AMAYA ARCHITECTS

ADDENDUM NUMBER 1

For:

Antigua Residence
384 Henry Avenue
Stratford, Connecticut

Project Number 2447

31st of March 2015

The Drawings and Specifications prepared by Amaya Architects and it's Consultants entitled **"Re-Construction of Rear Entrance Addition, Deck Railing and Miscellaneous Interior Renovations"** and known as the **"Antigua Residence located at 384 Henry Avenue, Stratford, Connecticut"** Project Number 2447, Drawings and Specifications dated the 10th of March 2015 (Bid Set), are hereby amended in the following particulars:

Item #	Section/Dwg	Description
1		Attached is a list of the Contractors present at the walk-thru on the 30th of March 2015 – for your reference.
2		Per the posted Hazardous Building Materials Survey – Amaya Architects offers the following for your reference: A. Lead Paint: Remove lead paint from surfaces when disturbed by Construction Related Activities. Separately package all construction material that contains or is known to contain lead based paint. Track disposal of all lead coated materials and provide Waste Stream Manifests to the Architect. See the Survey of Hazardous Building Materials for suspect building components and their location. B. Asbestos Containing Materials: All asbestos containing materials shall be removed from the project site in advance of any construction activities when scheduled Construction Related Activities will disturb the ACM. Follow safe removal practices. Once removed the Asbestos Containing Materials shall be bagged and disposed of separately as required by State and Federal mandates for Asbestos. Track disposal of all Asbestos Containing Materials and provide Waste Stream Manifests to the Architect. Air testing will be required in all rooms or spaces were Asbestos Containing Materials were removed prior to starting construction activities. See the Survey of Hazardous Building Materials for suspect building components and their location.

		C. Mold Coated Surfaces: Clean all surfaces identified as having mold or mold spores thoroughly. All surfaces cleaned should be inspected prior to starting any construction activities in these areas. . See the Survey of Hazardous Building Materials for suspect building components and their location.
3		See Bid Notices on the DOH Website under Super Storm Sandy – Antigua Residence #2447 - for missing Specification Sections under Division 01 – General Conditions, Division 02 – Sitework, Division 06 – Wood and Plastics, Division 07 – Thermal and Moisture Protection, Division 08 – Openings, and Division 09 – Finishes.

END OF ADDENDUM ONE

Sign in Sheet - Antigua Residence 2447
30th of March 2014

Name/Company	Address	email	Phone Number	Do we have your business card?
John Danise DSW Homes	58 River Street Milford, CT. 06046	John.Danise@dswhomes.com	203-693-2776	Yes
Robert Sickeler VASE MANAGEMENT	360 Fairfield Avenue, Suite 2 Bridgeport, CT 06604	Robert@vasemanagement.com	203-332-7366	Yes
Jeff Hallquist Jeff Hallquist Builders	453 Elm Street Monroe, CT 06468	Jeff@jeffhallquist.com	203-650-5898	No
Melissa McGeown CIL	157 Charter Oak Avenue Hartford, CT 06106	mmcgeown@cil.org	860-563-6011	Yes
Oregon Bob, LLC	202 Merwin Avenue Milford, CT. 06466	oregonbob1225@yahoo.com	203-650-1475	Yes
Integrated Building Services Jim Quish	167 Cherry Street #319 Milford, CT. 06466	jquish@ibsgreen.com	203-243-9547	Yes
Danielle Foster DSW Homes	58 River Street Milford, CT. 06046	danielle.Foster@dswhomes.com	203-693-2776	Yes

FREEMAN
COMPANIES

LAND DEVELOPMENT
ENGINEERING DESIGN
CONSTRUCTION SERVICES

February 20, 2015

Amaya Architects
Attn: Rafael Amaya
284 Racebrook Rd
Orange, CT 06477

RE: Hazardous Building Materials Survey for Proposed Renovations
Location: 384 Henry Avenue, Stratford, Connecticut
Freeman Companies Project #: 2015-0006

Dear Mr. Amaya,

In accordance with our proposal, Freeman Companies, LLC (Freeman), conducted a comprehensive pre-renovation asbestos, lead, mold growth and radon-in-air survey and bulk sampling amongst suspect building materials from the single-family residence located at 384 Henry Avenue, Stratford, Connecticut. The purpose of the bulk sampling and analysis survey was to sample materials for asbestos, lead-based paint and mold growth prior to any further renovations to the surveyed site structure.

The inspections were conducted January 29, 2015.

We thank you for the opportunity to provide you with our consulting services. If you have any questions regarding this report or its contents, please contact me at 860-908-4499.

Sincerely,

Freeman Companies, LLC

Brett Nicholas
Hazardous Building Materials Manager

Appendix A:	ACM Laboratory Results
Appendix B:	Mold / Fungal Laboratory Results
Appendix C:	Radon-in-Air Laboratory Results
Appendix D:	Licenses and Accreditations
Appendix E:	Site Photographs (January 29, 2015)

FREEMAN COMPANIES

1.0 INTRODUCTION

1.1 Purpose

Freeman Companies, LLC was retained by Amaya Architects to conduct a pre-renovation asbestos, lead-based paint, mold growth and radon-in-air investigative survey amongst suspect materials associated with proposed renovations of the site structure located at 384 Henry Avenue, Stratford, CT. The asbestos survey was conducted in conformance with the Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61.

1.2 Special Terms and Conditions

Freeman Companies, LLC was contracted to perform an investigative survey of all accessible interior and exterior materials. These areas included the living spaces, basement, attic, and exterior areas. Non-destructive sampling techniques were conducted. Inaccessible areas were generally identified as above or behind documented finish materials. Estimated quantities and locations of asbestos-containing materials (ACM's) as presented were based on the visual observations at the time of the survey. Every attempt was made to locate all suspect materials, however additional materials may be discovered above hard ceilings or behind walls during demolition or renovation activities.

2.0 ASBESTOS INVESTIGATIVE SURVEY

2.1 General Summary

The following asbestos survey section presents the survey results, methods, and conclusions based on survey findings. Detailed information relative to ACM descriptions and locations are presented in the appendices to this report.

Appendix A Laboratory Analysis Data

Appendix A further illustrates each type of suspect asbestos-containing material identified, their location(s), and whether the materials are classified as ACM or non-ACM based upon the analytical results. All samples were submitted to EMSL Analytical, Inc. EMSL is a CT Licensed Laboratory.

2.2 Methodology

As required by the U.S. Occupational Safety & Health Administration (OSHA), the U.S. Environmental Protection Agency (EPA), and the State of Connecticut Department of Public Health (DPH), sampling was performed by an EPA Asbestos Hazard Emergency Response Act (AHERA)-accredited and DPH-certified asbestos inspector (see Appendix D). Sampling was done in a manner to prevent airborne fiber release and in accordance with the protocols specified in EPA 40 CFR Part 763. Samples were placed in appropriately labeled containers that were sealed, labeled and submitted to the laboratory for analysis. The samples were submitted for petrographic analysis using the EPA-endorsed Polarized Light Microscopy with Dispersion Staining (PLM/DS) method. The percentage of asbestos present in each sample was determined by the visual area estimation technique.

Samples were collected using a wet technique to prevent airborne fiber release. Each suspect material was sampled using a decontaminated knife to cut through its entire thickness to ensure that a complete cross section was obtained. The sample was then placed in an appropriately labeled container, which was sealed, labeled and submitted to the laboratory for analysis.

Initially, one sample of each homogeneous material was submitted to the laboratory for analysis. If this first sample result was found to contain asbestos, the remaining samples were not analyzed. If this first sample result was negative, then the remaining samples were submitted for analysis. In this manner, Freeman Companies' sampling and EMSL's analysis minimized analytical costs without compromising the integrity of the survey findings.

2.3 *Results of Sampling and Analysis for Asbestos*

Table 1 presents a summary of the results of the sampling. Please refer to Appendix A (ACM Laboratory Results) for laboratory analysis results.

Table 1 – Asbestos Analytical Results

Sample Number	Material Description	Location(s)	Estimated Quantity	Analytical Result
012915 – 1a	Plaster Skim Coat	1st Floor Walls	N/A	None Detected
012915 – 1b	Plaster Skim Coat	1st Floor Walls	N/A	None Detected
012915 – 1c	Plaster Skim Coat	1st Floor Walls	N/A	None Detected
012915 – 2a	Plaster Base Coat	1st Floor Walls	N/A	None Detected
012915 – 2b	Plaster Base Coat	1st Floor Walls	N/A	None Detected
012915 – 2c	Plaster Base Coat	1st Floor Walls	N/A	None Detected
012915 – 3a	Door Frame Caulk	Exterior Door to Driveway	N/A	None Detected
012915 – 3b	Door Frame Caulk	Exterior Door to Driveway	N/A	None Detected
012915 – 3c	Door Frame Caulk	Exterior Door to Driveway	N/A	None Detected
012915 – 4a	Backsplash Grout	Kitchen	N/A	None Detected
012915 – 4b	Backsplash Grout	Kitchen	N/A	None Detected
012915 – 4c	Backsplash Grout	Kitchen	N/A	None Detected
012915 – 5a	Tar Paper under Original Siding	Exterior (under red siding)	N/A	None Detected
012915 – 5b	Tar Paper under Original Siding	Exterior (under red siding)	N/A	None Detected
012915 – 5c	Tar Paper under Original Siding	Exterior (under red siding)	N/A	None Detected
012915 – 6a	Sheetrock	Basement	N/A	None Detected
012915 – 6b	Sheetrock	Basement	N/A	None Detected
012915 – 6c	Sheetrock	Basement	N/A	None Detected
012915 – 7a	Joint Compound	Basement	N/A	None Detected

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Sample Number	Material Description	Location(s)	Estimated Quantity	Analytical Result
012915 – 7b	Joint Compound	Basement	N/A	None Detected
012915 – 7c	Joint Compound	Basement	N/A	None Detected
012915 – 8a	12x12 Floor Tile Grout	Basement	N/A	None Detected
012915 – 8b	12x12 Floor Tile Grout	Basement	N/A	None Detected
012915 – 8c	12x12 Floor Tile Grout	Basement	N/A	None Detected
012915 – 9a	12x12 Floor Tile Mud-Set	Basement	N/A	None Detected
012915 – 9b	12x12 Floor Tile Mud-Set	Basement	N/A	None Detected
012915 – 9c	12x12 Floor Tile Mud-Set	Basement	N/A	None Detected
012915 – 10a	Block Wall Foundation Patch Coating	Basement	N/A	None Detected
012915 – 10b	Block Wall Foundation Patch Coating	Basement	N/A	None Detected
012915 – 10c	Block Wall Foundation Patch Coating	Basement	N/A	None Detected
012915 – 11a	Tar-Backed Paper on Fiberglass Batting	Attic	N/A	None Detected
012915 – 11b	Tar-Backed Paper on Fiberglass Batting	Attic	N/A	None Detected
012915 – 11c	Tar-Backed Paper on Fiberglass Batting	Attic	N/A	None Detected
012915 – 12a	Light Blue Texture Coating	Exterior (Foundation)	N/A	None Detected
012915 – 12b	Light Blue Texture Coating	Exterior (Foundation)	N/A	None Detected
012915 – 12c	Light Blue Texture Coating	Exterior (Foundation)	N/A	None Detected
012915 – 13a	Basement Window Glazing	Exterior (Foundation)	N/A	None Detected
012915 – 13b	Basement Window Glazing	Exterior (Foundation)	N/A	None Detected
012915 – 13c	Basement Window Glazing	Exterior (Foundation)	N/A	None Detected
012915 – 14a	White Window Frame Caulk	Exterior (Under Aluminum)	N/A	None Detected
012915 – 14b	White Window Frame Caulk	Exterior (Under Aluminum)	N/A	None Detected
012915 – 14c	White Window Frame Caulk	Exterior (Under Aluminum)	N/A	None Detected
012915 – 15a	**Tar on Chimney / Vent Stack**	**Roof (Chimney / Vent)**	**9 square feet**	**7% Chrysotile**
012915 – 15b	**Tar on Chimney / Vent Stack**	**Roof (Chimney / Vent)**		**NA/PS**
012915 – 15c	**Tar on Chimney / Vent Stack**	**Roof (Chimney / Vent)**		**NA/PS**
012915 – 16a	Light Brown Asphalt Shingles	Roof	N/A	None Detected
012915 – 16b	Light Brown Asphalt Shingles	Roof	N/A	None Detected
012915 – 16c	Light Brown Asphalt Shingles	Roof	N/A	None Detected
012915 – 17a	Light Green Asphalt Shingles	Roof	N/A	None Detected
012915 – 17b	Light Green Asphalt Shingles	Roof	N/A	None Detected

Sample Number	Material Description	Location(s)	Estimated Quantity	Analytical Result
012915 – 17c	Light Green Asphalt Shingles	Roof	N/A	None Detected
012915 – 18a	Black Felt Paper under 17A-C	Roof	N/A	None Detected
012915 – 18b	Black Felt Paper under 17A-C	Roof	N/A	None Detected
012915 – 18c	Black Felt Paper under 17A-C	Roof	N/A	None Detected

NA/PA = Not Analyzed / Positive Stop

3.0 LEAD-BASED PAINT SCREENING SURVEY

The Lead-based paint survey was conducted with an XRF direct reading instrument in accordance with the Department of Housing & Urban Development (HUD) testing guidelines. These protocols were developed for residential or day care facilities and were adopted by the Connecticut Childhood Lead Poisoning Prevention Regulations (CLPPR). The Lead-paint reports were prepared using the CLPPR threshold of 1 mg/cm^2. Although most surface paints are reported as below the threshold of 1.0 mg/cm^2, the instrument recorded some results that indicated lead was present in limited locations but **below** the CLPPR threshold of 1.0 mg/cm^2. Other limited locations indicated the presence of lead **above** 1.0 mg/cm^2.

The State of Connecticut and the U.S. Department of Housing and Urban Development (HUD) have developed technical guidelines for testing, abatement, cleanup, and disposal of lead-based paint in specific types of buildings such as public and Indian housing, and locations where children below the age of six years old reside. These guidelines define the regulated level of lead paint (Toxic Level of Lead) as paint containing greater than 1.0 milligrams lead per square centimeter (mg/cm^2) of surface as measured on-site by an X-ray fluorescent (XRF) analyzer or more than 0.50 percent lead by dry weight as measured by Atomic Absorption Spectrometry (AAS).

For the purposes of this report, all paints containing detectable amounts of lead should be considered lead-based paints. This action is taken because OSHA regulates lead in construction based on airborne exposures and it cannot be ensured that lead paint with concentrations of lead less than 1.0 mg/cm^2 or 0.50% mass will not result in exposures exceeding the OSHA standard.

4.0 LEAD-BASED PAINT SURVEY RESULTS

Table 2 – Lead Paint - XRF Results

Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Living Room	1st	Wall	North	Beige	Plaster (Intact)	0.0
Living Room	1st	Wall	South	Beige	Plaster (Intact)	0.0
Living Room	1st	Wall	East	Beige	Plaster (Intact)	0.0
Living Room	1st	Wall	West	Beige	Plaster (Intact)	0.0
Living Room	1st	Ceiling	-	White	Plaster (Intact)	0.0

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Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Living Room	1st	Crown Molding	North	White	Wood (Intact)	0.0
Living Room	1st	Crown Molding	South	White	Wood (Intact)	0.0
Living Room	1st	Crown Molding	East	White	Wood (Intact)	0.0
Living Room	1st	Crown Molding	West	White	Wood (Intact)	0.0
Living Room	1st	Crown Mold Strip	North	White	Wood (Intact)	0.0
Living Room	1st	Crown Mold Strip	South	White	Wood (Intact)	0.0
Living Room	1st	Crown Mold Strip	East	White	Wood (Intact)	0.0
Living Room	1st	Crown Mold Strip	West	White	Wood (Intact)	0.0
Living Room	1st	Front Entry Door Molding	-	White	Wood (Intact)	0.0
Living Room	1st	Front Entry Door Jamb	-	Beige	Wood (Intact)	0.0
Living Room	1st	West Window Molding	-	White	Wood (Intact)	**0.08**
Living Room	1st	West Window Frame	-	White	Wood (Intact)	**0.28**
Living Room	1st	West Window Sill	-	White	Wood (Intact)	**0.12**
Living Room	1st	West Window Vertical Run	-	White	Wood (Intact)	0.0
Living Room	1st	South Window Molding	-	White	Wood (Intact)	**0.06**
Living Room	1st	South Window Frame	-	White	Wood (Intact)	**0.02**
Living Room	1st	South Window Sill	-	White	Wood (Intact)	**0.07**
Living Room	1st	Southeast Entry Molding	-	White	Wood (Intact)	0.0
Living Room	1st	Southeast Entry Frame	-	White	Wood (Intact)	0.0
Living Room	1st	East Entry Molding	-	White	Wood (Intact)	0.0
Living Room	1st	East Entry Frame	-	White	Wood (Intact)	0.0
Living Room	1st	Baseboard	North	White	Wood (Intact)	**0.11**
Living Room	1st	Baseboard	South	White	Wood (Intact)	**0.08**
Living Room	1st	Baseboard	East	White	Wood (Intact)	**0.09**
Living Room	1st	Baseboard	West	White	Wood (Intact)	**0.17**
Living Room	1st	Steam Radiator	East	Black	Metal (Slightly Deteriorated)	**0.04**
Living Room	1st	Step-up Riser	Southwest	White	Wood (Intact)	**0.02**
Dining Room	1st	Wall	North	Beige	Plaster (Intact)	**0.09**
Dining Room	1st	Wall	South	Beige	Plaster (Intact)	0.0
Dining Room	1st	Wall	East	Beige	Plaster (Intact)	0.0
Dining Room	1st	Wall	West	Beige	Plaster (Intact)	**0.07**

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Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Dining Room	1st	Ceiling	-	White	Plaster (Intact)	0.0
Dining Room	1st	West Entry Molding	-	White	Wood (Intact)	0.0
Dining Room	1st	South Entry Molding	-	White	Wood (Intact)	0.0
Dining Room	1st	South Entry Frame	-	White	Wood (Intact)	0.0
Dining Room	1st	East Window Molding	-	White	Wood (Intact)	**0.14**
Dining Room	1st	East Window Frame	-	White	Wood (Intact)	**0.04**
Dining Room	1st	East Window Sill	-	White	Wood (Intact)	0.0
Dining Room	1st	Radiator	East	White	Metal (Slightly Deteriorated)	**0.02**
Dining Room	1st	Closet Door (inner)	Northeast	White	Wood (Intact)	0.0
Dining Room	1st	Closet Door (outer)	Northeast	White	Wood (Intact)	0.0
Dining Room	1st	Closet Door Molding	Northeast	White	Wood (Intact)	**0.03**
Dining Room	1st	Closet Door Jamb	Northeast	White	Wood (Intact)	**0.07**
Dining Room	1st	Northwest Entry Molding	-	White	Wood (Intact)	0.0
Dining Room	1st	Northwest Entry Frame	-	White	Wood (Intact)	0.0
Dining Room	1st	Baseboard	North	White	Wood (Intact)	**0.01**
Dining Room	1st	Baseboard	South	White	Wood (Intact)	**0.04**
Dining Room	1st	Baseboard	East	White	Wood (Intact)	**0.01**
Dining Room	1st	Baseboard	West	White	Wood (Intact)	0.0
Dining Room Pantry	1st	Wall	North	White	Plaster (Intact)	**0.08**
Dining Room Pantry	1st	Wall	East	White	Plaster (Intact)	**0.04**
Dining Room Pantry	1st	Wall	West	White	Plaster (Intact)	**0.06**
Dining Room Pantry	1st	Baseboard	North	White	Wood (Intact)	**0.04**
Dining Room Pantry	1st	Baseboard	East	White	Wood (Intact)	**0.02**
Dining Room Pantry	1st	Baseboard	West	White	Wood (Intact)	**0.02**
Dining Room Pantry	1st	Shelf Support	-	White	Wood (Intact)	**0.04**
Dining Room Pantry	1st	Shelves	-	White	Wood (Intact)	**0.07**
Dining Room Pantry	1st	Ceiling	-	White	Plaster (Intact)	0.0
Kitchen	1st	Ceiling	-	White	Plaster (Intact)	0.0
Kitchen	1st	Crown Molding	North	White	Wood (Intact)	0.0
Kitchen	1st	Crown Molding	South	White	Wood (Intact)	0.0
Kitchen	1st	Crown Molding	East	White	Wood (Intact)	0.0

