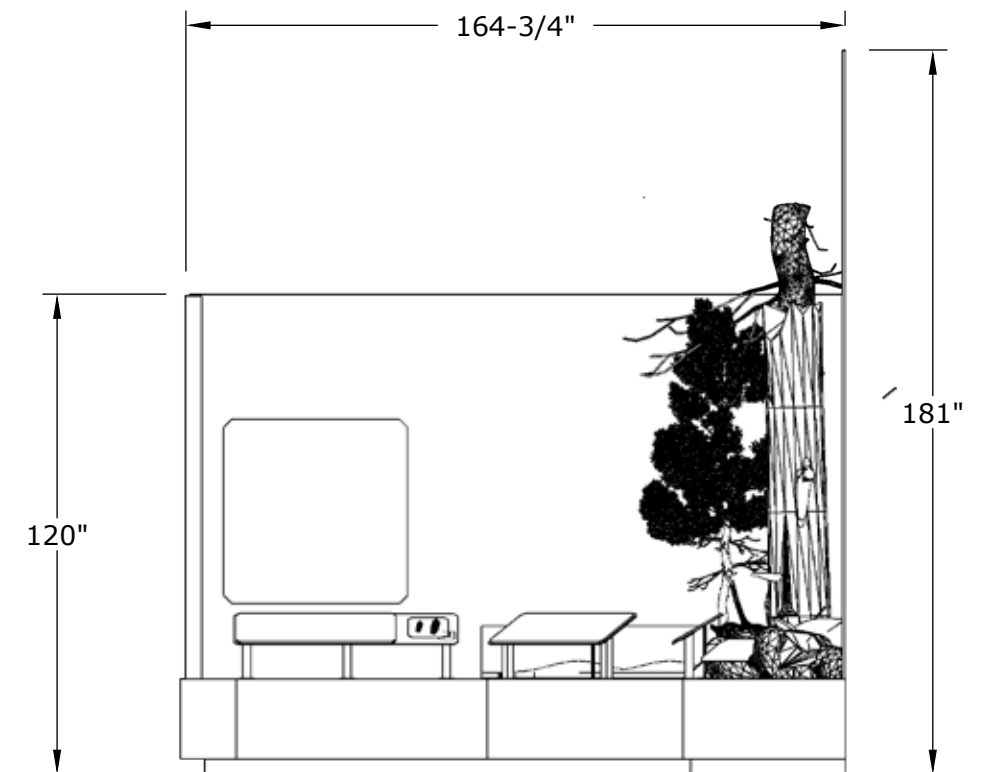
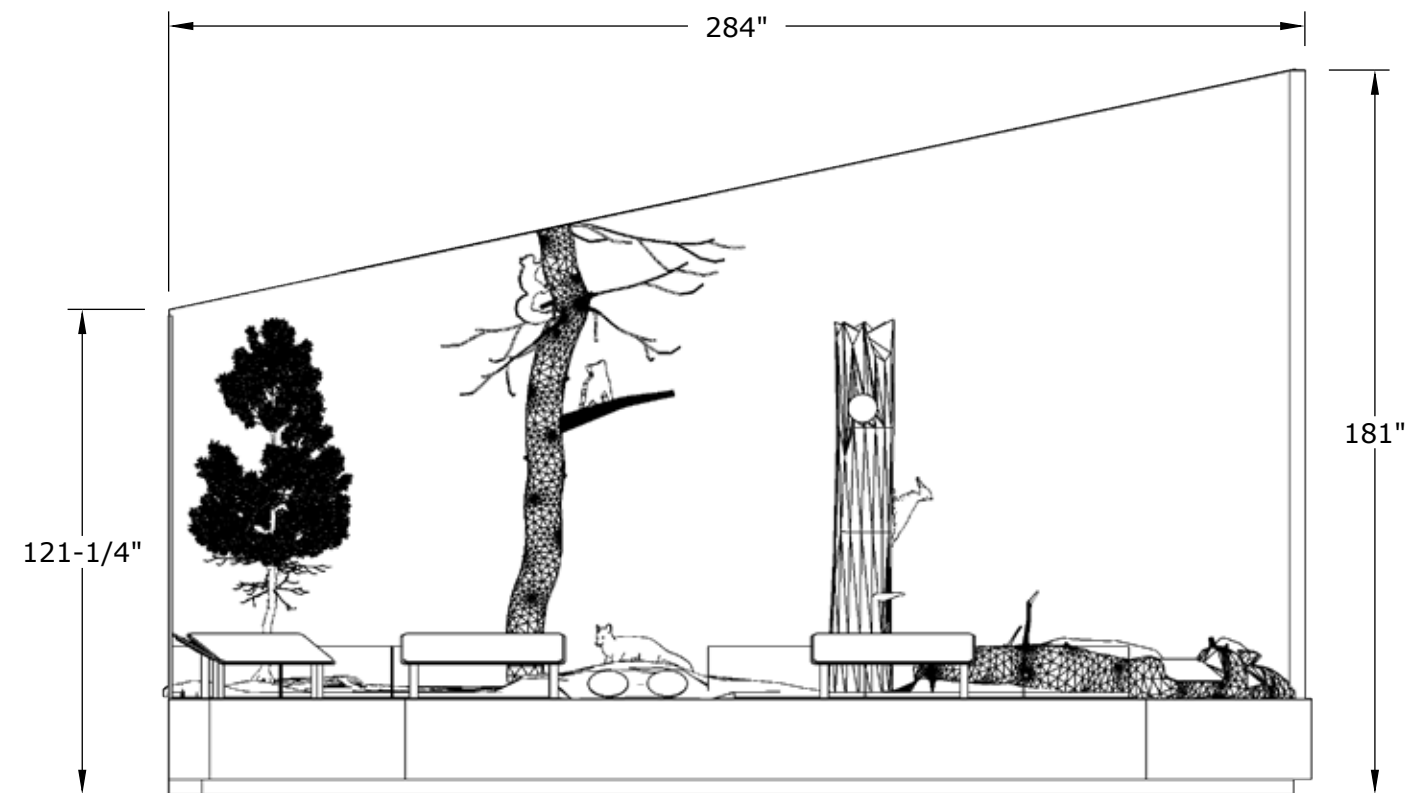
