faceplate. Pushbutton design shall match car operating panel pushbuttons. Provide vandal resistant pushbutton and light assemblies. Provide LED illumination.

B. Phase I Fire Service fixture, including keyswitch, engraved operating instructions and illuminating jewel. Provide illuminating jewel(s) indicating standby power status. Provide communication check failure indication and silence key switch. Incorporate all items required by Code at the primary egress level into a single hall fixture.

2.12 SIGNALS

A. Car Direction Lantern, Elevator 1:
1. Provide dual fixtures at each entrance to indicate travel direction of arriving car. Locate as detailed on architectural drawings. Provide flush-mounted car lanterns in each car entrance columns.
2. Illuminate up or down LED lights and sound tone once for up and twice for down direction prior to car arrival at floor. Illuminate light until the car doors start to close as doors open.
3. Sound level shall be adjustable from 20-80 dBA measured at 5'-0" in front of hall control station and 3'-0" off floor.
4. Car direction lenses shall be arrow shaped with faceplates.
5. Lenses shall be minimum 2½" in their smallest dimension.
6. Provide vandal resistant lantern and light assemblies consisting of series of dots or lines for maximum visibility.

B. Car Position Indicator: Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 1/2" high to indicate floor served and direction of car travel. Locate fixture in car operating panel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel.

C. Faceplate Material and Finish: Satin finish stainless steel, all fixtures. Tamper resistant fasteners for all fastenings exposed to the public.
1. Car Direction Lantern:
2. Car Position Indicator:
3. Call Stations.

D. Floor Passing Tone: Provide an audible tone of no less than 20 decibels and frequency of no higher than 1500 Hz, to sound as the car passes or stops at a floor served.

E. Voice Synthesizer: Provide electronic device with easily reprogrammable message and male voice to announce car direction, floor, emergency exiting instructions, etc.

F. Firefighters' Key Box: Flush-mounted box with lockable hinged cover. Engrave instructions for use on cover per Local Fire Authority requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to beginning installation of equipment examine hoistway and machine room areas. Verify no irregularities exist which affect execution of work specified.

B. Do not proceed with installation until work in place conforms to project requirements.

3.2 INSTALLATION

A. Install all equipment in accordance with Contractor's instructions, referenced codes, specification, and approved submittals.

B. Install machine room equipment with clearances in accordance with referenced codes and specification.

C. Install all equipment so it may be easily removed for maintenance and repair.

D. Install all equipment for ease of maintenance.

E. Install all equipment to afford maximum accessibility, safety, and continuity of operation.

F. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one coat of field-applied machinery enamel in color as selected by Architect.
   1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.
   2. Machine room equipment may be factory colors. All hoistway equipment including guide rails, guide rail brackets, and pit equipment must be field painted in color as selected.
   3. Neatly touch up damaged factory-painted surfaces in the machine with original paint color. Protect machine-finish surfaces against corrosion.

G. Clean all architectural finishes and replace or restore any surfaces damaged during construction to like new condition.

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

B. Operating Test: Load elevator capacity, speed, and travel distance to rated capacity and operate continuously for 30 minutes over full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of elevator machine during 30-minute test period. Record failure to perform as required.

C. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 ADJUSTING

A. Install hydraulic jack assembly and guide rails plumb and align vertically with tolerance of 1/16" in 100'-0". Secure guide rail joints without gaps and file any irregularities to a smooth surface.

B. Static balance car to equalize pressure of guide shoes on guide rails.

C. Lubricate all equipment in accordance with Contractor's instructions.

D. Adjust motors, valves, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

3.5 CLEANUP

A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis.

B. Remove all loose materials and filings resulting from work.

C. Clean machine room equipment and floor.

D. Clean pit equipment and floor.

E. Clean hoistways, car, car enclosure, entrances, operating, and signal fixtures.

3.6 TEST RESULTS:

A. Under any load obtain specified contract speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of Consultant. Tests may be conducted under no load, balanced load, and full load conditions.

B. Consultant may test temperature rise in motor windings limited to 50° Celsius above ambient. A full-capacity one hour running test, stopping at each floor for ten seconds in up and down directions, may be required.

C. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).

D. Check operation of elevator with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.7 PROTECTION

A. Temporary Use: Comply with the following requirements for each elevator used for construction purposes:
   1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
   2. Provide strippable protective film on entrance and car doors and frames.
   3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.

4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
5. Do not load elevators beyond their rated weight capacity.
6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair, or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
7. Engage Elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items which cannot be refinished in the field to the shop, make required repairs, and refinish entire unit, or provide new units as required.

END OF SECTION