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Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Kitchen	1st	Crown Molding	West	White	Wood (Intact)	0.0
Kitchen	1st	Wall	North	Grey	Plaster (Intact)	0.0
Kitchen	1st	Wall	South	Grey	Plaster (Intact)	0.0
Kitchen	1st	Wall	East	Grey	Plaster (Intact)	0.0
Kitchen	1st	Wall	West	Grey	Plaster (Intact)	0.0
Kitchen	1st	Chair Rail	North	White	Wood (Intact)	**0.09**
Kitchen	1st	Chair Rail	South	White	Wood (Intact)	**0.04**
Kitchen	1st	Chair Rail	East	White	Wood (Intact)	**0.04**
Kitchen	1st	Chair Rail	West	White	Wood (Intact)	**0.07**
Kitchen	1st	Wainscoting Bead board	North	White	Wood (Intact)	0.0
Kitchen	1st	Wainscoting Bead board	South	White	Wood (Intact)	0.0
Kitchen	1st	Wainscoting Bead board	East	White	Wood (Intact)	0.0
Kitchen	1st	Wainscoting Bead board	West	White	Wood (Intact)	0.0
Kitchen	1st	Chimney Chase	-	Red	Sheetrock (Intact)	0.0
Kitchen	1st	Baseboard	North	White	Wood (Intact)	0.0
Kitchen	1st	Baseboard	South	White	Wood (Intact)	0.0
Kitchen	1st	Baseboard	East	White	Wood (Intact)	**0.14**
Kitchen	1st	Baseboard	West	White	Wood (Intact)	0.0
Kitchen	1st	Radiator	East	Black	Metal (Slightly Deteriorated)	0.13
Kitchen	1st	North Entry Molding	-	White	Wood (Intact)	0.0
Kitchen	1st	Northwest Entry Molding	-	White	Wood (Intact)	0.0
Kitchen	1st	Southwest Entry Molding	-	White	Wood (Intact)	**0.11**
Kitchen	1st	Southwest Entry Frame	-	White	Wood (Intact)	**0.18**
Kitchen	1st	South Window Molding	-	White	Wood (Intact)	**0.09**
Kitchen	1st	South Window Frame	-	White	Wood (Intact)	**0.03**
Kitchen	1st	South Window Vertical Run	-	White	Wood (Intact)	**0.07**
Kitchen	1st	South Window Sill **(tested twice)**	-	White	Wood (Intact)	0.0
Kitchen	1st	East Window Molding	-	White	Wood (Intact)	0.0
Kitchen	1st	East Window Frame	-	White	Wood (Intact)	0.0
Kitchen	1st	Northeast Door Molding	-	White	Wood (Intact)	**0.04**

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Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm²)
Kitchen	1st	Northeast Door Jamb	-	White	Wood (Intact)	**0.06**
Kitchen	1st	Northeast Entry Door	-	White	Metal (Intact)	0.0
Bed / Bath Hallway	1st	Wall	North	Beige	Plaster (Intact)	0.0
Bed / Bath Hallway	1st	Wall	South	Beige	Plaster (Intact)	0.0
Bed / Bath Hallway	1st	Wall	East	Beige	Plaster (Intact)	0.0
Bed / Bath Hallway	1st	Wall	West	Beige	Plaster (Intact)	0.0
Bed / Bath Hallway	1st	Ceiling	-	Beige	Plaster (Intact)	0.0
Bed / Bath Hallway	1st	Northeast Door Molding	-	White	Wood (Intact)	**0.07**
Bed / Bath Hallway	1st	Northeast Door Jamb	-	White	Wood (Intact)	**0.07**
Bed / Bath Hallway	1st	Northeast Door	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Baseboard	North	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Baseboard	South	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Baseboard	East	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Baseboard	West	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Bathroom Door	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Bathroom Door Molding	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	Bathroom Door Jamb	-	White	Wood (Intact)	**0.03**
Bed / Bath Hallway	1st	West Door	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	West Door Molding	-	White	Wood (Intact)	**0.05**
Bed / Bath Hallway	1st	West Door Jamb	-	White	Wood (Intact)	**0.03**
Bed / Bath Hallway	1st	Southeast Entry Molding	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	East Closet Door	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	East Closet Door Molding	-	White	Wood (Intact)	0.0
Bed / Bath Hallway	1st	East Closet Door Jamb	-	White	Wood (Intact)	0.0
Bed / Bath Hallway Linen Closet	1st	Wall	North	White	Plaster (Intact)	0.0
Bed / Bath Hallway Linen Closet	1st	Wall	South	White	Plaster (Intact)	0.0
Bed / Bath Hallway Linen Closet	1st	Wall	East	White	Plaster (Intact)	**0.01**
Bed / Bath Hallway Linen Closet	1st	Shelves	-	White	Wood (Intact)	**0.02**
Bed / Bath Hallway Linen Closet	1st	Shelf Support	-	White	Wood (Intact)	0.0

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Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Bed / Bath Hallway Linen Closet	1st	Baseboard	North	White	Wood (Intact)	**0.01**
Bed / Bath Hallway Linen Closet	1st	Baseboard	South	White	Wood (Intact)	**0.01**
Bed / Bath Hallway Linen Closet	1st	Baseboard	East	White	Wood (Intact)	**0.02**
Bed / Bath Hallway Linen Closet	1st	Ceiling	-	White	Plaster (Intact)	0.0
Northeast Bedroom	1st	Ceiling	-	White	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Upper)	North	Pink	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Upper)	South	Pink	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Upper)	East	Pink	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Upper)	West	Pink	Plaster (Intact)	0.0
Northeast Bedroom	1st	East Window Molding	-	White	Wood (Intact)	**0.04**
Northeast Bedroom	1st	East Window Frame	-	White	Wood (Intact)	**0.04**
Northeast Bedroom	1st	East Window Sill	-	White	Wood (Intact)	0.0
Northeast Bedroom	1st	North Window Molding	-	White	Wood (Intact)	**0.03**
Northeast Bedroom	1st	North Window Frame	-	White	Wood (Intact)	**0.04**
Northeast Bedroom	1st	North Window Sill	-	White	Wood (Intact)	**0.04**
Northeast Bedroom	1st	Wall (Lower)	North	Purple	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Lower)	South	Purple	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Lower)	East	Purple	Plaster (Intact)	0.0
Northeast Bedroom	1st	Wall (Lower)	West	Purple	Plaster (Intact)	0.0
Northeast Bedroom	1st	Chair Rail	North	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Chair Rail	South	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Chair Rail	East	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Chair Rail	West	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Baseboard	North	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Baseboard	South	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Baseboard	East	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Baseboard	West	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Closet Door	-	White	Wood (Intact)	0.0
Northeast Bedroom	1st	Closet Dorr Molding	-	White	Wood (Intact)	**0.02**
Northeast Bedroom	1st	Closet Door Jamb	-	White	Wood (Intact)	**0.04**

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FREEMAN COMPANIES

Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Northeast Bedroom	1st	Closet Wall	South	White	Plaster (Intact)	0.0
Northeast Bedroom	1st	Closet Wall	East	White	Plaster (Intact)	0.0
Northeast Bedroom	1st	Closet Wall	West	White	Plaster (Intact)	0.0
Northeast Bedroom	1st	Closet Ceiling	-	White	Plaster (Intact)	0.0
Northeast Bedroom	1st	Closet Shelf	-	White	Wood (Intact)	**0.04**
Northeast Bedroom	1st	Closet Shelf Support	-	White	Wood (Intact)	**0.02**
Northeast Bedroom	1st	Steam Radiator	East	Black	Metal (Slightly Deteriorated)	**0.21**
Bathroom	1st	Wall	North	Beige	Plaster (Intact)	0.0
Bathroom	1st	Wall	South	Beige	Plaster (Intact)	0.0
Bathroom	1st	Wall	East	Beige	Plaster (Intact)	0.0
Bathroom	1st	Wall	West	Beige	Plaster (Intact)	0.0
Bathroom	1st	Window Molding	North	Varnish	Wood (Intact)	0.0
Bathroom	1st	High Chair Rail	-	Varnish	Wood (Intact)	0.0
Bathroom	1st	Steam Radiator	North	White	Metal (Slightly Deteriorated)	**0.14**
Bathroom	1st	Ceiling	-	Beige	Plaster (Intact)	0.0
Bathroom	1st	Door Molding (Inner)	-	Varnish	Wood (Intact)	**0.02**
West Bedroom	1st	Ceiling	-	White	Plaster (Intact)	0.0
West Bedroom	1st	Wall	North	Beige	Plaster (Intact)	0.0
West Bedroom	1st	Wall	South	Beige	Plaster (Intact)	0.0
West Bedroom	1st	Wall	East	Beige	Plaster (Intact)	0.0
West Bedroom	1st	Wall	West	Beige	Plaster (Intact)	0.0
West Bedroom	1st	West Window Molding	-	White	Wood (Intact)	**0.12**
West Bedroom	1st	West Window Frame	-	White	Wood (Intact)	**0.09**
West Bedroom	1st	West Window Sill	-	White	Wood (Intact)	**0.02**
West Bedroom	1st	North Window Molding	-	White	Wood (Intact)	**0.04**
West Bedroom	1st	North Window Frame	-	White	Wood (Intact)	**0.07**
West Bedroom	1st	North Window Sill	-	White	Wood (Intact)	**0.01**
West Bedroom	1st	Baseboard	North	White	Wood (Intact)	0.0
West Bedroom	1st	Baseboard	South	White	Wood (Intact)	0.0
West Bedroom	1st	Baseboard	East	White	Wood (Intact)	0.0

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FREEMAN COMPANIES

Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
West Bedroom	1st	Baseboard	West	White	Wood (Intact)	0.0
West Bedroom	1st	Entry Door Molding (Inner)	-	White	Wood (Intact)	**0.04**
West Bedroom	1st	Closet Door Molding	-	White	Wood (Intact)	**0.02**
West Bedroom	1st	Closet Door	-	White	Wood (Intact)	0.0
West Bedroom	1st	Closet Door Jamb	-	White	Wood (Intact)	**0.02**
West Bedroom	1st	Closet Wall	South	White	Plaster (Intact)	0.0
West Bedroom	1st	Closet Wall	North	White	Plaster (Intact)	0.0
West Bedroom	1st	Closet Wall	East	White	Plaster (Intact)	0.0
West Bedroom	1st	Closet Shelf Support	-	White	Wood (Intact)	0.0
West Bedroom	1st	Closet Shelf	-	White	Wood (Intact)	0.0
West Bedroom	1st	Steam Radiator	West	Black	Metal (Slightly Deteriorated)	**0.02**
Basement Stairwell	B	Wall	North	Grey	Plaster (Intact)	**0.31**
Basement Stairwell	B	Wall	East	Grey	Plaster (Intact)	**0.07**
Basement Stairwell	B	Wall	West	Grey	Plaster (Intact)	**0.04**
Basement Stairwell	B	Wall	South	Grey	Sheetrock (Intact)	0.0
Basement Stairwell	B	Foundation Wall	South	Light Grey	Cinderblock (Intact)	0.0
Basement Stairwell	B	Driveway Entry Door (Inner)	-	White	Metal (Intact)	0.0
Basement Stairwell	B	Driveway Entry Door (Inner)	-	White	Metal (Intact)	0.0
Basement Stairwell	B	Driveway Entry Door Molding (Inner)	-	White	Wood (Intact)	0.0
Basement Stairwell	B	Driveway Entry Door Jamb	-	White	Wood (Intact)	**0.04**
Basement Stairwell	B	Driveway Entry Door Molding (Outer)	-	White	Wood (Intact)	0.0
Basement Stairwell	**B**	**Driveway Entry Threshold**	**-**	**Grey**	**Concrete (Intact)**	**1.02**
Basement Stairwell	B	Stair Risers	-	Grey & White	Wood (Deteriorated)	**0.19**
Basement Stairwell	B	Attic Hatch	-	Grey	Wood (Intact)	**0.09**
Basement Stairwell	B	Attic Hatch Molding	-	Grey	Wood (Intact)	**0.07**
Basement Stairwell	B	Stair Landing under Carpet (Driveway Level)	-	Grey	Wood (Deteriorated)	**0.25**

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FREEMAN COMPANIES

Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm^2)
Basement Stairwell	B	Stair Landing (Basement Level)	-	Grey	Wood (Deteriorated)	**0.22**
Basement Stairwell	B	Stringer	-	Grey	Wood (Deteriorated)	**0.68**
Basement Stairwell	B	Stair Posts	-	Grey	Wood (Deteriorated)	**0.87**
Basement Lounge	B	Block Wall	West	Light Grey	Cinderblock (Intact)	0.0
Basement Lounge	B	Block Wall	North	Light Grey	Cinderblock (Intact)	0.0
Basement Laundry	B	Vertical Posts	-	Light Grey	Metal (Intact)	**0.72**
Basement Laundry	B	Horizontal Beam	Southeast	Beige	Wood (Intact)	0.0
Basement Lounge	B	West Closet Wall	West	White	Sheetrock (Intact)	0.0
Basement Lounge	B	West Closet Wall	South	White	Sheetrock (Intact)	0.0
Basement Lounge	B	West Closet Wall	North	White	Sheetrock (Intact)	0.0
Basement Lounge	B	West Closet Ceiling	-	White	Sheetrock (Intact)	0.0
Basement Lounge	B	West Closet Door	-	White	Wood (Intact)	0.0
Basement Play Rm	B	Wall	East	Pink	Sheetrock (Intact)	0.0
Basement Play Rm	B	Wall	West	Pink	Sheetrock (Intact)	0.0
Basement Play Rm	B	Wall	North	White	Sheetrock (Intact)	0.0
Basement Play Rm	B	Wall	South	White	Sheetrock (Intact)	0.0
Basement Play Rm	B	Door	North	Pink	Wood (Intact)	0.0
Basement Play Rm	B	Door	South	Pink	Wood (Intact)	0.0
Basement Play Rm	B	Ceiling	-	White	Sheetrock (Intact)	0.0
Basement Play Rm Closet	B	Wall	North	White	Sheetrock (Intact)	0.0
Basement Play Rm Closet	B	Wall	South	White	Sheetrock (Intact)	0.0
Basement Play Rm Closet	B	Wall	East	White	Sheetrock (Intact)	0.0
Basement Play Rm Closet	B	Wall	West	White	Sheetrock (Intact)	0.0
Basement Play Rm Closet	B	Ceiling	-	White	Sheetrock (Intact)	0.0
Basement Office	B	Wall	North	White	Sheetrock (Intact)	0.0
Basement Office	B	Wall	South	White	Sheetrock (Intact)	0.0
Basement Office	B	Wall	East	White	Sheetrock (Intact)	0.0
Basement Office	B	Wall	West	White	Sheetrock (Intact)	0.0
Basement Office	B	Ceiling	-	White	Sheetrock (Intact)	0.0

Room / Area	Floor	Component	Side	Paint Color	Substrate (Condition)	Results (mg/cm²)
Basement Office	B	Door (Inner)	-	White	Wood (Intact)	0.0
Basement Office	B	Door Molding	-	White	Wood (Intact)	0.0
Basement Office	B	Door Jamb	-	White	Wood (Intact)	0.0
Exterior	-	Foundation Walls	West	Peach	Concrete (Intact)	0.0
Exterior	-	Foundation Walls	South	Peach	Concrete (Intact)	0.0
Exterior	-	Foundation Walls	North	Light Blue	Concrete (Intact)	0.0
Exterior	**-**	**Basement Window**	**Northwest**	**White**	**Wood (Deteriorated)**	**3.67**
Exterior	**-**	**Basement Window**	**Northeast**	**White**	**Wood (Deteriorated)**	**4.47**
Exterior	**-**	**Basement Window**	**South**	**Peach**	**Wood (Deteriorated)**	**2.63**
Exterior	**-**	**Basement Window**	**East**	**Peach**	**Wood (Deteriorated)**	**3.36**
Exterior	-	Dining Room Window Frame	East	White	Wood (Deteriorated)	**0.87**
Exterior	-	Front Porch Rails	-	Red	Wood (Intact)	0.0
Exterior	-	Front Porch Stringer	-	Red	Wood (Intact)	0.0
Exterior	-	Front Porch Newel Post	-	Red	Wood (Intact)	0.0
Exterior	-	Front Porch Baluster	-	Red	Wood (Intact)	0.0
Exterior	-	Rear Deck Floor	-	Peach	Wood (Intact)	0.0
Exterior	-	Rear Deck Newel Posts	-	Peach	Wood (Intact)	0.0
Exterior	-	Rear Deck Rails	-	Peach	Wood (Intact)	0.0
Exterior	-	Rear Deck Stair Treads	-	Peach	Wood (Intact)	0.0
Exterior	-	Risers	-	Peach	Wood (Intact)	0.0
Exterior	-	Stringer	-	Peach	Wood (Intact)	0.0
Exterior	**-**	**Original Siding under Vinyl Siding**	**East**	**Red**	**Wood (Slightly Deteriorated)**	**1.66**

5.0 MOLD GROWTH

Freeman Companies LLC observed only mild mold growth residue. The visually impacted surfaces were swab sampled and analyzed via direct microscopic examination in order to determine mold type and relative concentration of the mold. The samples were labeled and delivered with a Chain of Custody to EMSL, which is located in Wallingford, CT. The samples were analyzed by direct examination optical microscopy for mold species identification and quantification. EMSL is an AIHA approved Laboratory.

Laboratory testing confirmed the presence of *Aspergillus/Penicilium, Zygomycetes, Cladosporium and Mucor* molds ranging from rare to high concentrations on surfaces. Hyphal or fruiting structures were also present indicating active mold colonies. These mold types along with the presence of hyphal structures,

indicates that continued mold growth is likely. Aspergillus/Penicillium type mold is often associated with buildings having water or moisture problems. Microbiological growth can produce offensive odors and can produce upper respiratory allergy-like symptoms if it is disturbed and the spores inhaled.

- Aspergillius / Penicillium are mold species that are often present in water that creates mycotoxins, and is a main contributor to the development of harmful bacteria. Continued exposure to this mold may also lead to bronchitis and pulmonary disease.
- Zygomycetes have been known to cause serious infections for diabetic and immuno-compromised individuals. These molds can also cause infections where major burns or other traumatic injuries might be located.
- Cladosporium is rarely infectious to humans, but has been reported to cause infections of the skin and toenails, as well as sinusitis and pulmonary infections.
- Mucor is a harmful mold that can adversely affect the respiratory system. Exposure to constant high levels of mucor can cause or worsen the symptoms of asthma. Other symptoms include elevated temperature, flu-like symptoms, malaise, and difficulty breathing. Constant exposure to the spores can be dangerous to those with weak immune systems.

REPORT LIMITATIONS CRITERIA

Information contained in this report is based on site observations, sample results relevant to the scope of work for this survey. Conclusions of this report are based on the survey, study, and/or investigation. This is not to be interpreted as a complete compilation of all existing information pertaining to the site conditions.

It should be noted that mold / fungal conditions observed during this investigation may change based on any number of influencing factors and/or environmental variables such as fluctuations in indoor and outdoor temperatures, humidity and seasonal changes in sunlight. These factors can influence the spread and concentration of molds as they change. This report is not intended to guarantee that the investigated site is, or is not, free from conditions, which could pose a threat or hazard to human health or safety. Should further research on the site be conducted, any additional data should be submitted to Freeman Companies for review and revisions as necessary.

This report is intended for the sole use of the Client, and may not be used or relied upon by others without the written consent of the Client. The scope of work conducted in performing this service for the Client may not be appropriate to satisfy the needs of other Parties, and the use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.

The criteria used to evaluate the survey results includes, but is not limited to, guidelines recommended by the:

- American Conference of Governmental Industrial; Hygienists (ACGIH);
- The American Society for Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE);
- The U.S. Environmental Protection Agency (EPA);
- The American Industrial Hygiene Association (AIHA);
- The American Indoor Air Quality Council (AIAQC);
- Indoor Environmental Standards Organization (IESO);

- The Institute of Inspection Cleaning and Restoration Certification (IICRC);
- The National Air Duct Cleaners Association (NADCA);

Any comments and/or questions in regards this report should be directed to Freeman Companies LLC.

6.0 RADON TESTING

Radon is an odorless, tasteless and invisible gas produced by the decay of naturally occurring uranium in soil and water. Radon is a form of ionizing radiation and a proven carcinogen. Lung cancer is the only known effect on human health from exposure to radon in air. Thus far, there is no evidence that children are at greater risk of lung cancer than are adults. EPA recommends homes be mitigated if the radon level is 4.0 pCi/L (picocuries per liter) or more. There is no known safe level of exposure to radon. Although the average of the two tests resulted in 2.8 pCi/L, EPA **strongly recommends** those with a reading of between 2 and 4 pCi/L in their homes to "consider fixing" via radon mitigation methods. Laboratory results are found in Appendix C.

Radon gas typically moves up through the ground to the air above and into a building through cracks and other holes in the foundation. Radon mitigation may involve sealing the routes of entry or installing sub-slab ventilation systems. The basement of the dwelling was sampled from January 29, 2015 to February 2, 2015.

Table 4 – Radon Summary Results – 1st Floor

Sample Number	Area	Sample Result
180871	Basement, Lounge Area (West)	2.5 pCi/L
180951	Basement, Lounge Area (West)	3 pCi/L
AVERAGE		**2.8 pCi/L**

A standard recommendation by the EPA to reduce Radon gas migration into homes is to caulk all joints and stress fractures or cracks in all slab and concrete foundations if radon concentrations are below 4.0 pCi/L.