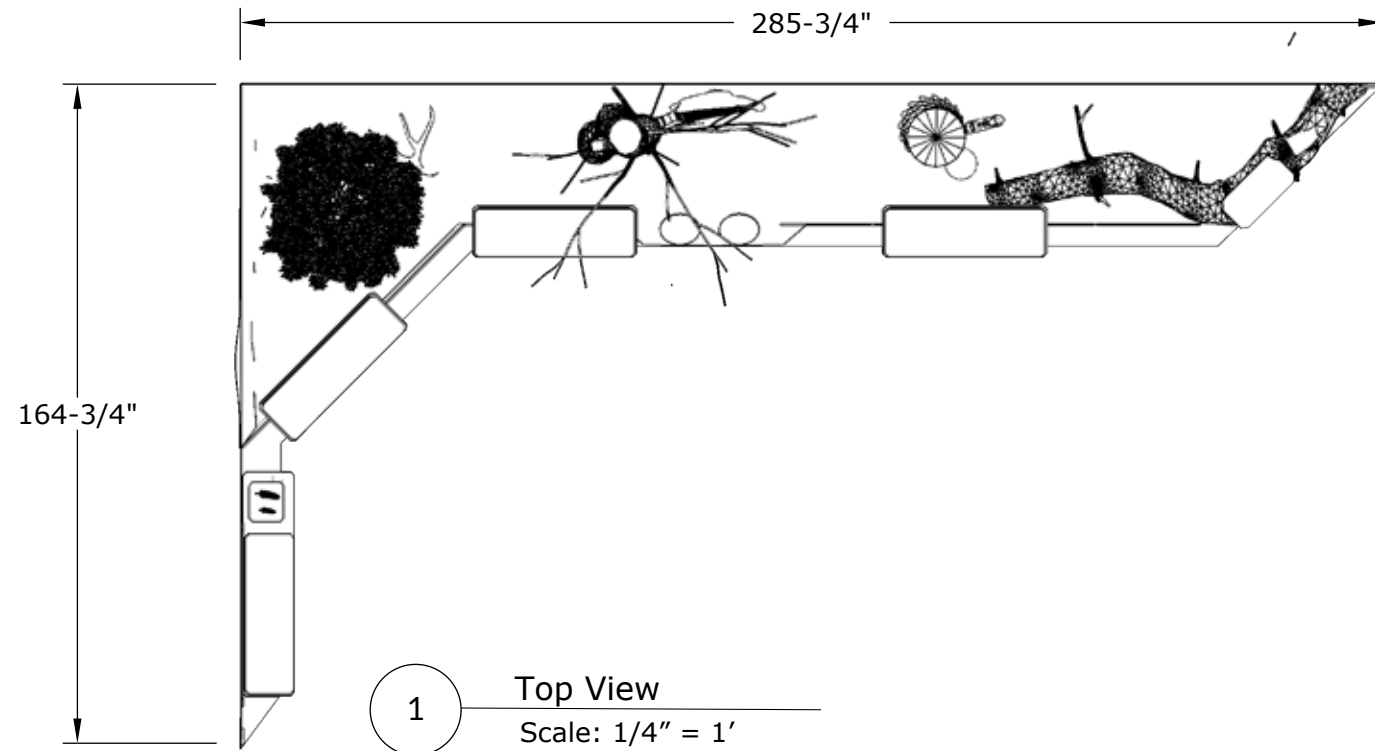
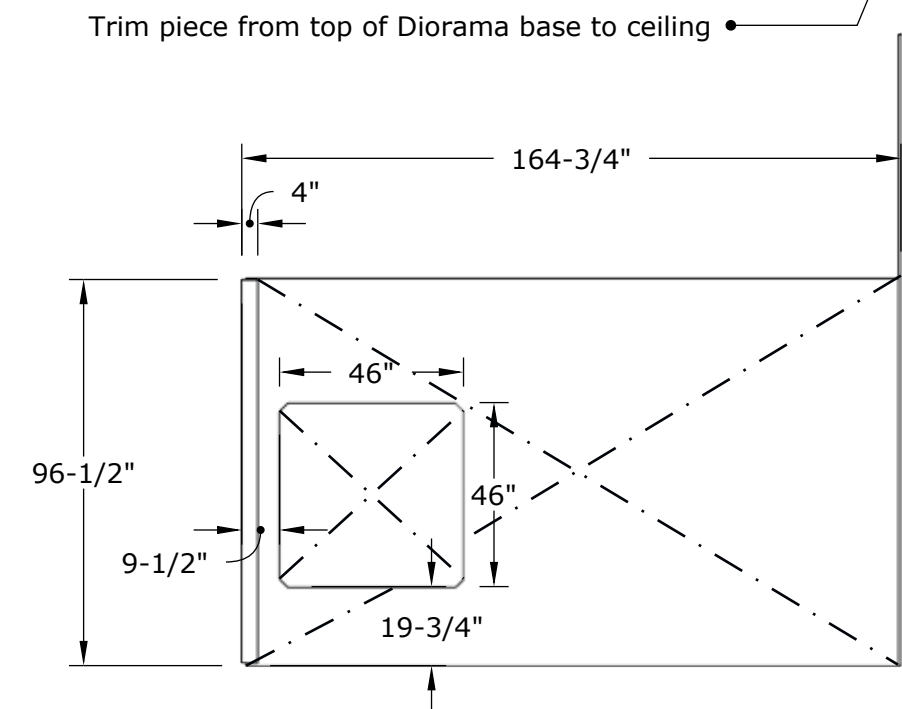
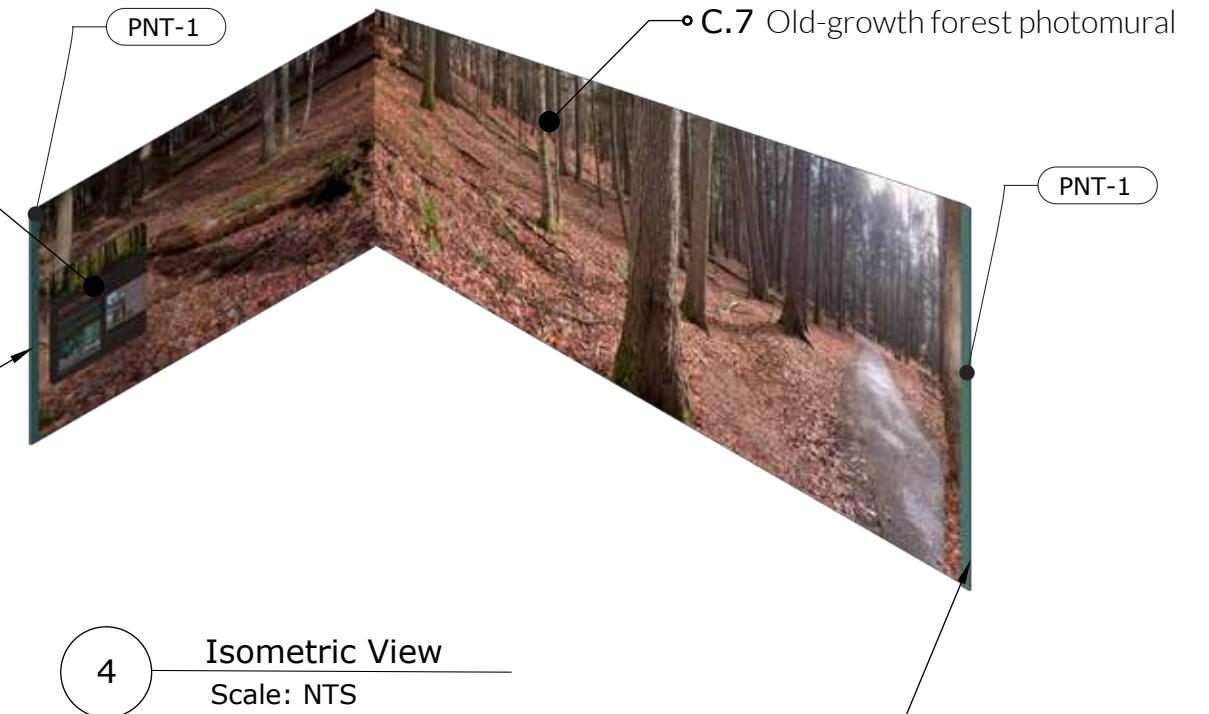
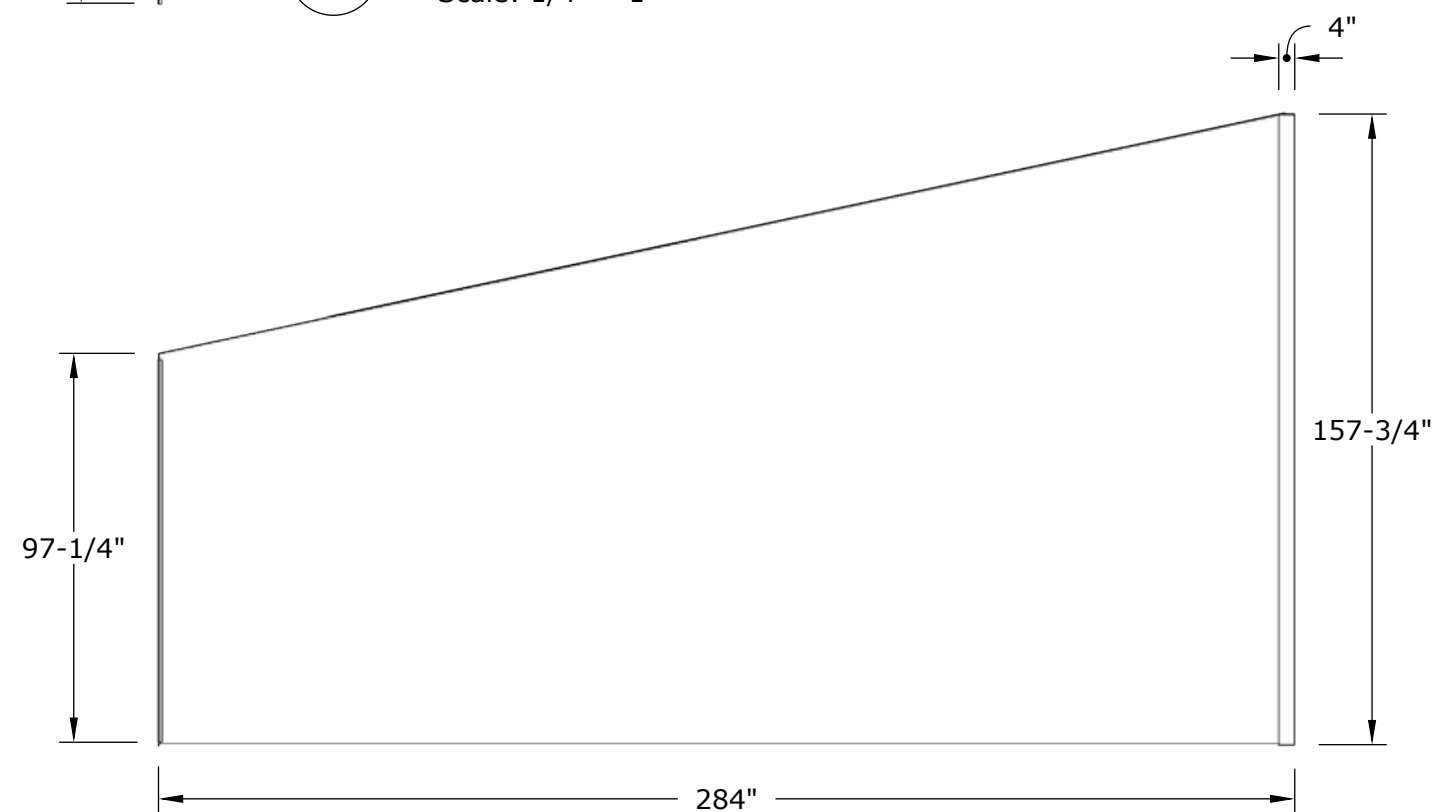
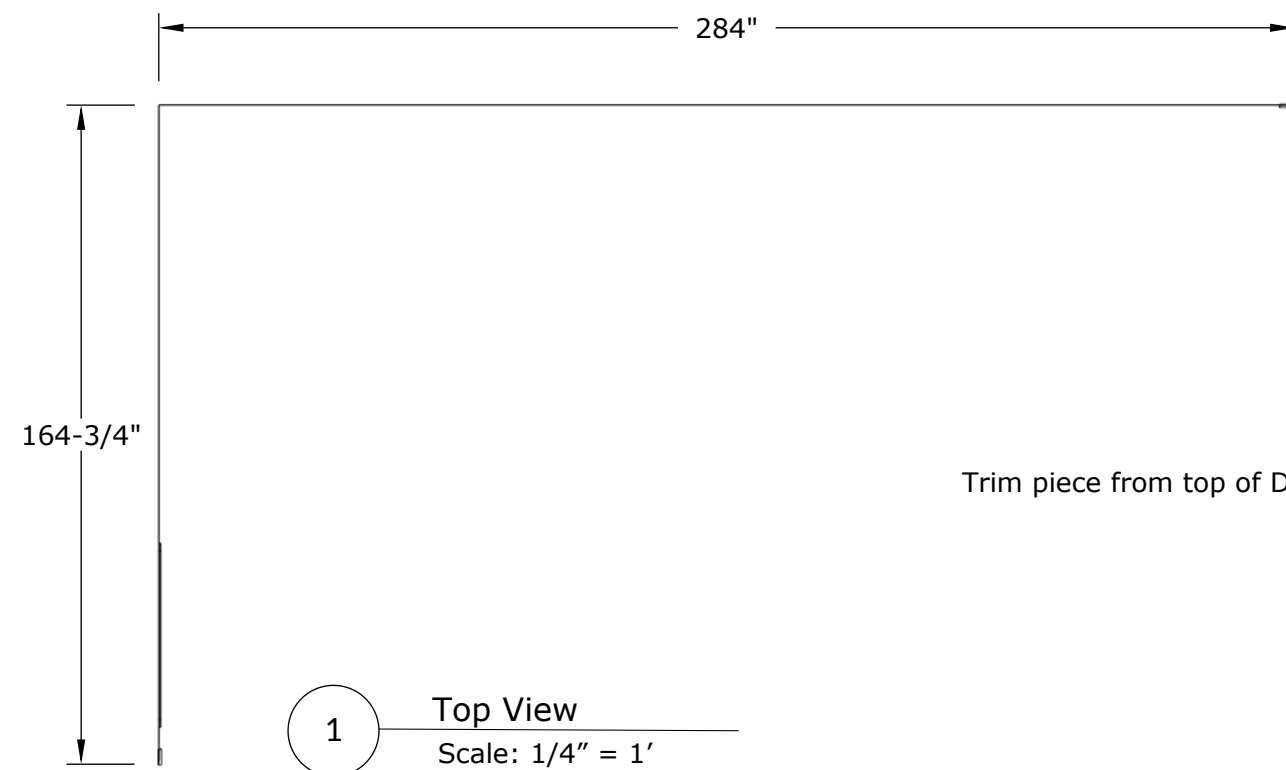