This round of Radon testing indicates that the basement is below the EPA 4.0 pCi/L threshold

7.0 CONCLUSIONS and RECOMMENDATIONS

In accordance with the OSHA regulations (29 CFR Part 1926.1101 and 1910.1001), all potential contractors bidding on work **must first be informed** of the results of this survey.

All materials identified as negative for asbestos may be removed at will and disposed of as standard construction debris. In addition, notification regarding the presence of the ACM must be provided to all employees and tenants who occupy any areas containing ACM.

In accordance with EPA NESHAPS regulations (40 CFR Part 61), building owners must remove all ACM from a facility (or area of a facility) before any activity begins that would break up, dislodge, or similarly disturb the ACM.

FREEMAN COMPANIES

In the State of Connecticut, a licensed asbestos abatement contractor must perform all asbestos-related activities, including the renovation/demolition portion of the work that includes asbestos disturbance. Disturbance of asbestos-containing material can only be done by trained and licensed individuals. It should be noted that the State of Connecticut regulations governing asbestos abatement does not distinguish between friable and non-friable material. Therefore, full containment procedures are required for any interior abatement work (removal, encapsulation, or enclosure) involving both Category I and/or Category II non-friable asbestos-containing materials.

Asbestos-Containing Material	Quantity	Total Abatement Cost Estimate
Tar on Chimney / Vent Stack (Roof)	9 Square Feet	$1,000
Consulting Fees		$500
	TOTAL	**$1,500**

During any renovation or demolition process, safe work procedures must be implemented by properly (lead-paint) trained workers employed by contractors to address worker protection, lead exposure controls, waste stream management, and ambient air quality monitoring. Specifically, contractors will be required to comply with all applicable OSHA regulations including 29 CFR 1926.62, "Lead Exposure in Construction: Interim Final Rule" and 29 CFR 1926.59, "Hazard Communication for the Construction Industry". In addition, pre-disposal lead-waste testing requirements must be complied with.

Per the HUD and Connecticut regulations Toxic Levels of lead-paint (>1.0 mg/cm^2) were identified on the dwelling tested. Measurable levels of lead were detected on other painted surfaces. OSHA regulations prohibit dry scraping or sanding that may generate lead emissions. Freeman Companies LLC recommends wet sanding or the use of local exhaust ventilation with High Efficiency Particulate Air (HEPA) filtration during preparation procedures prior to repainting.

Lead-Painted Components	Approximate Quantity	Per unit abatement cost estimate	Total Abatement Cost
Original Siding	1,650 Square Feet	$7 / S.F.	$11,550
Basement Window Units	4	$100 each	$400
Consulting Fees			$2,390
		TOTAL	**$14,250**

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FREEMAN COMPANIES

Freeman Companies LLC recommends contracting a qualified mold remediation contractor to clean mold affected surfaces prior to renovations.

Mold Contaminated Components	Estimated Quantity	Per unit abatement cost estimate	Total Remediation Cost
Wall / Radiator Behind Toilet (Bathroom)	20 square feet	$8.00	$160
Cabinetry Under Kitchen Sink (Kitchen)	20 square feet	$8.00	$160
Wall Behind Fish Tank (Basement)	30 square feet	$8.00	$240
Wall Behind Washing Machine (Basement)	60 square feet	$8.00	$480
Consulting Fees			$500
		TOTAL	**$1,540**

FREEMAN COMPANIES

Appendix A

ACM Laboratory Results

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com wallingfordlab@emsl.com

EMSL Order:	241500405
CustomerID:	FREE42
CustomerPO:	
ProjectID:	

Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/02/15 12:45 PM
Analysis Date:	2/5/2015
Collected:	

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-1A *241500405-0001*	1st floor - plaster wall skim coat	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-1B *241500405-0002*	1st floor - plaster wall skim coat	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-1C *241500405-0003*	1st floor - plaster wall skim coat	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-2A *241500405-0004*	1st floor - plaster wall base coat	Gray/White Non-Fibrous Homogeneous		15% Quartz 85% Non-fibrous (other)	**None Detected**
012915-2B *241500405-0005*	1st floor - plaster wall base coat	Gray Non-Fibrous Homogeneous	2% Cellulose	20% Quartz 78% Non-fibrous (other)	**None Detected**
012915-2C *241500405-0006*	1st floor - plaster wall base coat	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-3A *241500405-0007*	Door to driveway - door frame caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-3B *241500405-0008*	Door to driveway - door frame caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)

Erin Guzowski (12) *Lauren Brennan (13)*
Kristin Lopez (27)

Gloria V. Oriol, Laboratory Manager
or other approved signatory

Initial report from 02/05/2015 18:53:48

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com wallingfordlab@emsl.com

EMSL Order:	241500405
CustomerID:	FREE42
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Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/02/15 12:45 PM
Analysis Date:	2/5/2015
Collected:	

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-3C *241500405-0009*	Door to driveway - door frame caulk	White Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
012915-4A *241500405-0010*	Kitchen - backsplash grout	White Non-Fibrous Homogeneous	<1%	Cellulose	100% Non-fibrous (other)	**None Detected**
012915-4B *241500405-0011*	Kitchen - backsplash grout	White Non-Fibrous Homogeneous	<1%	Cellulose	100% Non-fibrous (other)	**None Detected**
012915-4C *241500405-0012*	Kitchen - backsplash grout	White Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
012915-5A *241500405-0013*	Under original (red) exterior siding - tar paper	Black Fibrous Homogeneous	55%	Cellulose	45% Non-fibrous (other)	**None Detected**
012915-5B *241500405-0014*	Under original (red) exterior siding - tar paper	Black Fibrous Homogeneous	50%	Cellulose	50% Non-fibrous (other)	**None Detected**
012915-5C *241500405-0015*	Under original (red) exterior siding - tar paper	Black Fibrous Homogeneous	65%	Cellulose	35% Non-fibrous (other)	**None Detected**
012915-6A *241500405-0016*	Basement - sheetrock	White Non-Fibrous Homogeneous	<1%	Cellulose	100% Non-fibrous (other)	**None Detected**

Analyst(s)

Erin Guzowski (12) *Lauren Brennan (13)*
Kristin Lopez (27)

Gloria V. Oriol, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Wallingford, CT NVLAP Lab Code 200700-0,

Initial report from 02/05/2015 18:53:48

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
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EMSL Order: 241500405
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Phone: (860) 908-4499
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Analysis Date: 2/5/2015
Collected:

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-6B *241500405-0017*	Basement - sheetrock	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-6C *241500405-0018*	Basement - sheetrock	White Non-Fibrous Homogeneous	2% Cellulose <1% Glass	98% Non-fibrous (other)	**None Detected**
012915-7A *241500405-0019*	Basement - joint compound	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-7B *241500405-0020*	Basement - joint compound	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-7C *241500405-0021*	Basement - joint compound	White Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (other)	**None Detected**
012915-8A *241500405-0022*	Basement - 12x12 floor tile grout	White Non-Fibrous Homogeneous		30% Quartz 70% Non-fibrous (other)	**None Detected**
012915-8B *241500405-0023*	Basement - 12x12 floor tile grout	White Non-Fibrous Homogeneous		25% Quartz 75% Non-fibrous (other)	**None Detected**
012915-8C *241500405-0024*	Basement - 12x12 floor tile grout	Tan Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (other)	**None Detected**

Analyst(s)

Erin Guzowski (12) *Lauren Brennan (13)*
Kristin Lopez (27)

Gloria V. Oriol, Laboratory Manager
or other approved signatory

Initial report from 02/05/2015 18:53:48

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com wallingfordlab@emsl.com

EMSL Order:	241500405
CustomerID:	FREE42
CustomerPO:	
ProjectID:	

Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/02/15 12:45 PM
Analysis Date:	2/5/2015
Collected:	

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-9A *241500405-0025*	Basement - 12x12 floor tile mud-set	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-9B *241500405-0026*	Basement - 12x12 floor tile mud-set	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-9C *241500405-0027*	Basement - 12x12 floor tile mud-set	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-10A *241500405-0028*	Basement - block foundation wall patch coating	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-10B *241500405-0029*	Basement - block foundation wall patch coating	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-10C *241500405-0030*	Basement - block foundation wall patch coating	White Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (other)	**None Detected**
012915-11A *241500405-0031*	Attic - tar-backed paper on fiberglass batting	Black Fibrous Homogeneous	75% Cellulose	25% Non-fibrous (other)	**None Detected**
012915-11B *241500405-0032*	Attic - tar-backed paper on fiberglass batting	Black Fibrous Homogeneous	70% Cellulose	30% Non-fibrous (other)	**None Detected**

Analyst(s)

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Kristin Lopez (27)

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or other approved signatory

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EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com wallingfordlab@emsl.com

EMSL Order:	241500405
CustomerID:	FREE42
CustomerPO:	
ProjectID:	

Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/02/15 12:45 PM
Analysis Date:	2/5/2015
Collected:	

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-11C *241500405-0033*	Attic - tar-backed paper on fiberglass batting	Black Fibrous Homogeneous	70% Cellulose	30% Non-fibrous (other)	**None Detected**
012915-12A *241500405-0034*	Exterior (foundation) - l. blue texture coating	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-12B *241500405-0035*	Exterior (foundation) - l. blue texture coating	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-12C *241500405-0036*	Exterior (foundation) - l. blue texture coating	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-13A *241500405-0037*	Exterior (foundation) - basement window glazing	Tan Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-13B *241500405-0038*	Exterior (foundation) - basement window glazing	Tan Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-13C *241500405-0039*	Exterior (foundation) - basement window glazing	Tan Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-14A *241500405-0040*	Exterior windows - white window frame caulk (under aluminum)	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**

Analyst(s)

Erin Guzowski (12) *Lauren Brennan (13)*
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Gloria V. Oriol, Laboratory Manager
or other approved signatory

Initial report from 02/05/2015 18:53:48

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com wallingfordlab@emsl.com

EMSL Order:	241500405
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ProjectID:	

Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/02/15 12:45 PM
Analysis Date:	2/5/2015
Collected:	

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-14B *241500405-0041*	Exterior windows - white window frame caulk (under aluminum)	White Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
012915-14C *241500405-0042*	Exterior windows - white window frame caulk (under aluminum)	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
012915-15A *241500405-0043*	Roof - tar on chimney + vent stack	Black Non-Fibrous Homogeneous		93% Non-fibrous (other)	**7% Chrysotile**
012915-15B *241500405-0044*	Roof - tar on chimney + vent stack				**Stop Positive (Not Analyzed)**
012915-15C *241500405-0045*	Roof - tar on chimney + vent stack				**Stop Positive (Not Analyzed)**
012915-16A *241500405-0046*	Roof - light brown asphalt shingles	Black Fibrous Homogeneous	8% Glass	92% Non-fibrous (other)	**None Detected**
012915-16B *241500405-0047*	Roof - light brown asphalt shingles	Black Fibrous Homogeneous	8% Glass	92% Non-fibrous (other)	**None Detected**
012915-16C *241500405-0048*	Roof - light brown asphalt shingles	Black Fibrous Homogeneous	12% Glass	88% Non-fibrous (other)	**None Detected**

Analyst(s)

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Kristin Lopez (27)

Gloria V. Oriol, Laboratory Manager
or other approved signatory

Initial report from 02/05/2015 18:53:48

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4, Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com wallingfordlab@emsl.com

EMSL Order:	241500405
CustomerID:	FREE42
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ProjectID:	

Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/02/15 12:45 PM
Analysis Date:	2/5/2015
Collected:	

Project: **384 HENRY AVE, STRATFORD (AMAYA)**

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
012915-17A *241500405-0049*	Roof - light green asphalt shingles	Black Fibrous Homogeneous	10%	Glass	90% Non-fibrous (other)	**None Detected**
012915-17B *241500405-0050*	Roof - light green asphalt shingles	Black Fibrous Homogeneous	7%	Glass	93% Non-fibrous (other)	**None Detected**
012915-17C *241500405-0051*	Roof - light green asphalt shingles	Black Fibrous Homogeneous	14%	Glass	86% Non-fibrous (other)	**None Detected**
012915-18A *241500405-0052*	Roof - black felt paper under/7A-C	Black Fibrous Homogeneous	65%	Cellulose	35% Non-fibrous (other)	**None Detected**
012915-18B *241500405-0053*	Roof - black felt paper under/7A-C	Black Fibrous Homogeneous	60%	Cellulose	40% Non-fibrous (other)	**None Detected**
012915-18C *241500405-0054*	Roof - black felt paper under/7A-C	Black Fibrous Homogeneous	55%	Cellulose	45% Non-fibrous (other)	**None Detected**

Analyst(s)

Erin Guzowski (12) *Lauren Brennan (13)*
Kristin Lopez (27)

Gloria V. Oriol, Laboratory Manager
or other approved signatory

Initial report from 02/05/2015 18:53:48

THIS IS THE LAST PAGE OF THE REPORT.

OrderID: 241500405

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (*Lab Use Only*): 241500405

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

Company : FREEMAN COMPANIES, LLC (FREE42)	**EMSL-Bill to:** ☒ Same ☐ Different If Bill to is Different note instructions in Comments**
Street: 36 JOHN STREET	*Third Party Billing requires written authorization from third party*
City: HARTFORD **State/Province:** CT	**Zip/Postal Code:** 06106 **Country:** USA
Report To (Name): BRETT NICHOLAS	**Telephone #:** 860-908-4499
Email Address: BNICHOLAS@FREEMANCOS.COM	**Fax #:** **Purchase Order:**
Project Name/Number: 384 Henry Ave, Stratford (Amy)	**Please Provide Results:** ☐ Fax ☒ Email
U.S. State Samples Taken: CT	**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:** 1-29-15

Samplers Name: Brett Nicholas **Samplers Signature:**

Sample #	HA #	Sample Location	Material Description
012915-1A		1st Floor	Plaster Wall Skim Coat
" -1B		"	"
" -1C		"	"
" -2A		"	Plaster Wall Base Coat
" -2B		"	"
" -2C		"	"
" -3A		Door to Driveway	Door Frame Caulk
" -3B		"	"
" -3C		"	"

Client Sample # (s): 1A – 1C **Total # of Samples:** 54

Relinquished (Client): **Date:** 1-29-15 **Time:** FedEx

Received (Lab): **Date:** **Time:**

Comments/Special Instructions:

RECEIVED
FEB 01 2015
02 2/2/15
By 12:45pm
Iclet

OrderID: 241500405

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

241500405

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

Sample #	HA #	Sample Location	Material Description
012915-4A		Kitchen	Backsplash Grout
-4B		↓	↓
-4C		↓	↓
-5A		Under original (red) exterior siding	Tar Paper
-5B		↓	↓
-5C		↓	↓
-6A		Basement	Sheetrock
-6B		↓	↓
-6C		↓	↓
-7A		↓	Joint Compound
-7B		↓	↓
-7C		↓	↓
-8A		↓	12x12 Floor Tile Grout
-8B		↓	↓
-8C		↓	↓
-9A		↓	12x12 Floor Tile Mud-Set
-9B		↓	↓
-9C		↓	↓
-10A		↓	Block Foundation Wall Patch Coating
-10B		↓	↓
-10C		↓	↓
-11A		Attic	Tar-Backed Paper on Fiberglass Batting
-11B		↓	↓
-11C		↓	↓

***Comments/Special Instructions:**

RECEIVED
FEB 01 2015
By JD 12:45 pm

OrderID: 241500405

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

241500405

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

Sample #	HA #	Sample Location	Material Description
012915-12A		Exterior (Foundation)	L. Blue Texture Coating
12B		↓	↓
12C		↓	↓
13A		↓	Basement Window Glazing
13B		↓	↓
13C		↓	↓
14A		Exterior Windows	White Window Frame Caulk (under Aluminum)
14B		↓	↓
14C		↓	↓
15A		Roof	Tar on Chimney + Vent Stack
15B		↓	↓
15C		↓	↓
16A		↓	Light Brown Asphalt Shingles
16B		↓	↓
16C		↓	↓
17A		↓	Light Green Asphalt Shingles
17B		↓	↓
17C		↓	↓
18A		↓	Black Felt Paper under 17A-C
18B		↓	↓
18C		↓	↓

***Comments/Special Instructions:**

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FEB 01 2015
By JB 12:45pm
Fed Ex

FREEMAN COMPANIES

Appendix B

Mold / Fungal Laboratory Results

EMSL Analytical, Inc.
29 North Plains Highway, Unit # 4 Wallingford, CT 06492
Phone/Fax: 203-284-5948 / (203) 284-5978
http://www.EMSL.com / wallingfordlab@emsl.com

Order ID: 241500404
Customer ID: FREE42
Customer PO:
Project ID:

Attn: Brett Nicholas
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone: (860) 908-4499
Fax:
Collected: 01/29/2015
Received: 02/02/2015
Analyzed: 02/09/2015

Proj: 384 HENRY AVE, STRATFORD (AMAYA)

Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Swab Samples (EMSL Method: M041)

Lab Sample Number:	241500404-0001	241500404-0002	241500404-0003	241500404-0004	
Client Sample ID:	012915-M-1	012915-M-2	012915-M-3	012915-M-4	
Sample Location:	Bathroom- behind toilet	Kitchen- under kitchen sink	Basement- behind fish tank	Basement- behind washing machine	
Spore Types	Category	Category	Category	Category	
Agrocybe/Coprinus	-	-	-	-	
Alternaria	-	-	-	-	
Ascospores	-	-	-	-	
Aspergillus/Penicillium	*High*	*High*	*High*	*High*	
Basidiospores	-	-	-	-	
Bipolaris++	-	-	-	-	
Chaetomium	-	-	-	-	
Cladosporium	*High*	-	*Low*	-	
Curvularia	-	-	-	-	
Epicoccum	-	-	-	-	
Fusarium	-	-	-	-	
Ganoderma	-	-	-	-	
Myxomycetes++	-	-	-	-	
Paecilomyces	-	-	-	-	
Rust	-	-	-	-	
Scopulariopsis	-	-	-	-	
Stachybotrys	-	-	-	-	
Torula	-	-	-	-	
Ulocladium	-	-	-	-	
Unidentifiable Spores	-	-	-	-	
Zygomycetes	Low	-	Rare	-	
Mucor	-	-	-	*Medium*	
Fibrous Particulate	-	-	-	-	
Hyphal Fragment	Low	Low	Low	Medium	
Insect Fragment	-	-	-	-	
Pollen	-	-	-	-	

Sample Comment: 241500404-0001 Aspergillus conidiophores present in sample.

Category: Count/per area analyzed
Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

Bipolaris++ = Bipolaris/Dreschlera/Exserohilum Myxomycetes++ = Myxomycetes/Periconia/Smut
* = Sample contains fruiting structures and/or hyphae associated with the spores.

No discernable field blank was submitted with this group of samples.

Gloria V. Oriol, Laboratory Manager
or Other Approved Signatory

Initial report from: 02/09/2015 14:00:34

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

OrderID: 241500404

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 241500404

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX:(856) 786-0262

Company : FREEMAN COMPANIES LLC (FREE42)	**EMSL-Bill to:** ☒ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 36 JOHN STREET	
City: HARTFORD **State/Province:** CT	**Zip/Postal Code:** 06106 **Country:** USA
Report To (Name): BRETT NICHOLAS	**Telephone #:** 860-908-4499
Email Address: BNICHOLAS@FREEMANCOS.COM	**Fax #:** **Purchase Order:**
Project Name/Number: 384 Henry Ave, Stratford (Amaya)	**Please Provide Results:** ☐ Fax ☒ Email ☐ Fax
U.S. State Samples Taken: CT	**Connecticut Samples:** ☐ Commercial ☒ Residential

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hour | ☐ 6 Hour | ☐ 24 Hour | ☐ 48 Hour | ☐ 72 Hour | ☐ 96 Hour | ☒ 1 Week | ☐ 2 Week

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements*

Non Culturable Air Samples (Spore Traps) – Test Codes

• **M001** Air-O-Cell • **M049** BioSIS • **M030** Micro 5	• **M173** Allegro M2 • **M003** Burkard • **M174** MoldSnap	• **M004** Allergenco • **M043** Cyclex • **M176** Relle Smart	• **M032** Allergenco-D • **M002** Cyclex-d • **M130** Via-Cell	• **M172** Versa Trap

Other Microbiology Test Codes

• **M041** Fungal Direct Examination • **M005** Viable Fungi ID and Count • **M006** Viable Fungi ID and Count (Speciation) • **M007** Culturable Fungi • **M008** Culturable Fungi (Speciation) • **M009** Gram Stain Culturable Bacteria • **M010** Bacterial Count and ID – 3 Most Prominent • **M011** Bacterial Count and ID – 5 Most Prominent • **M013** Sewage Contamination in Buildings	• **M014** Endotoxin Analysis • **M015** Heterotrophic Plate Count • **M180** Real Time Q-PCR-ERMI 36 Panel • **M018** Total Coliform (Membrane Filtration) • **M020** Fecal *Streptococcus* (Membrane Filtration) • **M210-215** *Legionella* Detection • **M026** Recreational Water Screen • **M027** Mycotoxin Analysis	• **M029** *Enterococci* • **M019** Fecal Coliform • **M133** MRSA Analysis • **M028** *Cryptococcus neoformans* Detection • **M120** *Histoplasma capsulatum* Detection • **M033-39** Allergen Testing • **M044** Group Allergen (Cat, Dog, Cockroach, Dustmites) • **Other** See Analytical Price Guide

Preservation Method (Water):

Name of Sampler: **Signature of Sampler:**

Sample #	Sample Location	Sample Type	Test Code	~~Volume~~/Area	Date/Time Collected
Example: A1	Kitchen	Air	M001	75L	1/1/12 4:00 PM
012915-M-1	Bathroom - Behind Toilet	Swab	M041	Tile/wood work	1-29-15 @1400
-2	Kitchen - under kitchen sink	"	"	wall behind	"
-3	Basement - behind fish tank	"	"	wall behind	"
-4	Basement - behind washing machine	"	"	wall behind	"

Client Sample # (s): 1 - 4 **Total # of Samples:** 4

Relinquished (Client): **Date:** 1-29-15 **Time:** FedEx

Received (Client): **Date:** **Time:**

Comments:

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02 2/4/15
FEB 01 2015
By LB 12:45pm

FREEMAN COMPANIES

Appendix C

Radon-in-Air Laboratory Results

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0327
http://www.EMSL.com cinnaminsonradonlab@emsl.com

EMSL Order:	381500647
CustomerID:	FREE42
CustomerPO:	
ProjectID:	

Attn: **Brett Nicholas**
Freeman Companies, LLC
36 John St
Hartford, CT 06106

Phone:	(860) 908-4499
Fax:	
Received:	02/05/15 3:30 PM
Analysis Date:	2/6/2015
Collected:	1/29/2015

Project: **384 Henry Ave**

Test Site: **384 Henry Ave**
Hartford, CT 06106

Test Report: Radon in Air Test Results

Samples for EMSL Kit 106898

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
180871	Basement	2.5	1/29/2015	2/2/2015	68	20	Customer
381500647-0001			2:10:00 PM	9:55:00 AM			
Sample Notes:							
180951	Basement	3	1/29/2015	2/2/2015	68	20	Customer
381500647-0002			2:10:00 PM	9:55:00 AM			
Sample Notes:							

Summary for EMSL kit 106898 **Average Radon Result: 2.8 pCi/L**

The results indicate that both testing devices registered below the United States Environmental Protection Agency (EPA) action level of 4.0 picoCuries per liter of air (pCi/L). The EPA recommends fixing your home if the average of two short-term tests taken in the lowest lived-in level of the home show radon levels that are equal to or greater than 4.0pCi/L. The radon test was performed using a liquid scintillation radon detector/s and counted on a liquid scintillation counter using approved EPA testing protocols for Radon in Air testing.
The EPA recommends retesting your home every two years.

Please contact EMSL Analytical, Inc. or your State Health Department for further information.
All procedures used for generating this report are in complete accordance with the current EPA protocols for the analysis of Radon in Air.

Report Notes

Analyst(s)
Tiffanie Cosgrove (2)

Garrett A. Ray, Laboratory Manager
Certified Radon MeasurementSpecialist NRSB 5SS0093
NJ MES12264, FL R2001, NE 116, PA 2572

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from 02/09/2015 09:28:48

Please visit www.radontestinglab.com

OrderID: 381500647

381500647

RECEIVED
EMSL
CINNAMINSON, N.J.

2015 FEB -5 P 3:27

DOM: 9/2/14
EXP: 9/2/15 #1

FREE 42
5day

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
Tel: 800-220-3675 • Fax: 856-786-0327
www.radontestinglab.com

Radon In Air Data Sheet

Tear Here

Send Written Report To:

Name Britt Nicholas
Address 36 John St.
City Hartford State CT Zip 06106
Phone 860-908-4499 Fax
Email bnicholas@freemancos.com
Technician Name Britt Nicholas
Technician Certification #
Technician Signature

1ST RED VIAL # 180871
LOCATION

☒ Basement ☐ First Floor ☐ Bedroom ☐ Den
☐ Living Room ☐ Other
☐ Location in Room

2ND RED VIAL # 180951
(If Purchased)

The device has been scientifically tested to provide reliable indoor radon measurements when exposed to temperatures between 60 and 80 degrees F; temperatures outside this range will invalidate the test results.

Kit # 106898 (Outside of Box)

Property Tested:

Name
Address 384 Henry Ave
City Stratford
Municipality County
State CT Zip
☐ Check here if this is a Post Mitigation test.
Technician Name
Technician Certification #
Technician Signature

INDOOR CONDITIONS

Temperature 68 °F Humidity 20 %

EXPOSURE PERIOD

Beginning Date: 1 / 29 / 15
Time: 1410 AM / (PM) (Circle)

Ending Date: 2 / 2 / 15
Time: 0955 (AM) / PM (Circle)

The test device must remain open for 48 to 96 hours • Return this section with the test device to the laboratory

FREEMAN COMPANIES

Appendix D

Licenses and Accreditations

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
ASBESTOS CONSULTANT-PROJECT DESIGNER

BRETT M NICHOLAS

CERTIFICATE NO.
000308

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-928543

SIGNATURE

COMMISSIONER

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
ASBESTOS CONSULTANT-INSP/MGMT PLANNER

BRETT M NICHOLAS

CERTIFICATE NO.
000313

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-103346

SIGNATURE

COMMISSIONER

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
ASBESTOS CONSULTANT-INSPECTOR

BRETT M. NICHOLAS

CERTIFICATE NO.
000685

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-847351

SIGNATURE

COMMISSIONER

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
ASBESTOS CONSULTANT-PROJECT MONITOR

BRETT M. NICHOLAS

CERTIFICATE NO.
000582

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-847352

SIGNATURE

COMMISSIONER

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS LICENSED
BY THIS DEPARTMENT AS A
LEAD CONSULTANT CONTRACTOR

FREEMAN COMPANIES LLC

LICENSE NO.
002097

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-929200

SIGNATURE

COMMISSIONER

VOID VOID VOID

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
LEAD INSPECTOR

BRETT M NICHOLAS

CERTIFICATE NO.
002212

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-847350

SIGNATURE

COMMISSIONER

VOID VOID VOID

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
Lead Inspector Risk Assessor

BRETT M NICHOLAS

CERTIFICATION NO.
2255

CURRENT THROUGH
07/31/2015

VALIDATION NO.
DUPLICATE

SIGNATURE

COMMISSIONER

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200700-0

EMSL Analytical, Inc.

Wallingford, CT

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2015-01-01 through 2015-12-31

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMSL Analytical, Inc.
29 North Plains Highway, Unit 4
Wallingford, CT 06492
Ms. Gloria Oriol
Phone: 203-284-5948 Fax: 203-284-5978
E-Mail: goriol@emsl.com
URL: http://www.emsl.com

BULK ASBESTOS FIBER ANALYSIS (PLM) **NVLAP LAB CODE 200700-0**

NVLAP Code	*Designation / Description*
18/A01	EPA 600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

2015-01-01 through 2015-12-31
Effective dates

For the National Institute of Standards and Technology

State of Connecticut, Department of Public Health

Approved Environmental Laboratory

THIS IS TO CERTIFY THAT THE LABORATORY DESCRIBED BELOW HAS BEEN APPROVED BY THE STATE DEPARTMENT OF PUBLIC HEALTH PURSUANT TO APPLICABLE PROVISIONS OF THE PUBLIC HEALTH CODE AND GENERAL STATUTES OF CONNECTICUT, FOR MAKING THE EXAMINATIONS, DETERMINATIONS OR TESTS SPECIFIED BELOW WHICH HAVE BEEN AUTHORIZED IN WRITING BY THAT DEPARTMENT.

EMSL ANALYTICAL, INC. - CT

LOCATED AT **29 North Plains Highway, Unit #4** IN **Wallingford, CT 06492**

AND REGISTERED IN THE NAME OF **Gloria Oriol**

THIS CERTIFICATE IS ISSUED IN THE NAME OF **Gloria Oriol** WHO HAS BEEN DESIGNATED

BY THE REGISTERED OWNER/AUTHORIZED AGENT TO BE IN CHARGE OF THE LABORATORY WORK COVERED BY THIS CERTIFICATE OF APPROVAL AS FOLLOWS:

Drinking Water, Non-potable Water/Wastewater
Examination for:
Bacteria

ASBESTOS
Examination for:
Air – PCM, TEM Bulk Materials – PLM, TEM
Water - TEM

SEE COMPUTER PRINT-OUT FOR SPECIFIC TESTS APPROVED

THIS CERTIFICATE EXPIRES **September 30, 2015** AND IS REVOCABLE FOR CAUSE BY THE STATE DEPARTMENT OF PUBLIC HEALTH

DATED AT HARTFORD, CONNECTICUT, THIS **13th** DAY OF **September, 2013**

Registration No.

PH-0322

SUZANNE BLANCAFLOR, MS
CHIEF, ENVIRONMENTAL HEALTH SECTION

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION

ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM

CERTIFIED ANALYTES REPORT
FOR ALL MATRICES

EMSL Analytical, Inc. - CT

CT-APP-NUM : PH-0322

LOCATION

29 North Plains Highway
Unit #4
Wallingford CT 06492-

PHONE (203)-284-5948

REGISTERED OWNER/ AUTHORIZED AGENT Gloria Oriol
DIRECTOR Gloria Oriol
CO DIRECTOR(S)

APPROVED BY _____ DATE 09/13/2013 9:04:29 AM
DERMOT T. JONES

LABORATORY APPROVAL EXPIRATION DATE 09/30/2015
LABORATORY STATUS APPROVED

ANY QUESTIONS CONCERNING THIS DOCUMENT SHOULD BE ADDRESSED TO
THE ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM AT (860) 509-7389

DRINKING WATER (SDWA)

STATUS REPORTED ON 09/13/2013

SOC: REGULATED SYNTHETIC ORGANIC CHEMICAL WITH.MINIMUM MDL REQUIREMENTS

ANALYTE NAME

MICROBIOLOGY/BACTERIA

TOT. COLIFORM - MF mENDO (SM9222B)

TOT COLIFORM - COLILERT (SM9223 P/A)

E. COLI - COLILERT (SM9223 P/A)

HPC - POUR PLATE (SM9215B)

FECAL COLIFORM- EC Medium(SM9221E)

NON-POTABLE WATER/ WASTEWATER

STATUS REPORTED ON 09/13/2013

ANALYTE NAME
MICROBIOLOGY/BACTERIA
TOT. COLIFORM - MF mENDO (SM9222B)
FECAL COLIFORM - MF m-FC (SM9222D)
FECAL STREPT - MF mEnterococcus Agar (SM9230C)

AIR, BULK, & WATER

STATUS REPORTED ON 09/13/2013

ANALYTE NAME
ASBESTOS
ASBESTOS IN AIR (PCM & TEM)
ASBESTOS IN BULK MATERIALS (PLM & TEM)
ASBESTOS IN WATER (TEM)

END OF SECTION FOR EMSL Analytical, Inc. - CT

REPORT PROFILE

Report Printed on:	09/13/2013 9:04:29 AM	lab code = ID1306S4
Report Name:	APPROVED TESTS_ALT_NEW	test code = *
Printed by:	dermot	matrix code = *
Report published from:	CERTIFICATION REPORTS screen #3	matrix selection = ALL OR SOME MATRICES SELECTED
		certifications approved or provisional on 09/13/2013

THIS IS THE LAST PAGE OF THE REPORT

AIHA Laboratory Accreditation Programs, LLC

acknowledges that

EMSL Analytical, Inc.

29 North Plains Highway Unit # 4, Wallingford, CT 06492

Laboratory ID: 165118

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2005 international standard, *General Requirements for the Competence of Testing and Calibration Laboratories in* the following:

LABORATORY ACCREDITATION PROGRAMS

☐	**INDUSTRIAL HYGIENE**	Accreditation Expires:
☐	**ENVIRONMENTAL LEAD**	Accreditation Expires:
✓	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: 02/01/2016
☐	**FOOD**	Accreditation Expires:
☐	**UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached **Scope of Accreditation**. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2005 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached **Scope of Accreditation**. Please review the AIHA-LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Larry S. Pierce
Chairperson, Analytical Accreditation Board

Cheryl O. Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision 13: 03/12/2013

Date Issued: 09/30/2013

AIHA Laboratory Accreditation Programs, LLC
SCOPE OF ACCREDITATION

EMSL Analytical, Inc.
29 North Plains Highway Unit # 4, Wallingford, CT 06492

Laboratory ID: **165118**
Issue Date: 09/30/2013

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Environmental Microbiology Laboratory Accreditation Program (EMLAP)

Initial Accreditation Date: 06/01/2004

EMLAP Category	Field of Testing (FoT)	Method	Method Description *(for internal methods only)*
Fungal	Air - Culturable	M005 - Fungal Agar	Standard Operating Procedure for the Analysis of Bulk Speciments or Swabs for Fungi by Culture on Agar Plates and the Analysis of Fungi from Air samples collected on Agar Plates
	Bulk - Culturable	M005 - Fungal Agar	Standard Operating Procedure for the Analysis of Bulk Speciments or Swabs for Fungi by Culture on Agar Plates and the Analysis of Fungi from Air samples collected on Agar Plates
	Surface - Culturable	M005 - Fungal Agar	Standard Operating Procedure for the Analysis of Bulk Speciments or Swabs for Fungi by Culture on Agar Plates and the Analysis of Fungi from Air samples collected on Agar Plates
	Air - Direct Examination	05-TP-003.5	Standard Operating Procedure for the Analysis of Airborne Fungal Spores, Hyphal Fragments, Pollen, Insect Fragments, Skin Fragments and Fibrous Particulates by Optical Microscopy of Spore Trap Samples
	Bulk - Direct Examination	M041	Standard Operating Procedure for the Micoscopic examination of Fungal Spores, Fungal Structures, Hyphae, Pollen, Insect Fragments and Fibrous Material from Surface Samples
	Surface - Direct Examination	M041	Standard Operating Procedure for the Micoscopic examination of Fungal Spores, Fungal Structures, Hyphae, Pollen, Insect Fragments and Fibrous Material from Surface Samples

AIHA
Laboratory Accreditation Programs, LLC

EMLAP Category	Field of Testing (FoT)	Method	Method Description *(for internal methods only)*
Bacterial	Air - Culturable	M009	SOP for the Analysis of Bulk Specimens or Swabs for Bacteria by Culture on Agar Plates and the Analysis of Bacteria from Air Samples Collected on Agar Plates
	Bulk - Culturable	M009	SOP for the Analysis of Bulk Specimens or Swabs for Bacteria by Culture on Agar Plates and the Analysis of Bacteria from Air Samples Collected on Agar Plates
	Surface - Culturable	M009	SOP for the Analysis of Bulk Specimens or Swabs for Bacteria by Culture on Agar Plates and the Analysis of Bacteria from Air Samples Collected on Agar Plates

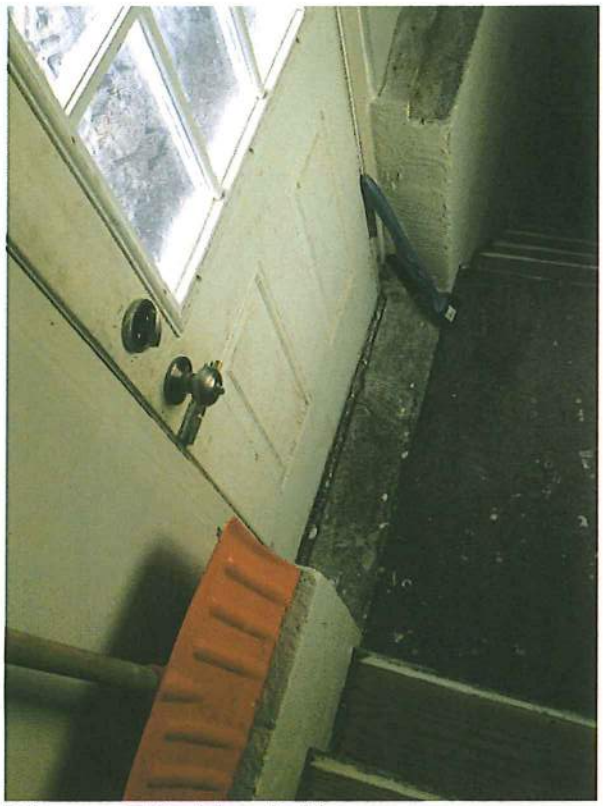
A complete listing of currently accredited Environmental Microbiology laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

FREEMAN COMPANIES

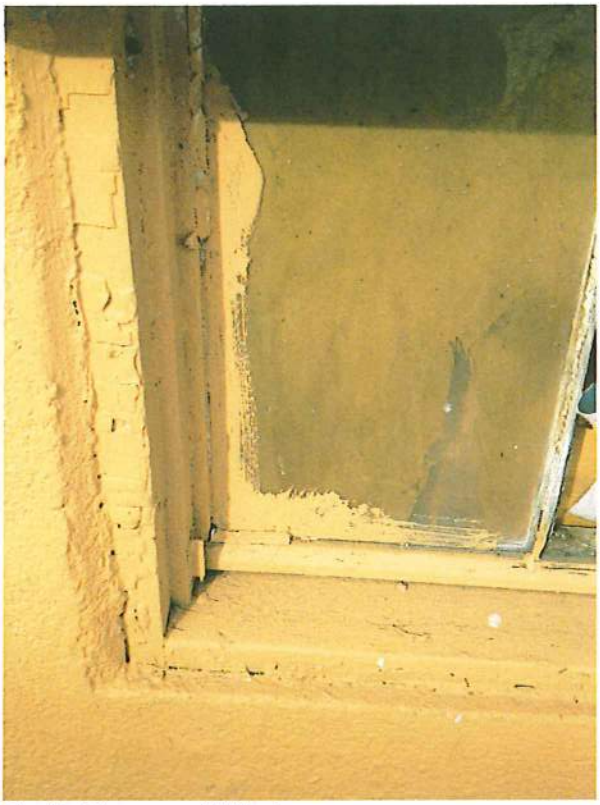
Appendix E

Site Photographs (January 29, 2015)

FREEMAN COMPANIES



Driveway Entry Threshold



South Basement Window

Typical North Basement Window

SECTION 01200 - EXAMINATION OF PREMISES AND ASSUMPTION OF RISKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 EXAMINATION OF PREMISES AND ASSUMPTION OF RISKS

A. The Contractor and the subcontractors shall carefully examine the site and all conditions that may be encountered in the performance thereof and shall assume all risks and bear all losses pertaining thereto. No claims for additional costs will be allowed because of a lack of full knowledge of the conditions.

B. All subcontractors shall carefully examine the conditions of the buildings and of the work done by others before beginning their work, and any condition therein that may be detrimental to their own installation shall be reported immediately in writing to the General Contractor, the Architect and the Owner.

C. Failure to make such report constitutes acceptance of the conditions then existing and the assumption of all risks and full responsibility for any subsequent damage, injury or loss either to the subcontractor's work or to the work of others. Any damage, injury or loss shall be made good by said Contractor.

D. All subcontractors shall carefully observe any changes in conditions prevailing upon starting their work, especially in temperature and humidity, both during and upon completing their work until final acceptance, which may be detrimental to their work.

E. Such changes in conditions shall be promptly reported to the General Contractor, the Architect and the Owner both verbally and in writing. The General Contractor shall immediately correct the condition reported. Failure of the General Contractor to correct the condition shall place responsibility for all damage incurred upon the General Contractor. Failure of the subcontractor to make such report shall constitute acceptance of responsibility for all damage, injury or loss including any damage, injury or loss of the work of others.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01200

SECTION 01210 – ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

B. See Division 01 Section 01400 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials selected by Architect and/or Owner under allowance and shall include taxes, freight, delivery to Project site, and installation (ready for use).

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Architect under allowance shall be included as part of the allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

None

END OF SECTION 01210

SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS

2.1 MANUFACTURES

A. See Manufacturer listed below

B. Substitutions will be considered.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

None

END OF SECTION 01230

SECTION 01240 - PROCEDURES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

A. The types of minimum requirements for procedures and performance or control work of a general nature include but are not limited to the following categories:

1. Coordination and meetings.
2. Surveys and records or reports.
3. Limitations for use of site.
4. Inspections, tests and reports.
5. General installation provisions.
6. Cutting and patching.
7. Cleaning and protection.
8. Conservation and salvage.

1.3 COORDINATION AND MEETINGS

A. General: Prepare and distribute to each entity performing work at project site, a written memorandum of instructions on required coordination activities, including required notices, reports and attendance at meetings. Prepare similar memorandum for separate contractors where interfacing of work is required.

1.4 LIMITATIONS FOR USE OF SITE

A. General: In addition to site utilization limitations and requirements shown on drawings, written instructions contained in these specifications, and indicated by other contract documents, administer allocation of available space equitably among entities needing access and space, so as to produce best overall efficiency in performance of total work of project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

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

B. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to extent these are more explicit and/or more stringent than requirements indicated in contract documents.