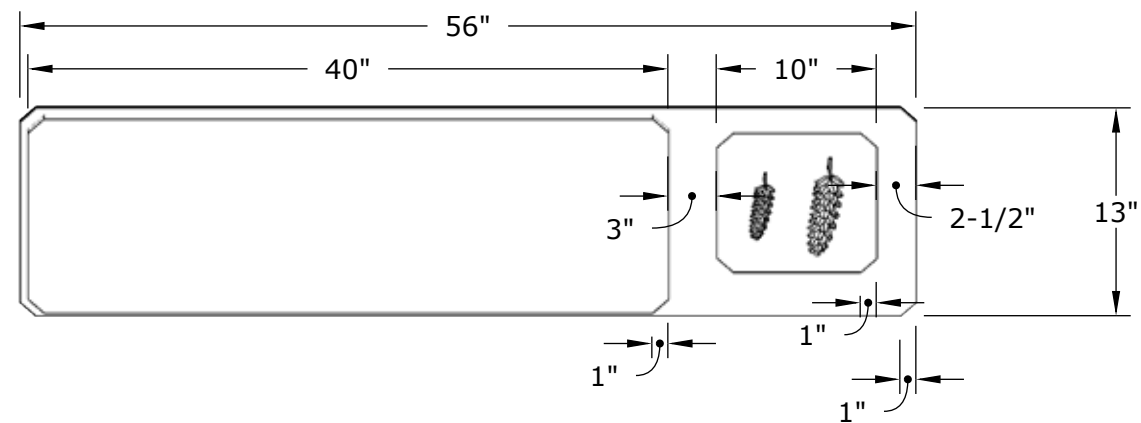
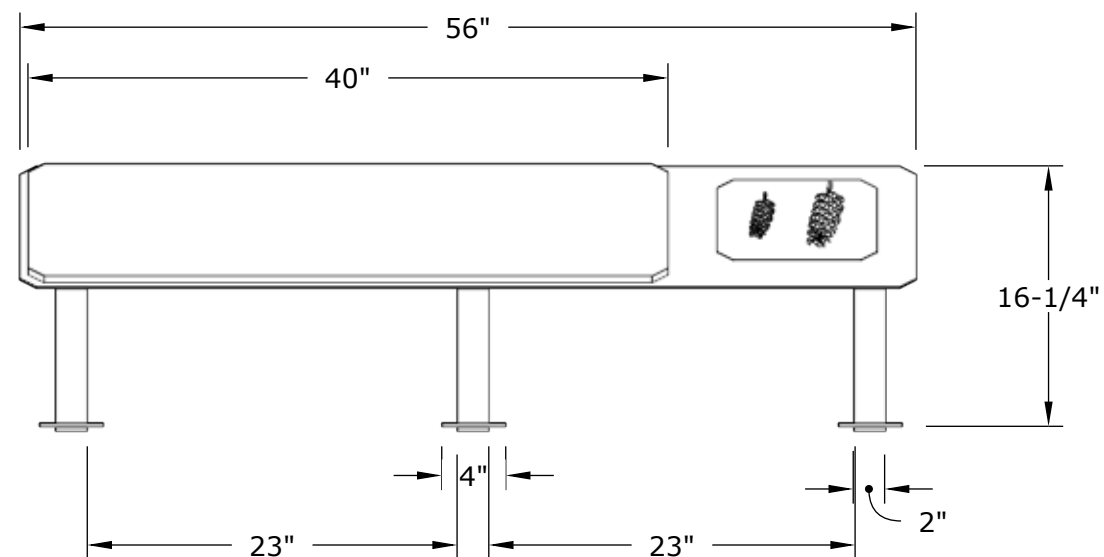




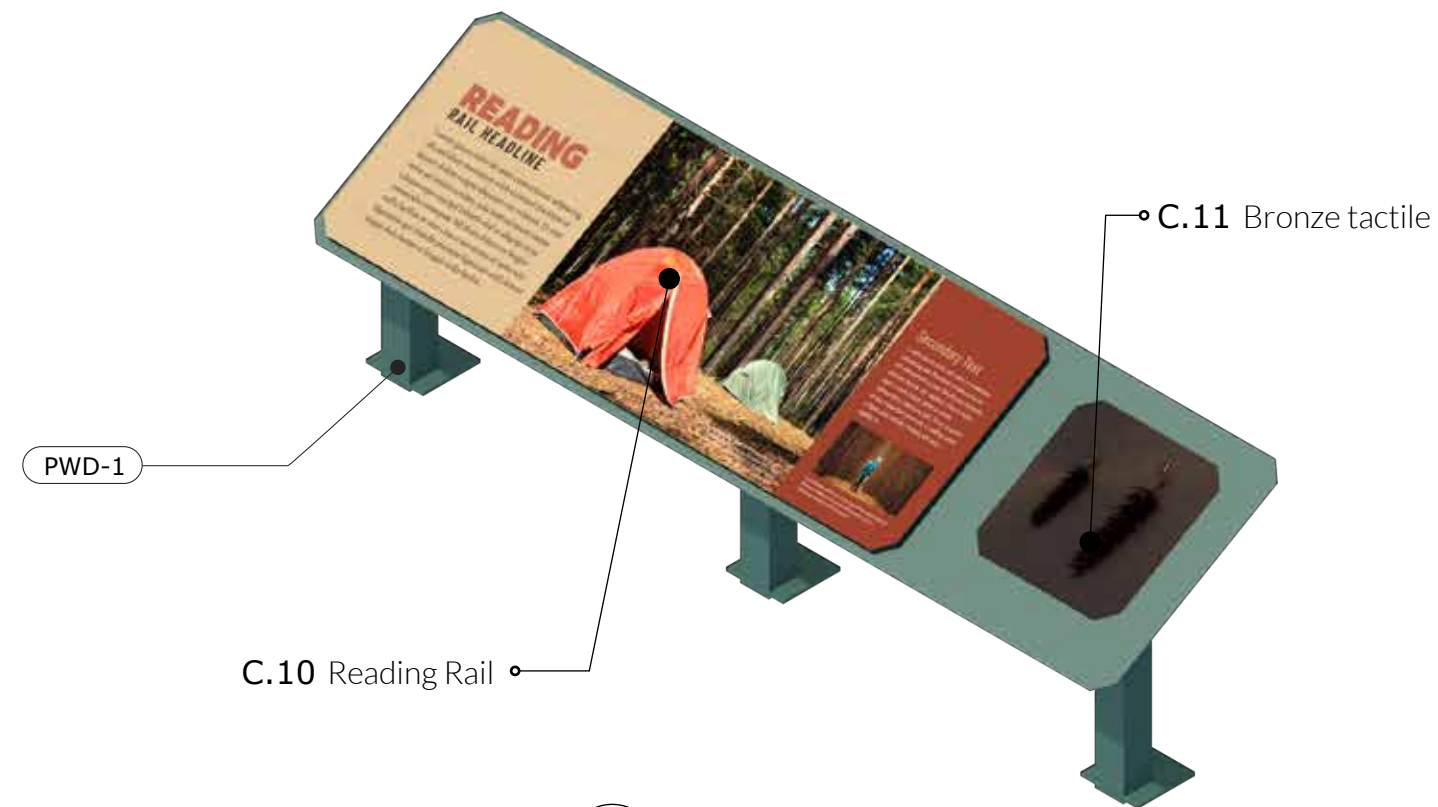




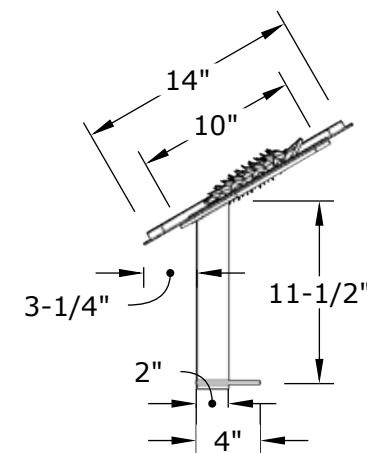
1 Top View
Scale: 1" = 1'