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

D. Provide attachment and connection devices and methods for securing work properly as it is installed; true to tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work organized for best possible visual effect. Refer questionable visual effect choices to architect for final decision.

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

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

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

3.2 CLEANING AND PROTECTION

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

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

C. Cleaning Materials and Equipment:

1. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
2. Use only the cleaning materials and equipment, which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the architect.

D. Progress Cleaning:

1. General:

a. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
b. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this work.
c. At least once each week, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
d. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
e. Clean areas outside of “fenced-in” work areas daily or more often as required to keep said areas clear of debris. This shall include, but not be limited to; blowing paper products, loose construction debris and discarded materials.

2. Site:

a. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
b. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site; restack, tidy, or otherwise service all arrangements.

3. Structures:

a. Daily, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage. Remove all such items to the place designated for their storage.
b. Daily, and more often if necessary, sweep all interior spaces clean. “Clean”, for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand held broom.
c. As required preparatory to installation of succeeding materials clean the structures of pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

4. Final Cleaning:

a. Definition: Except as otherwise specifically provided, “clean” (for the purposes of this article) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
b. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning.

1) Site: Unless otherwise specifically directed by the architect, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.
2) Structures:

a) Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the architect may require other cleaning at no additional cost to the owner.
b) Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.
c) Glass: Clean all glass inside and outside.
d) Polished Surfaces: To all surfaces requiring the routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.
e) Timing: Schedule final cleaning to enable the owner to accept a completely clean project.
f) If surfaces cannot be restored to like-new condition by cleaning, repaint or replace them as directed by the architect.

g) When workmen perform work after substantial completion, clean up immediately.

5. Cleaning During Occupancy: Since the Building Units are occupied, cleaning operations should be conducted in such a manner as to not cause damage to resident owned items.

END OF SECTION 01240

SECTION 01260 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on “Architect's Supplemental Instructions”.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within fourteen (14) days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect and Owner for their review.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section 01600 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
7. Credits listed on the Change Order Proposal must be listed and itemized separately from additional costs. Contractor shall submit back-up information to substantiate calculation of credit amounts as requested by the Architect or Owner.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, the General Contractor will issue a Proposed Change Order for signatures of Owner, Contractor and Architect on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: The Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01260

SECTION 01290 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

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

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
   1. Submit the Schedule of Values to Architect at earliest possible date but no later than seven (7) days before the date scheduled for submittal of initial applications for Payment.
   2. Sub-schedules: If required, where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
   3. The schedule of values cannot be changed or altered during the construction process, except as noted in Section 1.3.B.4.

B. Format and Content: Use the Exploded Trade Payment Breakdown as a guide to establish line items for the Schedule of Values.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.

   2. Stored Materials: Money will not be released for stored materials unless approved by the Architect and The Department of Housing prior to a request for payment. This applies to materials stored both on-site and off-site.
   3. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

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

APPLICATIONS FOR PAYMENT

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

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

E. MPI Standard Payment Application Forms: Requisition Forms for Contractor's Requisition, Change Order Requisition and Stored Materials Summary.

F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
   1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
   2. Amounts of Change Orders issued before last day of construction period covered by application shall be listed on the Change Order Requisition.

G. Transmittal: Submit five (5) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. All copies (except Application #1) shall include waivers of lien and similar attachments if required.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment (except Application #1), submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
   1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
   2. When an application shows completion of an item, submit final or full waivers.
   3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
   4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to The Department of Housing.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   1. List of subcontractors;
   2. Schedule of Values.
   3. Contractor's Construction Schedule (preliminary if not final).
   4. Schedule of unit prices.
   5. Submittals Schedule (preliminary if not final).

6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies.

J. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Evidence of completion of Project closeout requirements.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination Drawings.
2. Project meetings.
3. Requests for Interpretation (RFIs).

B. See Division 01 Section 01700 "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 DEFINITIONS

A. RFI: Request for Information - Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

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

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

1.5 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

   a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   b. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
3. Number of Copies: Submit five (5) opaque copies of each submittal. Architect will return a minimum of two (2) copies.
4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at the Project site on a weekly basis. A specific time and day of the week shall be set and agreeable to the Owner, Architect, Department of Housing and Contractor for weekly project meetings and will be conducted on site.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: The Architect will prepare the Meeting Minutes.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Department of Housing, Owner and Architect, but no later than fifteen (15) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Department of Housing, Owner, Architect, and their consultants; General Contractor and its superintendent; major subcontractors; 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.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Preparation of Record Documents.
    l. Use of the premises and existing buildings (Notification Required).
    m. Work restrictions.
    n. Owner's occupancy requirements.
    o. Responsibility for temporary facilities and controls.
    p. Construction waste management and recycling.
    q. Parking availability.
    r. Office, work, and storage areas.
    s. Equipment deliveries and priorities.
    t. First aid.
    u. Security.
    v. Progress cleaning.

w. Working hours.
x. Emergency numbers.

3. Minutes: Architect will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owner of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. The Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility problems.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written recommendations.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

5. 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.

6. Minutes: Contractor will record and distribute to Architect, and Owner, the meeting minutes.

7. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

    a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. General: Requests for Interpretations shall be as set forth in the Construction Contract and as outlined below.

2. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

C. Hard-Copy RFIs:

1. Identify each page of attachments with the RFI number and sequential page number.

D. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven (7) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for coordination information already indicated in the Contract Documents.
    d. Requests for adjustments in the Contract Time or the Contract Sum.
    e. Requests for interpretation of Architect's actions on submittals.
    f. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section 01250 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10) days of receipt of the RFI response.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Copies will be provided to Architect, and Owner. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

G. Copies of all RFI’s will be sent to the Owner. This will include the Architects response to the RFI.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01330 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. See Division 01 Section 01400 "Quality Requirements" for submitting test and inspection reports and for mockup requirements.

C. See Division 01 Section 01770 "Closeout Procedures" for submitting warranties.

D. See Division 01 Section 01782 "Operation and Maintenance Data" for submitting operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. 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.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. General Contractor Review: The General Contractor shall review and “sign-off” on all shop drawings before submission to Architect.

C. Submittals Schedule: The General Contractor shall establish a schedule for submission of the required Shop Drawings. Submit copies of the schedule to the Architect, and Owner at the weekly progress meetings.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow ten (10) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow ten (10) days for review of each resubmittal.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 6 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) 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).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked “Reviewed” or “Furnish as Corrected.”

J. Distribution: 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.

K. Use for Construction: Use only final submittals with mark indicating, “Reviewed” or “Furnish as Corrected” taken by Architect. Copies of all submittals, shop drawings, and samples accepted by Architect or “Furnish as Corrected” shall be kept on site and always available for Owner’s on-site review.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. 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.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.

c. Manufacturer's installation instructions.
d. Manufacturer's catalog cuts.
e. Wiring diagrams showing factory-installed wiring.
f. Printed performance curves.
g. Operational range diagrams.
h. Compliance with specified referenced standards.
i. Testing by recognized testing agency.

4. Number of Copies: Submit five (5) copies of Product Data, unless otherwise indicated. Architect will return two (2) copies to the Contractor; copies will be available for the Owner.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

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

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shop work manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Notation of coordination requirements.
j. Notation of dimensions established by field measurement.
k. Relationship to adjoining construction clearly indicated.
l. Seal and signature of professional engineer if specified.
m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. 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 40 inches.

D. Samples: Submit Samples 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.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.

c. Sample source.
d. Number and title of appropriate Specification Section.

3. 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.
4. 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.

   a. Number of Samples: Submit one (1) full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. After consultation with the Owner, Architect will return submittal with options selected.

5. 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.

   a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.

   1. Number of Copies: Submit five (5) copies of product schedule or list, unless otherwise indicated. Architect will return two (2) copies.

F. Submittals Schedule: The General Contractor shall establish a schedule for submission of the required Shop Drawings. Submit copies of the schedule to the Architect, and Owner at the weekly progress meetings.

G. Application for Payment: Comply with requirements specified in Division 01290 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01290 Section "Payment Procedures."

I. Subcontract 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.

   1. Number of Copies: Submit three (3) copies of subcontractor list, unless otherwise indicated. Architect will return two (2) copies.

J. Product Substitutions: Substitutions or alternate products will not be allowed unless written acceptance by Owner, and Architect is issued. Shop drawing submittal shall contain complete data for specified product and substitute products.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements specified in Division 01400 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01310 Section "Project Management and Coordination."

C. Contractor's Construction Schedule: The General Contractor shall submit a proposed construction schedule for the work outlined in these Specifications and in the Drawings.

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports (if required): Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of

material for compliance with requirements in the Contract Documents. Copies of these reports shall be distributed as follows:

1. Architect

2. Owner

3. Local Building Inspector

4. The Department of Housing

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency. Copies of these reports shall be distributed as indicated under section 2.2 J.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents. Copies of reports shall be sent by the testing agency directly to the Local Building Inspector, the Owner, the Architect, CHFA as well as to the Contractor and Engineers. Copies of these reports shall be distributed as indicated under section 2.2 J.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01782 Section "Operation and Maintenance Data."

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

S. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return them for resubmittal.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three (3) copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. “Reviewed”, “Rejected”, “Furnish as Corrected”, “Revise and Resubmit” or “ Submit Specified Item”.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

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

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. See other Divisions included in this Project Manual for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.

D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five (5) previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on re-testing and re-inspecting.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities that are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect and Owner seven (7) days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's and Owner’s approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

J. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections of this Project Manual.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least forty-eight (48) hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. When the Contractor is responsible for testing and inspections for quality control and as otherwise required by the Construction Contract, the Testing Agency employed by the Contractor shall submit copies of the results directly to the Architect, Owner, and the Building Department (as required). All results must be transmitted to the parties prior to the next requisition being approved.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section 01330 "Submittal Procedures."

D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Owner and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, Owner and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. The costs associated with re-testing and re-inspection of corrected work that is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with the Contract Document requirements for Division 01731 "Cutting and Patching."

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

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

END OF SECTION 01400

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 DEFINITIONS

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

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

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

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

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

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

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

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

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and

effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG Americans with Disabilities Act (ADA)
Architectural Barriers Act (ABA)

CFR Code of Federal Regulations

DOD Department of Defense Military Specifications and Standards

DSCC Defense Supply Center Columbus (See FS)

FED-STD Federal Standard (See FS)

FS Federal Specification

FTMS Federal Test Method Standard (See FS)

MILSPEC Military Specification and Standards

UFAS Uniform Federal Accessibility Standards

1.4 ABBREVIATIONS AND ACRONYMS

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

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in

the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The)
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	ACI International (American Concrete Institute)
ACPA	American Concrete Pipe Association
AGA	American Gas Association
AGC	Associated General Contractors of America (The)
AHA	American Hardboard Association (Now part of CPA)
AHAM	Association of Home Appliance Manufacturers
AI	Asphalt Institute
AIA	American Institute of Architects (The)
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standard Committee, Incorporated
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
APA	APA - The Engineered Wood Association
ARI	Air-Conditioning & Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers

ASME	ASME International
ASTM	ASTM International (American Society for Testing and Materials International)
AWCI	AWCI International (Association of the Wall and Ceiling Industry International)
AWCMA	American Window Covering Manufacturers Association (Now WCSC)
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
CCC	Carpet Cushion Council
CDA	Copper Development Association
CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPPA	Corrugated Polyethylene Pipe Association
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSI	Cast Stone Institute
CSI	Construction Specifications Institute (The)
CSSB	Cedar Shake & Shingle Bureau
DHI	Door and Hardware Institute
EIA	Electronic Industries Alliance
EIMA	EIFS Industry Members Association
FMG	FM Global (Formerly: FM - Factory Mutual System)

FMRC	Factory Mutual Research (Now FMG)
FSC	Forest Stewardship Council
GA	Gypsum Association
GANA	Glass Association of North America
HI	Hydronics Institute
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)
HPVA	Hardwood Plywood & Veneer Association
IEC	International Electrotechnical Commission
IESNA	Illuminating Engineering Society of North America
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Alliance
ISO	International Organization for Standardization
KCMA	Kitchen Cabinet Manufacturers Association
LPI	Lightning Protection Institute
MBMA	Metal Building Manufacturers Association
MFMA	Metal Framing Manufacturers Association
MPI	Master Painters Institute
NAAMM	National Association of Architectural Metal Manufacturers
NAIMA	North American Insulation Manufacturers Association
NCMA	National Concrete Masonry Association
NECA	National Electrical Contractors Association
NeLMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NFPA	NFPA (National Fire Protection Association)
NFRC	National Fenestration Rating Council

NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NLGA	National Lumber Grades Authority
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association)
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NWWDA	National Wood Window and Door Association (Now WDMA)
PCI	Precast/Prestressed Concrete Institute
PDCA	Painting & Decorating Contractors of America
PDI	Plumbing & Drainage Institute
PGI	PVC Geomembrane Institute
RFCI	Resilient Floor Covering Institute
SAE	SAE International
SDI	Steel Deck Institute
SDI	Steel Door Institute
SGCC	Safety Glazing Certification Council
SIA	Security Industry Association
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPIB	Southern Pine Inspection Bureau (The)
SPRI	Single Ply Roofing Industry
SSINA	Specialty Steel Industry of North America

SSPC	SSPC: The Society for Protective Coatings
STI	Steel Tank Institute
SWI	Steel Window Institute
SWRI	Sealant, Waterproofing, & Restoration Institute
TCA	Tile Council of America, Inc.
TMS	The Masonry Society
TPI	Truss Plate Institute, Inc.
UL	Underwriters Laboratories Inc.
WASTEC	Waste Equipment Technology Association
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association (Now WCSC)
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association)
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California)
WIC	Woodwork Institute of California (Now WI)
WMMPA	Wood Moulding & Millwork Producers Association
WWPA	Western Wood Products Association

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	BOCA International, Inc. (See ICC)
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials (See ICC)
ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)
ICC	International Code Council, Inc.

ICC-ES ICC Evaluation Service, Inc.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers
CPSC	Consumer Product Safety Commission
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOH	Department of Housing
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDA	Food and Drug Administration
GSA	General Services Administration
HUD	Department of Housing and Urban Development
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health Administration
PBS	Public Building Service (See GSA)
PHS	Office of Public Health and Science
SD	State Department
USDA	Department of Agriculture
USPS	Postal Service

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. See Divisions 02 through 16 sections for temporary heat, ventilation and humidity requirements for products in those sections.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities (required to complete contract work) shall be included in the Contract Sum, where services are not available at the site. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

B. Electric Service: Temporary electric service may be required. All costs for temporary electric will be borne by the General Contractor.

C. Heating Service: Temporary heating may be required depending on the timetable for the construction work being proposed. All costs for the temporary heating will be borne by the General Contractor.

1.4 QUALITY ASSURANCE

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

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

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: The General Contractor shall assume responsibility for operation, maintenance, and protection of each permanent service

during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. Protection of existing pavement. Where existing pavement areas are used for staging of materials, field office trailers, storage containers or trash receptacles – the pavement shall be protected from damage.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 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 or galvanized steel bases for supporting posts.

2.2 TEMPORARY FACILITIES

A. Field Offices (Trailer), General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated, with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate temporary facilities as coordinated with Owner and to suit the site conditions. Relocate and modify facilities as required by progress of the Work.

B. 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.

3.2 TEMPORARY UTILITY INSTALLATION

A. Electric: Install temporary service to Trailer.

1. Arrange with Utility Company for temporary electric services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install temporary service for construction purposes.

D. Sanitary Facilities: The General Contractor shall provide temporary toilet facilities for use by all construction personnel.

E. Ventilation and Humidity Control: Provide temporary ventilation if required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
1. Maintain support facilities until project has been completed.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site elements scheduled to remain including landscaped areas, planting, curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Park construction vehicles in such a way as to not block normal traffic patterns, emergency vehicles or surrounding neighbors.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations (if required).

E. Waste Disposal Facilities: The General Contractor will be responsible for providing waste-collection containers in sizes adequate to handle waste from construction

operations. Waste-disposal containers should be promptly removed from the project site when full.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. All contractors, subcontractors, or utility company representatives shall comply with the following.

1. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

2. Temporary Erosion and Sedimentation Control: 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.

3. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

4. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

5. Security Enclosure and Lockup: The General Contractor shall take any necessary precautions to prevent vandalism, theft, or similar violations of security to the Contractors property or materials stored at the project site. The Owner is not responsible for vandalism, theft, or similar violations of security to the Contractors property or materials.

6. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

7. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

8. Use of Public Sidewalks and Streets: All of the roadways serving the individual buildings are public. Contact City officials for rules and assistance on use of City streets and/or sidewalks for scaffolding, deliveries, parking, etc.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

B. Maintenance: Maintain facilities in good operating condition until removal.

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

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until project has been completed.

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

1. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division Section 01770 "Closeout Procedures."

END OF SECTION 01500

SECTION 01524 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. See Division 01 Section “Selective Structure Demolition” for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

C. See Division 02 Section “Structure Demolition” for disposition of waste resulting from demolition of buildings, structures, and site improvements.

D. See Division 2 Section “Site Clearing” for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

E. See Division 4 Section “Unit Masonry” for disposal requirements for masonry waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 PERFORMANCE GOALS

A. General: Develop waste management plan that results in end-of-project rates for salvage/recycling of 50 percent by weight of total waste generated by the Work.

B. Salvage/Recycle Goals: Owner's goal is to salvage and recycle as much nonhazardous demolition and construction waste as possible.

1.4 SUBMITTALS

A. Waste Management Plan: Submit three (3) copies of plan within 30 days of date established for commencement of the Work.

B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit three (3) copies of report. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons (tonnes).
4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Waste Reduction Calculations: Before request for Substantial Completion, submit three (3) copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

E. Record of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

H. Qualification Data: For Waste Management Coordinator.

1.5 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include list of their names, addresses, and telephone numbers.
5. Disposed materials: Indicate how and where materials will be disposed of. Include list of their names, addresses, and telephone numbers of each landfill and incinerator facility.
6. 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.

D. Forms: Prepare waste management plan on forms included at end of Part 3.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Architect and Owner. Provide handling, containers, storage, signage, transportation, and other items as

required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Division 01 Section “Temporary Facilities and Controls” for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvage items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Donation: Not permitted on Project site.

C. Salvaged Items for Owner’s Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner’s storage area off-site.
5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

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

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

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

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

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

3.4 RECYCLING DEMOLITION WASTE

A. Asphaltic Concrete Paving: Grind asphalt to maximum 1-1/2-inch (38-mm) size.

B. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 1-1/2-inch (38-mm) size.

D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum ¾-inch (19-mm) size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

F. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

H. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

1. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.

J. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

K. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

L. Plumbing Fixtures: Separate by type and size.

M. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

N. Lighting Fixtures: Separate lamps by type and protect form breakage.

O. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

P. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystryrene Packaging" Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees at landfill facility.

C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Transport waste materials and dispose of at designated spoil areas on Owner's property.

E. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01524

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. See other Divisions included in this Project Manual for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. 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.

1. 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.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, 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.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, 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.

1.4 SUBMITTALS

A. Substitution Requests: Submit seven copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

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

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

    a. Form of Acceptance: Change Order.
    b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Division Section 01330 "Submittal Procedures."
    b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division Section 01330 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. 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.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

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

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

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

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to other Divisions of this Project Manual for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section 01770 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. 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.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. 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.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with the requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. 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 2 "Product Substitutions" Article for consideration of an unnamed product or system.

8. 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 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 30-days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.

4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

SECTION 01700 – EXECUTION REQUIREMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. General installation of products.
   2. Progress cleaning.
   3. Starting and adjusting.
   4. Protection of installed construction.
   5. Correction of the Work.

B. See Division Section 01770 "Closeout Procedures" for submitting final Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

B. Existing Utilities: 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.

1. 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.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

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

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

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

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

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

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

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect promptly.

3.4 FIELD ENGINEERING

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

3.5 INSTALLATION

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

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

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

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

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

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

F. 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.

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

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. 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.

H. 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.

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

3.6 PROGRESS CLEANING

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

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

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

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

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

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

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

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

G. 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.

H. 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.

I. 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.

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

3.7 STARTING AND ADJUSTING

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

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

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

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section 01400 "Quality Requirements."

E. Perform all starting and adjusting of equipment per Manufacturer’s written specifications. If required, work in conjunction with Manufacturer of equipment to ensure proper operation.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

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

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

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section 01731 "Cutting and Patching."

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

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

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

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

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

END OF SECTION 01700

SECTION 01731 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. See other Divisions of this Project Manual for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 SUBMITTALS

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

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

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

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. 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.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

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

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. 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.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

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

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

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

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

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

END OF SECTION 01731

SECTION 01732 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building interiors.
2. Demolition and removal of existing selected site elements.

B. Related Sections include the following:
1. Division 01 Section “Summary of Work” for use of premises and Owner-occupancy requirements.

1.3 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 Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

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

D. 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.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREDEMOLITION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.
   6. Review items to be removed and reinstalled, and items to be removed and salvaged.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For demolition firm and professional engineer.