2 Front View
Scale: 1" = 1'

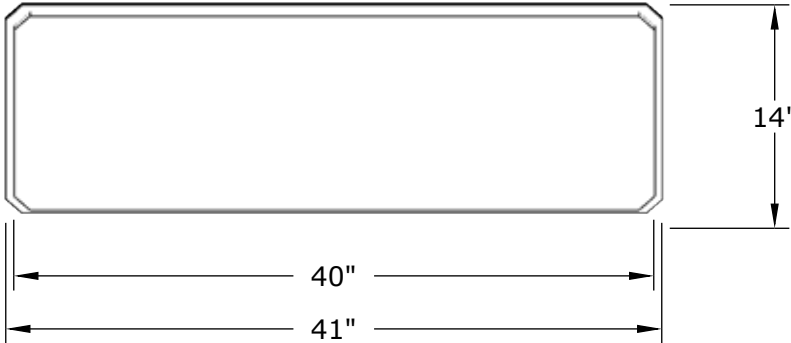


4 Isometric View
Scale: NTS

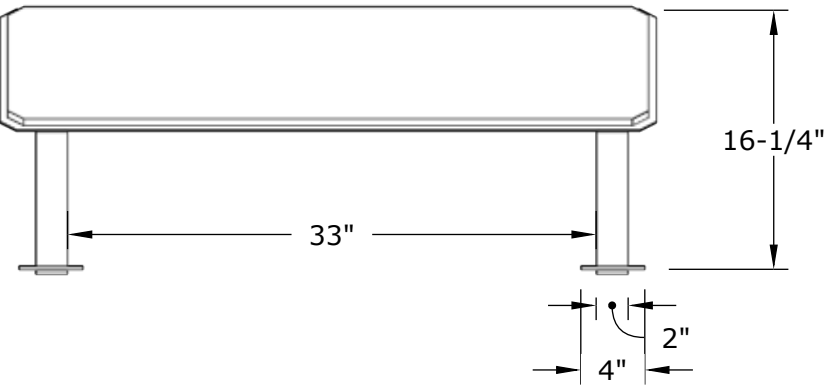


3 Right View
Scale: 1"=1'

X3



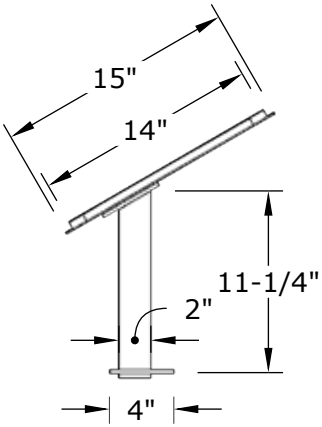
1 Top View
Scale: 1" = 1'



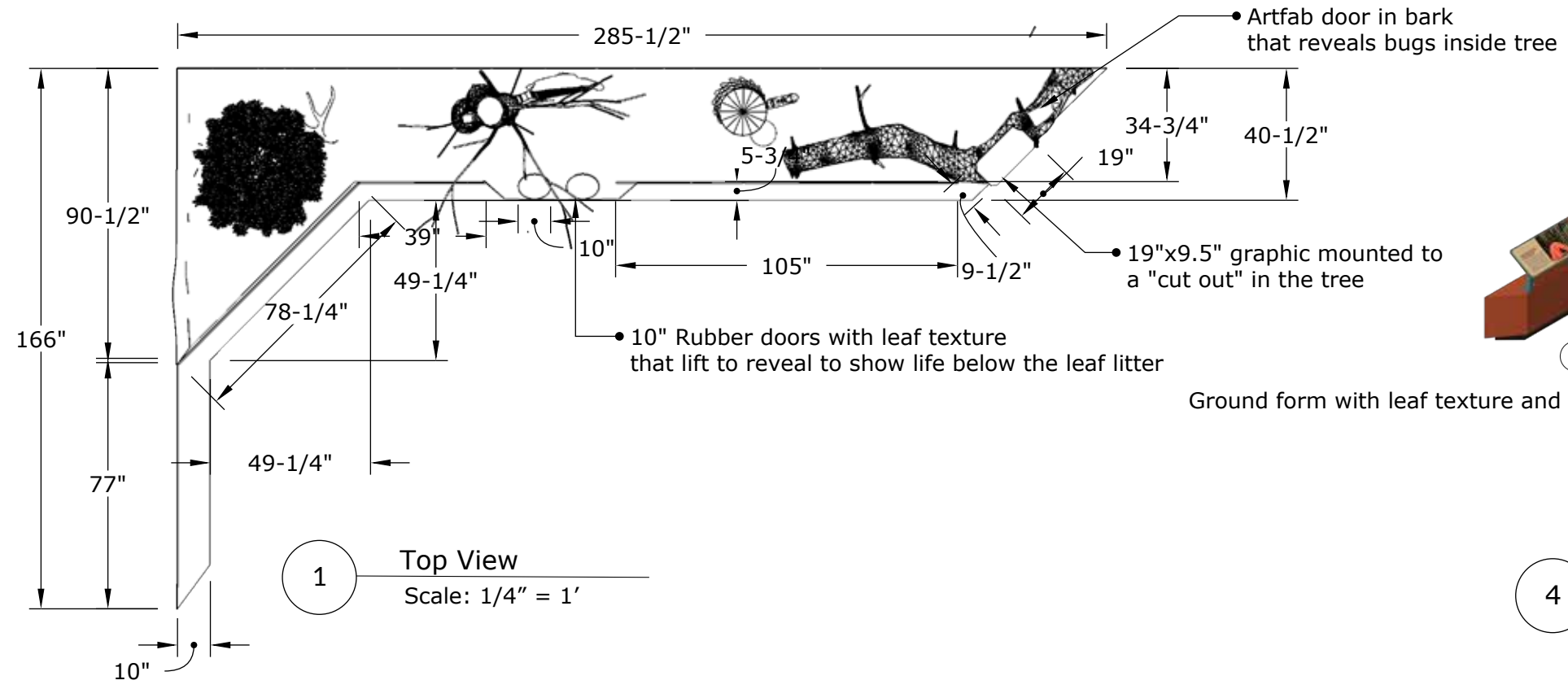
2 Front View
Scale: 1" = 1'



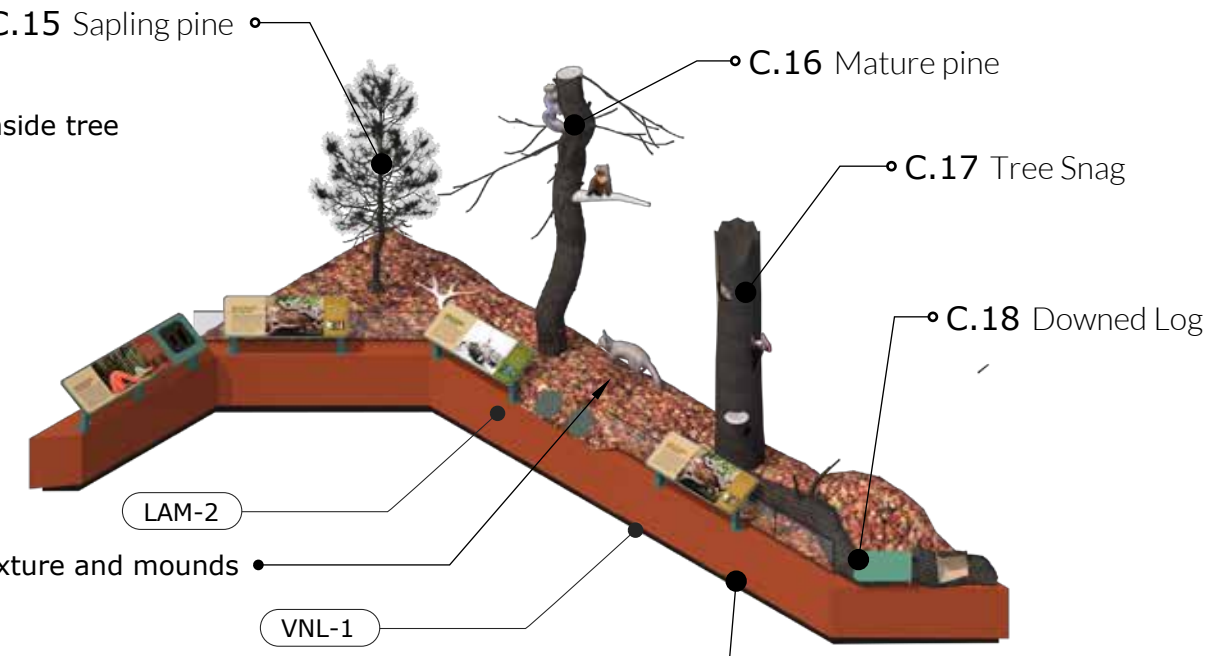
4 Isometric View
Scale: NTS



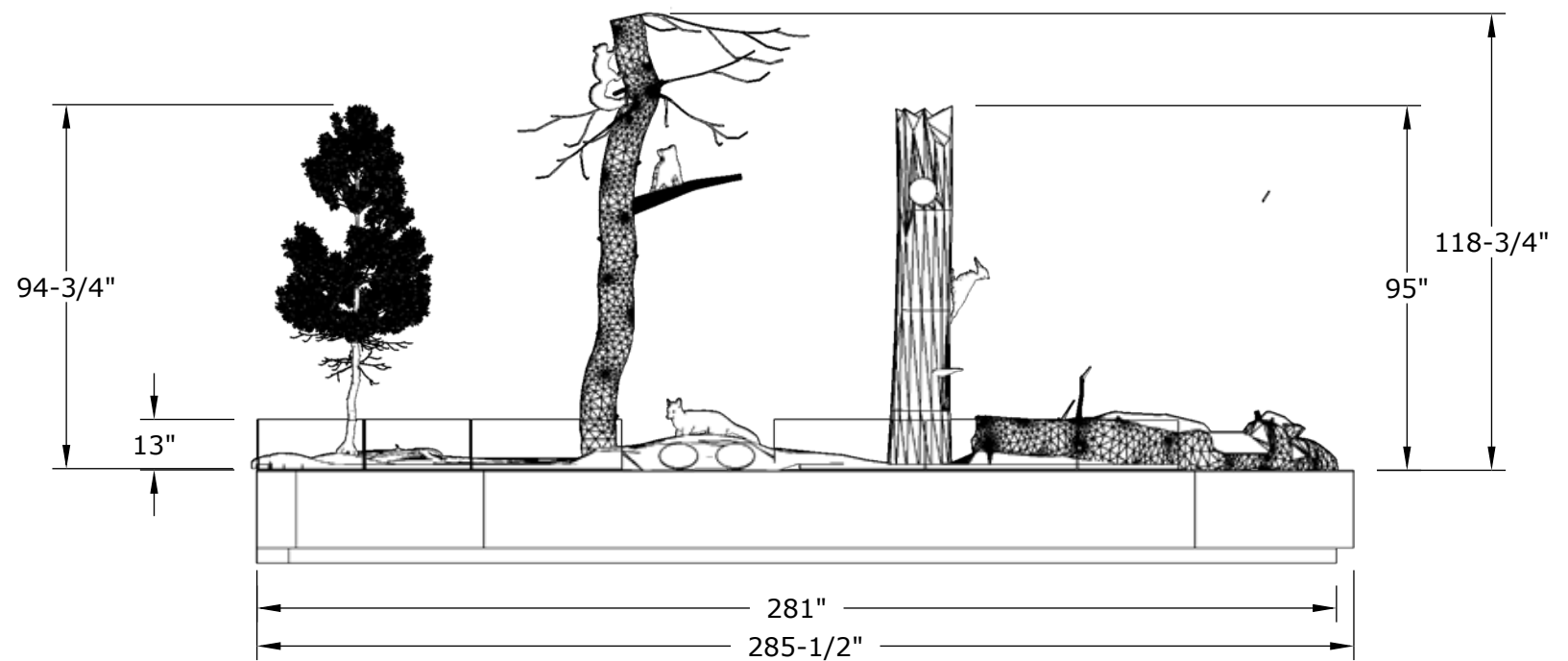
3 Right View
Scale: 1"=1'