B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Use of elevator and stairs.
   5. Locations of proposed dust- and noise-control temporary partitions and means of egress.
   6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
   7. Means of protection for items to remain and items in path of waste removal from building.
   8. Items to be removed and reinstalled and items to be removed and salvaged.

D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition, if applicable.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes, if any, by a landfill facility licensed to accept hazardous wastes, if applicable.

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

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

1.9 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
   1. Comply with requirements specified in Division 01 Section "Summary".

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

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

D. Hazardous Materials: See Hazardous Building Material Survey. The General Contractor is responsible for Removal of Hazardous Materials.

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

F. Utility Service: Protect existing utilities indicated to remain in service and protect them against damage during selective demolition operations. Refer to Division 01 Section "Summary of Work" for additional requirements.

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

PART 2 - PRODUCTS (Not Used)

2.1 PERFORMANCE REQUIREMENTS

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

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected or capped.

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

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. 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 and Owner.

E. 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.

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

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
1. Comply with requirements specified in Division 01 Section “Photographic Documentation”.
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
3. 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.

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.

1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section “Summary of Work”

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. All utility shutdowns shall occur only during the hours as pre-approved by the Owner.
2. Prior to the start of each Work Phase, submit to the Owner and Architect an anticipated schedule of anticipated utility shutdowns.
3. Do not proceed with utility interruptions without Owner's written permission.

C. 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.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. 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. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Summary of Work".

C. 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

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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. 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.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. 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.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. 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 DOMPLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish is small sections. Cut concrete to a depth of at least ¾ inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement as 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. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings". Do not use methods requiring solvent-based adhesive strippers.

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

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, 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.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Existing Items to Be Removed: Refer to Demolition Plans for Extent of Demolition Work.

END OF SECTION 01732

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

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

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. See Division 01 Section 01290 "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

C. See Division 01 Section 01782 "Operation and Maintenance Data" for operation and maintenance manual requirements.

D. See other Divisions of this Project Manual for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents (As-Built Drawings), operation and maintenance manuals and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Complete startup testing of systems.
8. Submit test/adjust/balance records.
9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements, including touchup painting.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section 01290 "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty (if required).
5. Instruct Owner in operation, adjustment, and maintenance of products, equipment, and systems.

B. Final Completion cannot be achieved until the following criteria have been met, in order as they are listed.

1. Architect does a complete Punch List (PL).
2. Architects Punch List is 100% completed by the GC.
3. Final Cleaning has occurred. (Several stages of cleaning generally need to occur prior to “final”).

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three (3) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.6 WARRANTIES

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

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

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
f. Remove debris and surface dust from limited access spaces.
g. Sweep concrete floors broom clean.
h. Vacuum carpets where debris has been tacked into a unit and similar soft surfaces, removing debris; shampoo if visible soil or stains are present after vacuuming.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

l. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Replace parts subject to unusual operating conditions.

n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

D. Occupied Units: All units will be occupied during final cleaning. Care should be taken to protect the occupants belongings during the cleaning process.

END OF SECTION 01770

SECTION 01782 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Emergency manuals.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, systems and equipment.

B. See other Divisions of this Project Manual for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 SUBMITTALS (FOR NEWLY INSTALLED EQUIPMENT)

A. Maintenance Manual: Submit three (3) copies of maintenance manual in final form for each major piece of equipment installed. All required maintenance manuals should be bound in three-ring binders.

B. Operation Manual: Submit three (3) copies of operation manual in final form for each major piece of equipment installed. All required operation manuals should be bound in three-ring binders.

C. Submission: Maintenance and Operation Manuals should be submitted in Binders. Maintenance/operation manuals should be submitted to Architect for distribution to Owner.

D. Operation Procedures: Provide on-site training for all equipment installed to the Owner. Training should cover, but not be limited to; normal operations of equipment, routine maintenance of equipment and emergency system shut-down or start-up procedures.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

A. 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. Each manual shall contain a title page, table of contents, and manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. 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.

D. Manual Contents: 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.

1. 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.

    a. 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.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab 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.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

b. 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.

2.2 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify by color-coding where required for identification.

2.3 PRODUCT MAINTENANCE MANUAL

A. 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.

B. Source Information: List each product included in the 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.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.

3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. 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.

B. Source Information: List each system, subsystem, and piece of equipment included in the 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.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:

D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions that detail essential maintenance procedures:

E. 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.

F. 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.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. 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.

E. Drawings (if required): 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.

   1. Do not use original Project Record Documents as part of operation and maintenance manuals.

F. Comply with Division 01 Section 01770 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01782

SECTION 01783 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

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

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. See Division 01 Section 01782 "Operation and Maintenance Data" for operation and maintenance manual requirements.

C. See other Divisions of this Project Manual for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit three (3) sets of marked-up Record Prints.
2. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal: Submit three (3) sets of marked-up Record Prints. Architect will return prints for organizing into sets, printing, binding, and final submittal.
b. Final Submittal: Submit three (3) sets of marked-up Record Prints, and the following:

1) Copies printed from Record. Print each Drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit three (3) of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit three (3) of each Product Data submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

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

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

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. 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.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location. Architect and Contractor to agree on color coding in advance.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
5. Include all issued SK-Drawings.

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

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

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

2.2 RECORD SPECIFICATIONS

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

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

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

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

END OF SECTION 01783

SECTION 02220 - FINISH GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 DESCRIPTION

A. Provide all labor, materials, equipment, services, and transportation required to “Re-Instate” the Site to original conditions (including, but not limited to topsoil, walkways, gravel driveways and bituminous pavement). Stripped topsoil shall be re-spread to existing finish grade elevations and seeded.

1.3 PROJECT/SITE CONDITIONS

A. Dust Nuisance: Assume full responsibility for alleviation or prevention of dust as a result of grading and general site work.

1.4 SUBMITTALS

A. Submit under provisions of Division 1-Submittal.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. At Contractor’s option, but equipment must be sufficient to properly grade or re-grade the site.

2.2 TOPSOIL

A. Topsoil shall match existing material or as follows:

B. Topsoil shall be friable and loamy with high organic content. It shall be free of debris, rocks larger than 1’ and roots. Topsoil shall have at least 11/5 percent by weight of fine textured stable organic material and no greater than 6 percent. Topsoil shall not have less than 20 percent fine textured material (passing the No. 200 sieve) and not more than 15 percent clay. PH range shall be 6.0 – 7.5 and soluble salts shall not exceed 500 ppm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that stumps, obstructions, shrubs, trees, debris and other vegetation to be removed have been completed prior to commencement of finish grading and that the subsoil is adequately prepared.

3.2 INSTALLATION

A. Finished Paved Area Grading:

1. Provide finish grading as shown on the Drawings, to match existing or be similar to existing and as specified within this section.
2. Provide all grades for positive runoff of water without low spots or pockets. Accurately set flow line grades a 2 percent minimum gradient unless otherwise noted on the Drawings.

B. Miscellaneous items and materials such as, but not limited to, area drains, catch basins; manholes, site lighting, walks, curbs and paved surfaces shall relate to the adjacent finish grade surfaces as shown on the drawings.

C. Finish Landscape Grading:

1. Provide all grading as shown on the Drawings and as specified.
2. Grade away from building walls at 2% minimum (typical) unless otherwise noted on the drawings.
3. Earth slopes shall be no steeper than 2:1 (horizontal or vertical).
4. Provide all grades for natural runoff of water without low spots or pockets. Accurately set flow line grades at 2 percent minimum gradient unless otherwise noted on the Drawings.
5. Finish grade all mulch areas, plant beds, and lawn areas by hand raking. Finish grades shall be smooth, even and on a uniform plane with no abrupt changes of surface. Slope uniformly between given spot elevations, unless otherwise shown on the Drawings.
6. Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs, catch basins, are drains or manholes.
7. Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.
8. The final finish grading will be done on site by the Contractor.

9. The Contractor shall have on site at the time of the grading review, sufficient manpower, earth and equipment available to do the work resulting from the review.
10. Fill or Topsoil shall not be placed nor compacted while in a frozen or muddy condition or while subgrade is frozen.
11. After the areas to be topsoiled have been brought to grade, the subgrade shall be loosened by scarifying to a depth of at least 2” to ensure bonding of the topsoil and subsoil.

D. Tolerances:

1. All planting areas, including lawn areas, shall be true to grade, within 1 in. when tested with a 10ft. straightedge.
2. Hold finished grades of topsoil below top of adjacent pavement, curbs, or walls follows:

    a. Seeded Areas: 1 inch.

END OF SECTION 02210

SECTION 06100 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Engineered Wood Products.
4. Wood blocking, cants, and nailers.
5. Wood furring.
6. Sheathing.
7. Building wrap.

B. Related sections include the following:
1. Division 6 Section 06106 Sheathing

1.3 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Exposed Framing: Dimension lumber not concealed by other construction.

C. Engineered Wood Products: Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D2559.

D. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA – Northeastern Lumber Manufacturers Association.
2. NLGA – National Lumber Grades Authority.
3. RIS – Redwood Inspection Service.
4. SPIB – Southern Pine Inspection Bureau.
5. WCLIB – West Coast Lumber Inspection Bureau.
6. WWPA – Western Wood Products Association.

7. APA – American Plywood Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacture's written instructions for handling, storing, installing, and finishing treated material.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

1. Preservative-treated wood.
2. Engineered wood products.
3. Power-driven fasteners.
4. Expansion anchors.
5. Metal framing anchors.
6. Building wrap.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's Fire Resistance Directory.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metal Framing Anchors
   a. Alpine Engineered Products, Inc.
   b. Simpson Strong-Tie Company, Inc.
   c. United Steel Products Company, Inc.

2.2 WOOD PRODUCT, 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 a stained or natural finish, mark grade stamp on end or 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” thickness or less, unless otherwise indicated.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that 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).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and the following:
   a. Chromated copper arsenate (CCA).
   b. Ammoniacal copper zinc arsenate (ACZA).

2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat all rough carpentry, unless otherwise noted.

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping and similar members in connections 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 member less than 18 inches above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.
5. Use Interior Type A High Temperature (HT), unless otherwise indicated.

E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

2.4 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 and any of the following species:

1. Mixed southern pine; SPIB.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

C. Exterior and Load-Bearing Walls Construction grade and any of the following species:

1. Douglas fir-south; WWPA.
2. Douglas fir-larch (north); NLGA.
3. Hem-fir; WCLIB or WWPA.
4. Hem-fir (north); NLGA
5. Southern pine; SPIB.

2.5 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Cants.
3. Nailers.
4. Furring.
5. Grounds.

B. For items of dimension lumber size, provide Standard grade lumber with 19 percent maximum moisture content and any of the following species:

1. Mixed southern pine; SPIB.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

C. For exposed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Eastern white pine, Idaho white, lodge pole, ponderosa, or sugar pine; D Select Quality.
2. Mixed southern pine, B&B; SPIB.

D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No.2 grade; SPIB.
2. Hem-fir or Hem-fir (north).

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 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 hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B 18.2.1.

G. Bolts: Steel bolts complying with ASTM A 307, Grade A hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.7 METAL FRAMING ANCHORS

A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, as specified on drawings. However, if not specified, anchors shall be as follows:

1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

C. Joist Hangers: U-shaped joist hangers sizes as indicated on drawings.

D. I-Joist Hangers: U-shaped joist hangers sizes as indicated on drawings.

E. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member. Sizes as indicated on drawings

F. Bridging: Rigid, V-section, nailless type, 0.062 inch thick, length to suit joist size and spacing. Sizes as indicated on drawings.

G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch minimum side cover. Sizes as indicated on drawings.

H. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports. Sizes as indicated on drawings.

I. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below. Tie fastens to side of rafter or truss, face of top plates, and side of stud below. Sizes as indicated on drawings.

J. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs. Sizes as indicated on drawings.

K. Wall Bracing: Angle bracing made for letting into studs in saw kerf. Sizes as indicated on drawings.

L. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base. Sizes as indicated on drawings.

2.8 MISCELLANEOUS MATERIALS

A. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I. See Section 07270 Air Barrier.

B. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

C. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

D. 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.

E. Sill-Sealer Gaskets: Closed-cell neoprene foam, ¼ inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

F. Water-Repellent Preservative: NWWDA- tested and –accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

G. Adhesive Anchoring System: Two-part epoxy adhesive used to fasten anchor rods to hardened concrete.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. "HIT RE 500 Epoxy Adhesive Anchor"; Hilti Corporation
   b. "SET High Strength Epoxy"; Simpson Strong-tie Company.

H. Sleeve Anchors for attachment to Concrete Masonry: Mechanical expansion bolts consisting of an externally threaded stud with a full-length expanding sleeve; zinc plated in accordance with ASTM B633, meeting the requirements of Federal Specification FF-S-325, Group II, Type 3, Class 3. Sleeve anchor diameter as indicated.

1. Products: Subject to compliance with requirements, provide one of the following;
   a. "HLC Sleeve Anchor"; Hilti Corporation
   b. "Power Bolt"; Powers/Rawl

I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Za 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for

accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. Table 2305.2,"Fastening Schedule," in the BOCA National Building Code.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicted. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

B. Furring to Receive Strand Board or Hardboard Paneling: Install 1-by3-inch nominal-size furring horizontally and vertically at 24 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- size furring vertically at 16 inches o.c.

3.4 WOOD FRAMING INSTALLATION, GENERAL

A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Do not splice structural members between supports.

D. Where built-up beams or girders of 2-inch nominal-dimension lumber on edge are required, fasten together with 2 rows of 20d nails spaced not less than 32 inches o.c. Locate one row near top edge and other near bottom edge.

1. For continuous members, stagger end joints at quarter points between supports.

3.5 WALL AND PARTITION FRAMING INSTALLATION

A. General: Arrange studs so wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Anchor or nail plates to supporting construction, unless otherwise indicated.

1. For exterior walls, provide 2-By nominal size wood studs spaced 16 inches on center.
   a. Size as indicated on drawings.

2. For interior partitions and walls, provide 2-by-4-inch nominal- size wood studs spaced 16 inches on center, unless otherwise indicated.

B. Construct corners and intersections with three or more studs. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.

C. Fire block concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where fire blocking is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal-thick lumber of same width as framing members.

D. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
2. For load-bearing walls, provide double-jamb studs for openings 72 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

E. Provide bracing in exterior walls, at both walls of each external corner, full-story height, unless otherwise indicated on drawings.

F. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:

1. Diagonal bracing at 45-degree angle using let-in 1-by-4-inch nominal size boards.
2. Diagonal bracing at 45-degree angle using metal bracing.
3. Oriented-strand-board panels not less than 48 by 96 inches applied vertically
4. Particleboard sheathing panels not less than 48 by 96 inches applied vertically.
5. In lieu of bracing at corners or at locations indicated, continuous gypsum sheathing may be provided in panels not less than 48 by 96 inches applied vertically.
6. In lieu of bracing at corners or at locations indicated, continuous fiberboard sheathing, intermediate type, may be provided in panels not less than 48 by 96 inches applied vertically.

3.6 PLYWOOD SHEATHING INSTALLATION

A. Fasten plywood sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails or galvanized staples; comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least 3/8 inch from edges and ends.

B. Install sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow 1/8-inch open space between edges and ends of adjacent units. Stagger horizontal joints, if any.

C. Cover sheathing as soon as practical after installation to prevent deterioration from wetting.

3.7 BUILDING WRAP APPLICATION

A. Cover wall sheathing with building wrap as indicated.

1. Comply with manufacturer's written instructions.
2. Cover upstanding flashing with 4-inch overlap.
3. Seal seams, edges, and penetrations with tape.
4. Extend into jambs of openings and seal corners with tape.

3.8 SHEATHING TAPE APPLICATION

A. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 06100

SECTION 06160 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY OF WORK

A. This Section includes new exterior roof sheathing as required to repair/replace existing roof sheathing.

B. This section includes new exterior wall sheathing to repair or replace damaged wall sheathing.

1.3 RELATED SECTIONS

A. Division 07 Section “Asphalt Shingles” for underlayment, flashing, roof accessories, and shingles installed over roof sheathing.

1.4 SUBMITTAL

A. Product Data: For each type of sheathing specified. Indicate component materials and dimensions and include construction and application details.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory".

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack sheathing panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings. Store and transport panels in accordance with panel manufacturer’s written instructions.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

A. General:

1. Plywood: DOC PS 1.
2. Thickness: indicated on drawings.
3. Factory mark panels to indicate compliance with applicable standard.

B. Plywood Roof Sheathing: Exterior Exposure 1, Structural I sheathing.

1. Span Rating: Not less than 16/0.
2. Nominal Thickness: As required to match existing sheathing thickness.

2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
4. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's "International One- and Two-Family Dwelling Code."

D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate roof 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 assembly.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

END OF SECTION 06160

SECTION 06201 – EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Standing and running trim. [Not otherwise indicated as Azek or Vinyl material]

2. Miscellaneous lumber

1.3 SUBMITTALS

A. Samples: Submit the following samples for each species and cut or pattern of finish carpentry.

1. Exterior standing and running trim: 1'-0" long x full board or molding width, finished on one side and one edge.

B. Wood Treatment Data: Submit chemical treatment manufacturer’s instructions for handling, storage, installation and finishing treated materials.

C. Shop Drawings: See instructions in Division 1.

1.4 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

1. Exterior standing and running trim.

B. Fire Retardant Marking: Mark each unit of fire retardant treated lumber and plywood with classification marking of Underwriters Laboratory, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction. Place marking on surfaces that will not be exposed after installation.

C. The “Architectural Woodwork Quality Standards and Guide Specifications,” published by AWI, is hereby incorporated by reference. This reference is referred to in this section as AWI Standards.

D. Standing and Running Trim: Conform to the requirements of AWI Standards, Section 300, Custom Grade.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver finish carpentry materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.6 JOB CONDITIONS

A. Conditioning: Installer shall advise contractor or temperature and humidity requirements for finish carpentry installation areas. Do not install finish carpentry until required temperature and relative humidity conditions have been stabilized and will be maintained in installation areas.

B. Temperature and Humidity: Maintain temperature and humidity control in installation area as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS QUALITY STANDARDS

A. Lumber Standards: Comply with DOC PS 20, “American Softwood Lumber Standard,” for lumber and with applicable grading rules of inspection agencies certified by the American Lumber Standards Committee Board of Review.

B. Softwood Plywood: Comply with DOC PS 1, “U.S. Product Standard for Construction and Industrial Plywood.”

C. Hardwood Plywood: Comply with HPVA HP-1, “Interim Voluntary Standard for Hardwood and Decorative Plywood.”

D. Hardwood Lumber Standard: Comply with National Hardwood Lumber Association (NHLA) rules.

E. Woodworking Standard: Where indicated for a specific product comply with specified provision of the following:
   1. Architectural Woodwork Institute (AWI) “Quality Standards”.

F. Glued-up Lumber Standard: Comply with PS 56.

G. Fire-Retardant Treatment: Where indicated, use materials impregnated with fire-retardant chemicals per AWPA C20; exterior type or interior Type A as required.

2.2 MATERIALS

A. General:
   1. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and patterns as shown, unless otherwise indicated.
   2. Moisture Content of Softwood Lumber: Provide seasoned (KD) lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

B. Lumber for Transparent Finish (Stained or Clear): Use pieces made of solid lumber stock.

C. Lumber for Painted Finish: At contractor’s option, use pieces which are either glued-up lumber or made of solid lumber stock.

2.3 STANDING AND RUNNING TRIM

A. Softwood Lumber Trim:

   1. Species and Grade: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; C Select (Choice) or D Select (Quality); NeLMA, NLGA, or WWPA.
   2. Species and Grade: Douglas fir-larch or Douglas fir south, Superior or C & Btr finish; NLGA, WCLIB, or WWPA.
   3. Species and Grade: Southern pine, C & Btr finish; SPIB.
   4. Maximum Moisture Content: 15 percent.

B. Hardwood Lumber Trim:

   1. Species and Grade: White maple or yellow poplar; A finish; NHLA.
   2. Maximum Moisture Content: 13 percent.

C. Moldings for Opaque Finish (Painted): Made to patterns included in WMMPA WM 12.

   1. Softwood Moldings: WMMPA WM 4, P-grade.

      a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.

b. Maximum Moisture Content: 15 percent.

2. Hardwood Moldings: WMMPA HWM 2, P-grade.

a. Species: Aspen, basswood, cottonwood, gum, magnolia, soft maple, tupelo, or yellow poplar.
b. Maximum Moisture Content: 9 percent.

2.4 EXTERIOR FINISH CARPENTRY

A. Standing and Running trim: For trim in form of boards and worked products, provide lumber complying with the following requirements including those of the grading agency listed with species.

B. For exterior finish carpentry work use glued-up lumber complying with PS 56 for “wet use” and certified so by respective grading and inspecting agency for species and product indicated.

2.5 MISCELLANEOUS MATERIALS

A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue.

1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Fasteners and Anchorages: Provide nails, screws and other anchoring devised of the type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.

PART 3 - EXECUTION

3.1 PREPARATION

A. Preparation:

1. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.
2. Backprime lumber for painted finish exposed on the exterior. Comply with requirements of section on painting within Division 9 for primers and their application.

B. Installation:

1. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of

joints or optimum jointing arrangements, or which are of defective manufacture with respect to surfaces, sizes or patterns.

2. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level countertops; and with 1/16" maximum offsets in revealed adjoining surfaces.
3. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
4. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum lengths of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end to end joints. Make exterior joints water-resistant by careful fitting.
5. Anchor finish carpentry work to anchorage devises or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailings, countersunk, concealed fasteners and blind nailing as required for a complete installation.

C. Adjustment, Cleaning, Finishing and Protection:

1. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
2. Clean finish carpentry work on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
3. Protection: Installer of finish carpentry work shall advise contractor of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION 06201

SECTION 06202 – INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior moldings.
2. Window casing (interior) and window sills.

1.3 SUBMITTALS

A. Samples: Submit the following samples for each species and cut or pattern of finish carpentry.

1. Interior standing and running trim: 1'-0" full board or molding width, unfinished.
2. Plastic Laminate: Full chain of samples for approval and color selection.

B. Wood Treatment Data: Submit chemical treatment manufacturer’s instructions for handling, storage, installation and finishing treated materials.

C. Shop Drawings: See instructions in Division 1.

1.4 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

1. Interior standing and running trim.

B. Fire Retardant Marking: Mark each unit of fire retardant treated lumber and plywood with classification marking of Underwriters Laboratory, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction. Place marking on surfaces that will not be exposed after installation.

C. The “Architectural Woodwork Quality Standards and Guide Specifications,” published by AWI, is hereby incorporated by reference. This reference is referred to in this section as AWI Standards.

D. Standing and Running Trim: Conform to the requirements of AWI Standards, Section 300, Custom Grade.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver finish carpentry materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.6 JOB CONDITIONS

A. Conditioning: Installer shall advise contractor or temperature and humidity requirements for finish carpentry installation areas. Do not install finish carpentry until required temperature and relative humidity conditions have been stabilized and will be maintained in installation areas.

B. Temperature and Humidity: Maintain temperature and humidity in installation area as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

C. Weather Limitations:Proceed with installation only when existing and forecasted weather conditions permit work to be performed according to manufacturer’s written instructions and warranty requirements and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS QUALITY STANDARDS

A. Lumber Standards: Comply with DOC PS 20, “American Softwood Lumber Standard,” for lumber and with applicable grading rules of inspection agencies certified by the American Lumber Standards Committee Board of Review.

B. Softwood Plywood: Comply with DOC PS 1, “U.S. Product Standard for Construction and Industrial Plywood.”

C. Hardwood Plywood: Comply with HPVA HP-1, “Interim Voluntary Standard for Hardwood and Decorative Plywood.”

D. Hardwood Lumber Standard: Comply with National Hardwood Lumber Association (NHLA) rules.

E. Woodworking Standard: Where indicated for a specific product comply with specified provision of the following:
   1. Architectural Woodwork Institute (AWI) “Quality Standards”.

F. Glued-up Lumber Standard: Comply with PS 56.

G. Fire-Retardant Treatment: Where indicated, use materials impregnated with fire-retardant chemicals per AWPA C20; exterior type or interior Type A as required.

2.2 MATERIALS

A. General:
   1. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and patterns as shown, unless otherwise indicated.
   2. Moisture Content of Softwood Lumber: Provide seasoned (KD) lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

B. Lumber for Transparent Finish (Stained or Clear): Use pieces made of solid lumber stock.

C. Lumber for Painted Finish: At contractor’s option, use pieces which are either glued-up lumber or made of solid lumber stock.

2.3 FIRE-RETARDANT TREATED MATERIALS

A. Lumber: Comply with performance requirements in AWPA C20, Interior Type A. Kiln dry after treatment to a maximum moisture content of 19 percent.

B. Plywood: Comply with performance requirements in AWPA C27, Interior Type A. Kiln dry after treatment to a maximum moisture content of 15 percent.

C. Application: All interior lumber and plywood.

2.4 STANDING AND RUNNING TRIM

A. Softwood Lumber Trim:

1. Species and Grade: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; C Select (Choice) or D Select (Quality); NeLMA, NLGA, or WWPA.
2. Maximum Moisture Content: 12 percent.

B. Hardwood Lumber Trim:

1. Species and Grade: White maple or yellow poplar; A finish; NHLA.
2. Maximum Moisture Content: 13 percent.

C. Moldings for Opaque Finish (Painted): Made to patterns included in WMMPA WM 12.

1. Softwood Moldings: WMMPA WM 4, P-grade.

a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
b. Maximum Moisture Content: 15 percent.

2. Hardwood Moldings: WMMPA HWM 2, P-grade.

a. Species: Aspen, basswood, cottonwood, gum, magnolia, soft maple, tupelo, or yellow poplar.
b. Maximum Moisture Content: 9 percent.

D. Molding Patterns:

1. Base Pattern: WM 620, 9/16-by-4-1/4-inch ogee base.
2. Casing Pattern: WM 361 11/16-by-2-1/2-inch featheredge casing.
3. Stool Cap similar to Brosco 1261 but extended to project 2” from face of wall.
4. Window Apron – Brosco 1269 5/8” by 2 1/2”.

2.5 CLOSET SHELVING AND POLES

A. Shelving shall be vinyl coated, ventilated, steel rod shelving having maximum rod spacing of 1". Color shall be white.

B. Shelf and pole shall be 16" shelf with integral rod or pole. At all units, install clips and anchors such that shelf and pole can be installed at both 4'-0" AFF and at 5'-6" AFF.

C. Shelving at storage closets shall be 16" deep at bottom 2 shelves and 12" deep at upper 3 shelves.

D. Shelving at linen closets and pantry shall be 16" deep at all shelves.

E. All installations shall be complete with all anchors, braces, end caps, joiner clamps, and all other accessories required for a complete installation. Intermediate support braces shall be installed so that spans do not exceed 3'-6" in any location.

2.6 MISCELLANEOUS MATERIALS

A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue.

1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Fasteners and Anchorages: Provide nails, screws and other anchoring devised of the type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.

PART 3 - EXECUTION

3.1 PREPARATION

A. Preparation:

1. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.
2. Backprime lumber for painted finish exposed on the exterior. Comply with requirements of section on painting within Division 9 for primers and their application.

B. Installation:

1. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacture with respect to surfaces, sizes or patterns.
2. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level countertops; and with 1/16” maximum offsets in revealed adjoining surfaces.
3. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
4. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum lengths of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end to end joints. Make exterior joints water-resistant by careful fitting.
5. Anchor finish carpentry work to anchorage devises or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailings, countersunk, concealed fasteners and blind nailing as required for a complete installation.

a. Attach siding to framing to comply with siding manufacturer's instructions including requirements for type, size, materials, location and spacing of fasteners.

C. Adjustment, Cleaning, Finishing and Protection:

1. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
2. Clean finish carpentry work on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
3. Protection: Installer of finish carpentry work shall advise contractor of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION 06202

SECTION 07210 – BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Perimeter wall insulation (supporting backfill).
2. Concealed building insulation.
3. Vapor retarders.
4. Sound attenuation insulation.
5. Rigid insulation.

1.3 PERFORMANCE REQUIREMENTS

A. Plenum Rating: Provide glass-fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.

1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm (13-m/s) air velocity.
2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosium on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: Full-size units for each type of exposed insulation indicated.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

D. Research/Evaluation Reports: For foam-plastic insulation.

1.5 QUALITY ASSURANCE

A. Retain ASTM test method below based on product and kind of fire-resistance characteristic specified for each product in Part 2. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and other methods indicated with product, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. ft. (26 kg/cu. m) VI, 1.80 lb/cu. ft. (29 kg/cu. m), with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

1. Available Manufacturers:

a. DiversiFoam Products.
b. Dow Chemical Company.
c. Owens Corning.

2.3 GLASS-FIBER BLANKET INSULATION

A. Available Manufacturers:

1. CertainTeed Corporation.
2. Johns Manville.
3. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

C. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with polypropylene-scrim-kraft vapor-retarder membrane on 1 face.

D. Provide insulation as shown on the drawings and as follows:

1. Exterior Walls: 3 ½", R-11 walls.
2. Sound Barriers in 2x4 partitions: 3", R-11.
3. Band Joists: 6 ¼ " R-19 minimum.
4. Uninhabited Attic Floors: 6 1/4", R-19.
5. Basement Ceilings: 5 1/2" R-21 minimum.
6. Window and Door Rough Openings: Non-expanding spray-foam/closed cell foam backer rod and sealant.
7. Gaps in Exterior Wall Sheathing: Seams, penetrations
8. Drywall Penetrations in Insulated Walls: Wall switches, duplex receptacles, etc. shall be sealed.

E. Foam Insulation: Provide spray foam insulation seal out at all floor and ceiling penetrations especially at attic.

F. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding either insulation, anchors, or substrates.

2.4 SPRAY FOAM INSULATION (OPEN-CELL)

A. Basis-of-Design Product: Subject to compliance with requirements, provide "Icynene LD-C-50™ all water-blown polyurethane foam insulation by Icynene Inc., or equivalent product by one of the following:
1. BaySystems North America, LLC>
2. Demilec (USA) LLC.

B. Open-Cell Polyurethane Foam Insulation: Spray-applied polyurethane foam using water as a blowing agent.
1. Thermal Resistance (R-Value/inch): ASTM C518; 3.7 hr/sq. ft/degree F/BTU.

2. Air Permeance (for 5.25 inches of material): ASTM E283; 0.009 l/m²/second.
3. Water Vapor Transmission (for 5 inches of material): ASTM E96; < 11 perms.
4. Corrosion: No significant corrosion when in contact with steel under 85 percent relative humidity.
5. Density (pcf @ 2" lift): ASTM D 1622; Minimum density of 0.5 lb/cu. Ft. (6.4 kg/cu. m).
6. Bacterial or Fungal Growth: No growth; no material deterioration.
7. Flame Spread and Smoke Developed Rating: ASTM E84; 20/400.
8. Fuel Contribution: ASTM E84; 0.

C. Thickness: As shown on the Drawings.

2.5 FOUNDATION INSULATION

A. Extruded-Polystryrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
1. Available Manufacturers:

a. DiversiFoam Products.
b. Dow Chemical Company.
c. Owens Corning.

2. Type IV, 1.60 lb/cu. ft. (26 kg/cu. m), unless otherwise indicated.
3. Insulation thickness 2" to fit within 2 x 3 studs.

2.6 VAPOR RETARDERS

A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

B. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).

1. Available Products:

a. Raven Industries Inc.; DURA-SKRIM 6WW.
b. Reef Industries, Inc.; Griffolyn T-65.

C. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than 22 lb/1000 sq. ft. (10 kg/100 sq. m), with maximum permeance rating of 0.1317 perm (7.56 ng/Pa x s x sq. m) and with flame-spread and smoke-developed indexes of not more than 5 and 60, respectively.

1. Available Products:

    a. Raven Industries Inc.; DURA-SKRIM 2FR.
    b. Reef Industries, Inc.; Griffolyn T-55 FR.

D. Foil-Polyester-Film Vapor Retarders: 2 layers of 0.5-mil- (0.013-mm-) thick polyester film laminated to an inner layer of 1-mil- (0.025-mm-) thick aluminum foil, with maximum water-vapor transmission rate in flat condition of 0.0 g/h x sq. m and with maximum flame-spread and smoke-developed indexes of 5.

1. Product: Subject to compliance with requirements, provide "Zero Perm" by Alumiseal Corporation.

E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

F. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

G. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

H. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

2.7 FIRE SAFING

A. Basis-of-Design: Equal to Safing Insulation manufactured by Fibrex Insulations, Inc.

2.8 AUXILIARY INSULATING MATERIALS

A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulating substrates.

2.9 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate or Angle formed from perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square, welded to projecting copper-coated steel spindle 0.105 inch (2.67 mm) in diameter and of length capable of holding insulation of thickness indicated securely in position with 1-1/2-inch- (38-mm-) square or diameter self-locking washers complying with the following requirements:

1. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-(0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness.
2. Where anchors are located in ceiling plenums and attic spaces, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.

B. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Section in which substrates and related work are specified and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachments.

B. Close off openings in cavities receiving poured-in-place insulation to prevent escape of insulation. Provide bronze or stainless – steel (inside) where openings must be maintained for drainage or ventilation.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSULATION OF PERIMETER INSULATION

A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

B. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to insulation manufacturer's written instructions.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by installation manufacturer.

C. Set vapor-retarder-faced units with vapor to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

D. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements.

1. Use blankets widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3.6 INSTALLATION OF VAPOR RETARDERS

A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16-inch o.c.

C. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor-retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

D. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor-retarder manufacturer.

E. Tape joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.7 PROTECTION

A. Protect installed insulation, and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and permanent construction immediately after installation.

END OF SECTION 07210

SECTION 07620 – SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes:

1. Manufactured Products: 2-piece reglet and counterflashing.
2. Formed Products
   a. Formed roof flashing and trim.
   b. Formed gutters and downspouts

B. Related Sections include the following:
1. Division 07 Sections “Asphalt Shingles” for installing sheet metal flashing and trim integral with asphalt roofing shingles.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosed, and shall remain watertight.

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 joints 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 (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 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 fabrication and installation layouts of sheet metal flashing and trim, including plans and elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
   1. Identify material, thicknesss, 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 joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
   4. Details of termination joints and assemblies, including fixed points.
   5. Details of expansion joints, including showing direction of expansion and contraction.
   6. Details of edge condition, including counterflashings as applicable.
   7. Details of special conditions.
   8. Details of connections to adjoining work.
   9. Detail formed flashing and trim at a scale of not less than 1 ½ inches per 12 inches (1:10)

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

D. Qualification Data: For qualified fabricator.

E. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

F. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.6 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. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

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.

D. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.8 WARRANTY

A. Special Warranty on Aluminum Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows 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 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 form date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces form damage by applying a strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

   1. Exposed Coil-Coated Finishes: AAMA 620, Two-Coat Fluoropolymer. Fluropolymer 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 manufactures' written instructions.

2.2 SHEET METAL FLASHING AND TRIM

A. Aluminum Gutter and Downspouts: Provide 3 1/2" seamless aluminum gutters and downspouts complete with all accessories. Provide elbows, boots and other accessories required to extend downspouts to grade. Gutters shall be .032" extra heavy gauge. Downspouts and accessories shall be .024" thick minimum. Downspouts shall be nominal 2 ½" x 3 1/4" corrugated aluminum. Provide continuous fascia apron and bar hangers at 24" o.c. for gutters. Spike and ferrule fasteners are not acceptable. Provide boots to join downspouts to perimeter drain system where existing boots are broken or missing. Provide lifetime warranty. Provide 50 lineal feet of both downspout and gutter as attic stock.

B. Shop Finish, Rain Drainage: Provide manufacturer's standard baked-on white acrylic shop finish on sheet metal rain drainage units (gutters, downspouts, and similar exposed units); 1.0 mil dry film thickness.

C. Typically where perimeter drain system does not occur, provide concrete splashguards.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coating, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

C. Solder:

1. For Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape ½ inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

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, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form 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.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Sealed Joints: Form no expansion but movable joints in metal to accommodate elastomeric sealant.

C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, no corrosive metal.

E. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

2.5 UNDERLAYMENT MATERIALS

A. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.

B. Felts: ASTM D 226, Type II (No.30), asphalt-saturated organic felt, nonperforated.

C. Slip Sheet: Rosin-sized paper, minimum 3-lb/100 sq. ft. (0.16kg/sq.m).

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. Examination 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 so that completed sheet metal flashing and trim shall not rattle, leak or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. 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 fabrication sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. 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 SMACNA.

1. Coat back side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment:Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. 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 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.

D. Seal joints as shown and as required for watertight construction.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply width performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual". Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.
1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install Sheet metal roof drainage items to produce complete roof drainage system according to SMACMA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches (900 mm) apart. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.
2. Loosely lock straps to front gutter bead and anchor to roof deck.
3. Anchor and loosely lock back edge of gutter to continuous cleat.
4. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 36 inches (900 mm) apart.
5. Anchor gutter with spikes and ferrules spaced not more than 24 inches (600 mm) apart.
6. Install gutter with expansion joints at locations indicated but not exceeding 30 feet apart. Install expansion joint caps.
7. Install continuous gutter screens on gutters with noncorrosive fasteners, hinged to swing open for cleaning gutters.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. in between.

1. Provide elbows at base of downspout to direct water away from building.
2. Connect downspouts to underground drainage system indicated.

3.5 WALL FLASHING INSTALLLATION

A. Openings Flashing in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 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 07620

SECTION 07841 – PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.

1.3 PERFORMANCE REQUIREMENTS

A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
3. Fire-resistance-rated floor assemblies.
4. Fire-resistance-rated roof assemblies.

B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:

1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

    a. Penetrations located outside wall cavities.
    b. Penetrations located outside fire-resistance-rated shaft enclosures.
    c. Penetrations located in construction containing fire-protection-rated openings.

d. Penetrating items larger than 4-inch-diameter nominal pipe or 16 sq. inch in overall cross-sectional area.

3. L-Rated Systems: Where through-penetration firestop systems are indicated in smoke barriers, provide through-penetration firestop systems with L-ratings of not more than 3.0 cfm/sq. ft at both ambient temperatures and 400 deg F.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each through-penetration firestop system, submit documentation, including illustrations, from a qualified testing and inspecting agency, showing each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."

B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems bearing classification marking of qualified testing and inspecting agency.

D. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

E. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector and fire marshal if required by authorities having jurisdiction.

F. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in “Performance Requirements” Article:

1. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements.

a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

1) UL in “Fire Resistance Directory.”
2) ITS in “Directory of Listed Products.”

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers’ labels identifying product and manufacturer; date of manufacture; log number; shelf life, if applicable; qualified testing and inspecting agency’s classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:

1. Grace, W. R. & Co. - Conn.
2. Hilti, Inc.
3. Specified Technologies Inc.
4. 3M; Fire Protection Products Division.

2.2 FIRESTOPPING

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:

a. Slag-rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.

2. Collars.

2.3 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Examination:

1. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Preparation:

1. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

a. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
b. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
c. Remove laitance and form-release agents from concrete.

D. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

E. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

F. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

G. Identification: Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.2 FIELD QUALITY CONTROL

A. Inspecting Agency: Contractor will engage an independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.

B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.3 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07841

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes sealants for the following applications, including those specified by reference to this Section:
   1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
      a. Joints between different materials listed above.
      b. Other joints as indicated.

   2. Exterior joints in the following horizontal traffic surfaces:
      a. Control, expansion, and isolation joints in cast-in-place concrete
         .
   3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
      a. Perimeter joints of exterior openings where indicated.
      b. Perimeter joints between interior wall surfaces and frames of exterior doors, windows, louvers, curtain wall and storefront framing systems.
      c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
      d. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      e. Other joints as indicated.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

E. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. 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 Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Five (5) years from date of Substantial Completion.

B. 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: Twenty (20) years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated for each type in the sealant scheduled at the end of Part 3.

2.2 MATERIALS, GENERAL

A. 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.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

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. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

B. Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Division 01 Section "Product Requirements."

2.4 URETHANE JOINT SEALANTS

A. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT.

B. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

2.5 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.6 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Concealed Joints: Provide manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.7 PRECOMPRESSED (PREFORMED) JOINT SEALANTS

A. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from alternating layers of high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to fit joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:

B. Precompressed Joint Sealant Manufacturer: **"Backerseal"** manufactured by EMSEAL joint Systems, Ltd. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
   1. illbruck Sealant Systems, Inc.
   2. Polytite Manufacturing Corporation.
   3. Sandell Manufacturing Co., Inc.

C. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.

2.8 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.9 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   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.
   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.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 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.

3.5 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.

3.6 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Low-Modulus Nonacid-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
   1. Products: Provide one of the following:
      a. 790; Dow Corning.
      b. 864; Pecora Corporation.
      c. PSI-641; Polymeric Systems, Inc.
      d. Spectrem 1; Tremco.
   2. Type and Grade: S (single component) and NS (nonsag).
   3. Class: 25.
   4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
   5. Use Related to Exposure: NT (nontraffic).
   6. Uses Related to Joint Substrates: O.
      a. Applications, Use O Joint Substrates: Exterior insulation and finish systems.
   7. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

B. Medium-Modulus Neutral-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
   1. Products: Provide one of the following:
      a. 756 H.P.; Dow Corning.
      b. Silglaze II; GE Silicones.
      c. 895; Pecora Corporation.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
    a. Use O Joint Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, and galvanized steel.
7. Applications: All exterior non-traffic joints unless otherwise specified.

C. Mildew-Resistant Silicone Sealant: Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:
1. Products: Provide one of the following:
    a. 786 Mildew Resistant; Dow Corning.
    b. Sanitary 1700; GE Silicones.
    c. 898 Silicone Sanitary Sealant; Pecora Corporation.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
    a. Use O Joint Substrates: Aluminum coated with a high-performance coating, galvanized steel, and ceramic tile.
6. Applications: Sealing perimeter joints of plumbing fixtures.

D. Multicomponent Nonsag Urethane Sealant: Provide products complying with the following:
1. Products: Provide one of the following:
    a. Vulkem 922; Mameco International.
    b. Dynatrol II; Pecora Corporation.
    c. Sikaflex - 2c NS; Sika Corporation.
    d. DYmeric 511; Tremco.
2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 50 percent movement in extension and 50 percent in compression for a total of 100 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
    a. Use O Joint Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, ceramic tile, and wood.
7. Applications: Interior and exterior joints as follows:
    a. Control and expansion joints in unit masonry.
    b. Sealing joints between unit masonry and frames of doors, windows, and other openings in unit masonry walls and partitions.

E. Multicomponent Pourable Urethane Sealant: Provide products complying with the following:
1. Products: Provide one of the following:

a. Chem-Calk 550; Bostik Inc.
b. Vulkem 245; Mameco International.
c. NR-200 Urexpan; Pecora Corporation.
d. SL 2; Sonneborn Building Products Div., ChemRex Inc.
e. THC-900; Tremco.

2. Type and Grade: M (multicomponent) and P (pourable).
3. Class: 25.
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
   a. Use O Joint Substrates: Ceramic tile.
6. Applications:
   a. Sealing exterior joints in horizontal traffic surfaces.
   b. Sealing interior joints in horizontal traffic surfaces.

3.7 LATEX JOINT-SEALANT SCHEDULE

A. Latex Sealant: Provide products complying with the following:
   1. Products: Provide one of the following:
      a. Chem-Calk 600; Bostik Inc.
      b. AC-20; Pecora Corporation.
   2. Applications: Paintable interior joints at hollow metal frames and surrounding gypsum board construction, and other interior joints requiring paint application.

3.8 ACOUSTICAL JOINT-SEALANT SCHEDULE

A. Acoustical Sealant for Concealed Joints: Provide products complying with the following:
   1. Products: Provide one of the following:
      a. Pro-Series SC-170 Rubber Base Sound Sealant; Ohio Sealants, Inc.
      b. BA-98; Pecora Corporation.
      c. Tremco Acoustical Sealant; Tremco.
   2. Applications: Concealed joints at intersection of sound-reduction-rated construction.

3.9 END OF SECTION 07920

SECTION 08230 – FIBERGLASS ENTRANCE DOORS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior fiberglass reinforced thermoset composite paneled doors with wood frames.

B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for installation of joint sealants.

1.3 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Provide fiberglass door and wood frame systems that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer’s corresponding standard systems, without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Thermal Movements: Provide wood-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. 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 (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. Air Infiltration: Provide fiberglass door and wood frame systems with maximum air leakage through door and framing areas of 0.90 cfm/sq. ft. per linear foot of perimeter crack when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).

D. Water Penetration Under Static Pressure: Provide fiberglass reinforced polyester (FRP) flush door and aluminum frame systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of not less than 7.50 lbf/sq. ft.

E. Cycle Slam Test Method per NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.

F. Sound Transmission, Exterior Doors: Minimum STC of 36 per ASTM E 90.

G. Thermal Transmission, Exterior Doors, U-Value per AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.

H. Surface Burning Characteristics, FRP Doors and Panels per ASTM E 84:

1. Flame Spread: Maximum of 200, Class C.
2. Smoke Developed: Maximum of 450, Class C.

I. Impact Strength, Doors and Panels, Nominal Value per ASTM D 256: 15.0 foot-pounds per inch of notch.

J. Tensile Strength, Doors, Nominal Value per ASTM D 638: 14,000 psi.

K. Flexural Strength, Doors, Nominal Value per ASTM D 790: 21,000 psi.

L. Water Absorption, Doors, Nominal Value per ASTM D 570: 0.20 percent after 24 hours.

M. Indentation Hardness, Doors, Nominal Value per ASTM D 2583: 55.

N. Gardner Impact Strength, Doors, Nominal Value per ASTM D 5420: 120 in-lb.

O. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.

P. Stain Resistance per ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.

Q. Chemical Resistance, ASTM D 543. Excellent rating.

1. Acetic acid, Concentrated.
2. Ammonium Hydroxide, Concentrated.
3. Citric Acid, 10%.
4. Formaldehyde.
5. Hydrochloric Acid, 10%.
6. Sodium hypochlorite, 4 to 6 percent solution.

R. Compressive Strength, Foam Core, Nominal Value per ASTM D 1621: 79.9 psi.

S. Compressive Modulus, Foam Core Nominal Value per ASTM D 1621: 370 psi.

T. Tensile Adhesion, Foam Core, Nominal Value per ASTM D 1623: 45.3 psi.

U. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days per ASTM D 2126: Minus 5.14 percent volume change.

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, finishes for each type of product indicated, and installation instructions.

B. Shop Drawings: For fiberglass reinforced door and wood frame systems. Include plans, elevations, sections, details, and attachments to other work. Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and face sheet thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.

C. Samples for Initial Selection: For each type of exposed finish required, in manufacturer's standard sizes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery.
2. Anchorage.
3. Expansion provisions.
4. For doors, show face sheets, core, framing and finish.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiberglass reinforced polyester (FRP) flush door and aluminum frame systems, indicating compliance with performance requirements.

G. Qualification Data: For manufacturer.

H. Maintenance Data: For fiberglass reinforced door and aluminum frame systems, to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: The manufacturer of the fiberglass door and wood frame systems specified in this Section shall demonstrate previous experience in successfully manufacturing fiberglass door and wood frame systems similar in scope and type to the required work for this Section for a continuous period of not less than 25 years.

B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' 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 revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

C. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1-2003.

D. Source Limitations: Obtain fiberglass reinforced polyester (FRP) flush doors and aluminum frame systems through one source from a single manufacturer.

E. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to installation of fiberglass reinforced polyester (FRP) flush doors and aluminum frames.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.7 WARRANTY

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fiberglass reinforced polyester (FRP) flush door and aluminum frame systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration caused by thermal movements.
c. Deterioration of metals and fiberglass reinforced polyester door face sheets, and other materials beyond normal weathering.
d. Water leakage through door and framing areas.
e. Failure of operating components to function properly.

2. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: The designs for fiberglass paneled door and wood frame systems are based on **"Smooth-Star"** door and frame systems as manufactured by Therma-Tru Doors. Subject to compliance with requirements, provide either the named products or comparable products as approved by the Architect:

1. Door Style: 6 panel door.

2. Door Style: Half-Glass door.

3. Door Style: As shown on Drawings.

2.2 FIBERGLASS DOOR SYSTEMS

A. Construction:

1. Door Thickness: 1-3/4 inches.
2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
3. Corners: Mitered.
4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.
5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, flue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.

B. Face Sheets:

1. Material: Fiber-glass-reinforced thermoset composite, 1/16 inch minimum thickness.
2. Texture: Lightly textured surface with 80-grit brushing.
3. Color: To be selected by Architect and/or Owner from manufacturer’s standard colors.

C. Door Edges: Machinable kiln-dried pine, primed to match color of faces, lock edge reinforced with laminated veneer lumber core, lockset area reinforced with solid blocking for hardware.

D. Door Bottom Edge: Moisture-proof and decay proof composite.

E. Core:

1. Material: Foamed-in-place polyurethane foam, CFC-free.
2. Density: Minimum of 2.0 pounds per cubic foot.
3. K-Factor: Minimum of 0.15.

F. Frame: 5/4 inch kiln-dried white pine profiles with 1/2 inch stops with depth as required to match existing conditions.

1. Brickmold: WM180 pattern.

G. Door Hardware: As specified in Division 08 Section "Door Hardware" except as indicated below.

1. Weather Stripping: Manufacturer's standard replaceable components.

a. Door Frame: Jacketed thermoset closed-cell foam, press-fit in kerfs at jamb stops in frames.

b. Bottom Edge of Door: Extruded thermoplastic elastomer, finned and chambered design, press-fit into bottom edge of door.

2. Hinges: 4 x 4 x 0.098 inch brass hinges. Screws to be plated and finished to match hinges. Proprietary adjustable strikes, permitting in-out adjustment of door in frame up to 3/16 inches.

3. Thresholds: Aluminum, thermally-broken, adjustable, with anodized aluminum finish.

2.3 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of wood-framed systems, as specified in Division 07 Section "Joint Sealants."

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 FABRICATION, GENERAL

A. Sizes and Profiles: Provide sizes for door and frame units, and profile requirements indicated on the Drawings.

B. Fit:

1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachment s and support at mechanical joints with hairline fit at contacting members.

2.5 FIBERGLASS DOOR FABRICATION

A. Doors: Reinforce doors as required for installing hardware.

B. Door Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

C. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, 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. General:

1. Comply with manufacturers written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure non-movement joints.
5. Seal joints watertight, unless otherwise indicated.

B. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

C. Install components plumb and true in alignment with established lines and grades, without warp or rack.

D. Fiberglass Doors: Install to produce smooth operation and tight fit at contact points.

1. Install to produce tight fit at weather stripping and weathertight closure.
2. Field-Installed Door Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

E. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.3 ERECTION TOLERANCES

A. Install wood-framed systems to comply with the following maximum tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment:

    a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
    b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

3. Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch (3 mm).

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating door hardware for smooth operation according to hardware manufacturers' written instructions.

B. Clean fiberglass door and wood frame system surfaces immediately after installing doors and frames, in accordance with manufacturer’s written instructions. Avoid damaging protective coatings and finishes. Remove excess sealants, dirt, and other substances.

C. Protect fiberglass door and wood frame system surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION 08230

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. Section includes mechanical hardware for the following exterior and interior swinging doors as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware.

B. Related Sections:

1. Division 08 Section "Fiberglass Doors" for exterior doors.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Initial Selection: For plastic protective trim units in each finish, color, and texture required for each type of trim unit indicated.

C. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.

1. Sample Size: Full-size units or minimum 2-by-4-inch (51-by-102-mm) Samples for sheet and 4-inch (102-mm) long Samples for other products.

a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

    a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
    b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
    c. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
    d. Content: Include the following information:

        1) Identification number, location, hand, fire rating, size, and material of each door and frame.
        2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
        3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
        4) Fastenings and other pertinent information.
        5) Explanation of abbreviations, symbols, and codes contained in schedule.
        6) Mounting locations for door hardware.

2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

E. Qualification Data: For Installer and Architectural Hardware Consultant.

F. Product Certificates: For electrified door hardware, from the manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

G. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

H. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

I. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:

1. For door hardware, an Architectural Hardware Consultant (AHC).

C. Source Limitations: Obtain each type of door hardware from a single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

D. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

E. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." In addition to Owner**,** Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Requirements for access control.
5. Address for delivery of keys.

F. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.6 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail 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 doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period:

a. Locksets: Seven years from date of Substantial Completion.
b. Butt Hinges: Lifetime warranty.
c. Other Hardware: One year from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products or products equivalent in function and comparable in quality to named products.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

A. Hinges: BHMA A156.1, five-knuckle, ball bearing hinges.

1. Where new hinges are specified for doors being replaced in existing frames, the new hinge size must be identical to hinge preparation present in the existing door and/or existing frame.

2. Standard Hinges – are also acceptable.

B. Basis-of-Design:

1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

a. Baldwin Hardware Corporation.
b. Bommer Industries, Inc.
c. Hager Companies.
d. IVES Hardware; an Ingersoll-Rand company.

e. Lawrence Hardware Inc.
f. McKinney Products Company; an ASSA ABLOY Group company.
g. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 MECHANICAL LOCKS AND LATCHES

A. Bored Locks: BHMA A156.2; Grade 2; Series 4000.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
b. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
c. Schlage Commercial Lock Division; an Ingersoll-Rand company.

B. Lock Functions: As indicated in door hardware schedule.

C. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

D. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

E. Lock Trim:

1. Description: As indicated in Door Hardware Schedule.
2. Operating Device: Lever with escutcheons (roses).
3. Dummy Trim: Match lever lock trim and escutcheons.

F. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

2.4 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Exterior Doors: Keyed similar or as directed by Owner.

B. Keys: Nickel silver.

1. Number of Keys: Provide 2 keys per lockset.

2.5 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

a. Baldwin Hardware Corporation.
b. Hager Companies.
c. Rockwood Manufacturing Company.
d. Stanley Commercial Hardware; Div. of The Stanley Works.

2.6 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except as otherwise approved by Architect.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors".
3. Gasketing Fasteners: Provide non-corrosive fasteners for exterior applications and elsewhere as indicated.

2.7 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical 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 doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI**/**SDI A250.8.
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless

other equivalent means of support for door, such as spring hinges or pivots, are provided.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.7 DOOR HARDWARE SCHEDULE

SET #1 – Entrance Doors

1	Latchset – Passage Function	Best 5k-0-N-14-C3-FL-626
1	Dead Bolt	Best 83T-7-STK-626
1	Wall Stop	Rockwood 409-626

END OF SECTION 08710

SECTION 09250 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes:
   1. Interior gypsum board (For walls and ceilings).

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wood framing and furring that supports gypsum board.
   2. Division 09 Section "Interior Painting" for primers applied to gypsum board surfaces.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
   2. Aluminum Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.4 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. American Gypsum Co.
      b. CertainTeed Corp.
      c. G-P Gypsum.
      d. Lafarge North America Inc.
      e. National Gypsum Company.
      f. USG Corporation.

B. Regular Type:
   1. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
   2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

C. Type X:
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

D. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces for use in Basement Spaces – Typically.
   1. Core: 5/8 inch (15.9 mm), regular type or 5/8 inch (15.9 mm), Type X, where indicated on the Drawings – (Basement Walls and Ceiling).
   2. Long Edges: Tapered.

E. Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.
   1. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
   2. Long Edges: Tapered and feathered (rounded or beveled) for prefilling.
   3. Products: Provide one of the following, where indicated. No substitutions will be permitted.
      a. National Gypsum Company; "Gold Bond Hi-Abuse® Brand XP® Gypsum Board".
      b. USG Corporation; "SHEETROCK® Brand Abuse-Resistant Gypsum Panels".

c. Certainteed Corporation; "ProRoc® extra Abuse Gypsum Board".

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. Expansion control joints

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
   1. Interior Gypsum Wallboard: Paper.
   2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: For second coat, use setting-type, sandable topping compound.
   4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:
   1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Type X: As indicated on Drawings and where required for fire-resistance-rated assembly.
   2. Ceiling Type: Ceiling surfaces.
   3. Moisture- and Mold-Resistant Type: Install in bathrooms and kitchens.
   4. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
   5. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
      b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

6. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
7. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Interior Trim: Install corner beads at outside corners, unless otherwise indicated.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
1. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
2. Level 5: Surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting.

3.6 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09250

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following substrates:
   1. Exterior Surfaces:
      a. Primed Steel.
      b. Wood.
   2. Interior Surfaces:
      a. Primed Steel.
      b. Wood.
      c. Gypsum board.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
   1. Submit Samples on rigid backing, 8 inches (200 mm) 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, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:
   1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
   2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

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 (7 deg C).
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. 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 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Benjamin Moore & Co.
   2. Behr Paints.
   3. ICI Paints.
   4. PPG Architectural Finishes.
   5. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable painting materials manufacturers. Materials not displaying manufacturer's identifications as a standard, best-grade product will not be acceptable.

B. 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.

C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
   2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
   3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
   4. Flat Topcoat Paints: VOC content of not more than 50 g/L.
   5. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
   6. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
   7. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
   8. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
   9. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

D. Colors: To be selected by Owner from manufacturers full range of colors.

2.3 EXTERIOR PAINTS

A. Quick-Drying Alkyd Metal Primer: MPI #76.
   1. VOC Content: E Range of E1.

B. Waterborne Galvanized-Metal Primer: MPI #134.
   1. VOC Content: E Range of E1.
   2. Environmental Performance Rating: EPR 1.

C. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).
   1. VOC Content: E Range of E1.

D. Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).
   1. VOC Content: E Range of E1.

2.4 INTERIOR PAINTS

A. Interior Latex Primer/Sealer: MPI #50.

1. VOC Content: E Range of E1 or E2.
    a. Benjamin Moore: Moorcraft - Latex Undercoater & Primer Sealer; No. 253-00.
    b. ICI Paints: Prep-N-Prime - Interior Latex Wall Primer; No. 1000-1200.
    c. ICI Paints: Prep-N-Prime - PVA Interior Wall Primer Sealer; No. 1030-1200.
    d. PPG: Speedhide - Int. Latex Primer Sealer; No. 6-2.
    e. Sherwin-Williams: Quali-Kote - Interior Latex Primer; No. B28WQ8001.

B. Rust-Inhibitive Metal Primer (Water Based): MPI #107.
1. VOC Content: E Range of E2 or E3.
    a. Benjamin Moore: Acrylic Metal Primer, No. M04.
    b. ICI Paints: Devoe Coatings - Devflex DTM Flat Int/Ext W.B. Primer, No. 4020.
    c. PPG: Pitt-Tech - Rust Inhibitive Primer (W.B.), No. 90-712.
    d. Sherwin-Williams: Industrial & Marine - Aquaclad W.B. Alkyd Primer, No. B55A710.
    e. Sherwin-Williams: Industrial & Marine - DTM Acrylic Primer/Finish, No. B66W Series.

C. Interior Latex-Based Wood Primer: MPI #39.
1. VOC Content: E Range of E2 or E3.
    a. Benjamin Moore: Fresh Start - Interior/Exterior Primer, No. 23.
    b. ICI Paints: Prep-N-Prime - 100% Acrylic Latex Primer, No. 2000-1200.
    c. ICI Paints: Prep-N-Prime - Gripper Stain Killer Primer, No. 3210-1200.
    d. PPG: Seal Grip - Plastic Primer (Waterborne), No. 17-21.
    e. Sherwin-Williams: PrepRite - ProBlock Int/Ext Latex Primer/Sealer, No. B51W20

D. Institutional Low-Odor/VOC Latex (Flat): MPI #143 (Gloss Level 1).
1. VOC Content: E Range of E3.
    a. Benjamin Moore: Eco Spec WB - Int. Latex Flat, No. 373.
    b. PPG: Pure Performance - Interior Latex Flat, No. 9-110.
    c. Sherwin-Williams: Harmony - Interior Latex Flat, No. B5W951.

E. Institutional Low-Odor/VOC Latex (Eggshell/Satin): MPI #144/145 (Gloss Level 2/3).
1. VOC Content: E Range of E3.
    a. Benjamin Moore: Eco Spec WB - Int. Latex Eggshell Enamel, No. 374.
    b. PPG: Pure Performance - Interior Eggshell Latex, No. 9-445.
    c. Sherwin-Williams: Harmony - Interior Latex Eg-Shel, No. B9W951.

F. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).
1. VOC Content: E Range of E3.
    a. Benjamin Moore: Eco Spec WB - Int. Latex Semi-Gloss Enamel, No. 376.
    b. PPG: Pure Performance - Interior Semi-Gloss Latex, No. 9-510.
    c. Sherwin-Williams: Harmony - Interior Latex Semi-Gloss, No. B10W951.

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. Wood: 15 percent.
   2. 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. 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 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 if any.
   2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. 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.

D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

E. 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.

F. 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.

G. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

A. Apply paints according to manufacturers written instructions.
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. 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.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. 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.

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.

3.4 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.

3.5 EXTERIOR PAINTING SCHEDULE

A. Steel Substrates:
   1. Quick-Drying Enamel System: MPI EXT 5.1A.
      a. Prime Coat: Quick-drying alkyd metal primer.
      b. Intermediate Coat: Quick-drying enamel matching topcoat.
      c. Topcoat: Quick-drying enamel (semigloss).

B. Exterior Wood Substrates:
   1. Latex System: MPI EXT 9.2A.
      a. Prime Coat: Exterior latex matching topcoat.
      b. Intermediate Coat: Exterior latex matching topcoat.

c. Topcoat: Exterior latex (semi-gloss).

3.6 INTERIOR PAINTING SCHEDULE

A. Primed Steel Substrates:
   1. Institutional Low-Odor/VOC Latex System: MPI INT 5.1S.
      a. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
      b. Topcoat: Institutional low-odor/VOC interior latex (semigloss).
      c. Applications: Primed steel surfaces such as but not limited to basketball backstops.

B. Dressed Lumber Substrates: Including architectural woodwork and trim.
   1. Institutional Low-Odor/VOC Latex System: MPI INT 6.3V.
      a. Prime Coat: Interior latex-based wood primer.
      b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
      c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).

C. Gypsum Board Substrates:
   1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M Walls.
      a. Prime Coat: Interior latex primer/sealer.
      b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
      c. Topcoat: Institutional low-odor/VOC interior latex flat.

D. Gypsum Board Substrates:
   1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M Ceilings.
      a. Prime Coat: Interior latex primer/sealer.
      b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
      c. Topcoat: Institutional low-odor/VOC interior latex flat.

END OF SECTION 09900