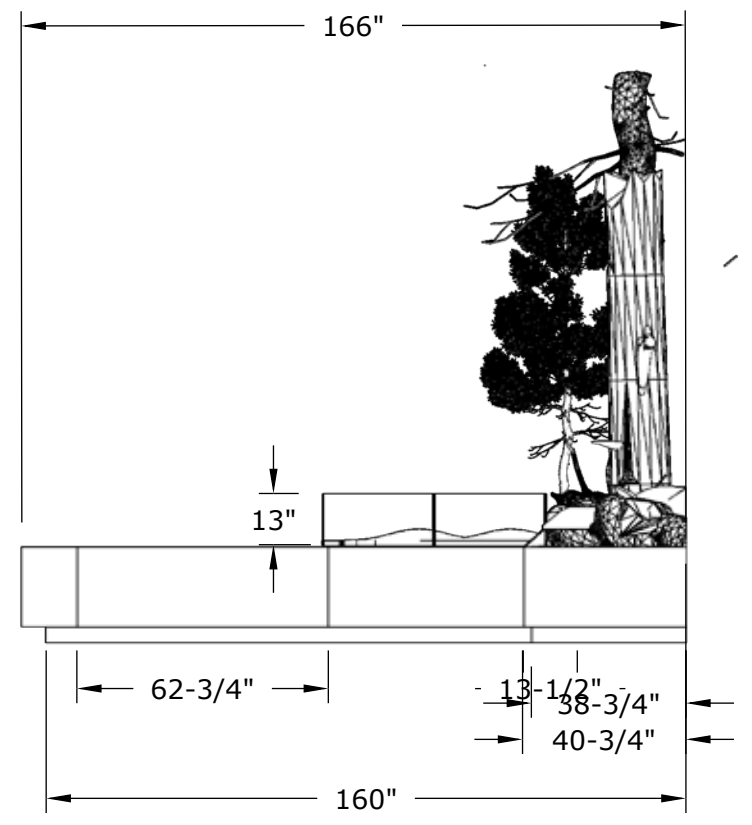
1 Top View
Scale: 1/4" = 1'



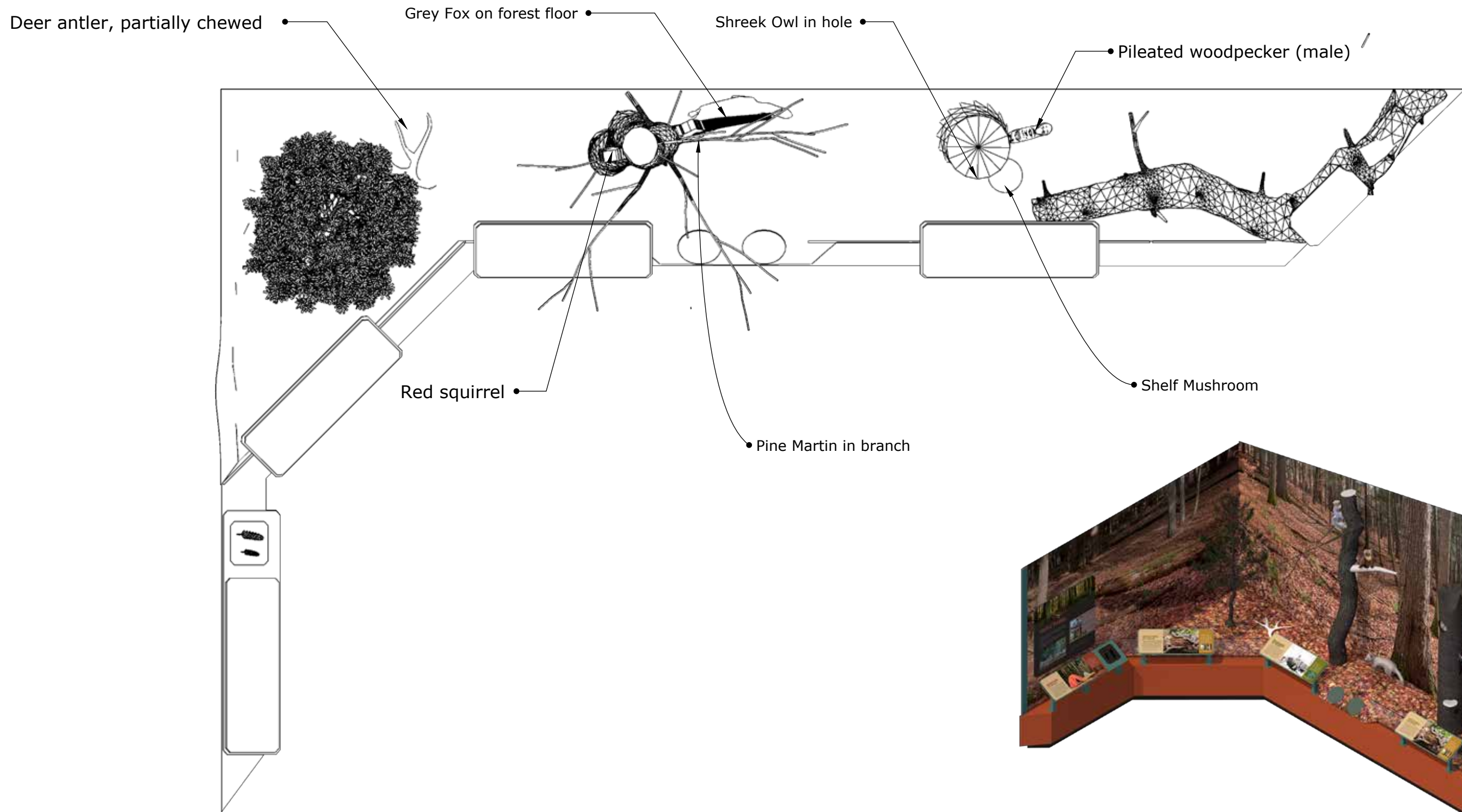
4 Isometric View
Scale: NTS



2 Front View
Scale: 1/4" = 1'



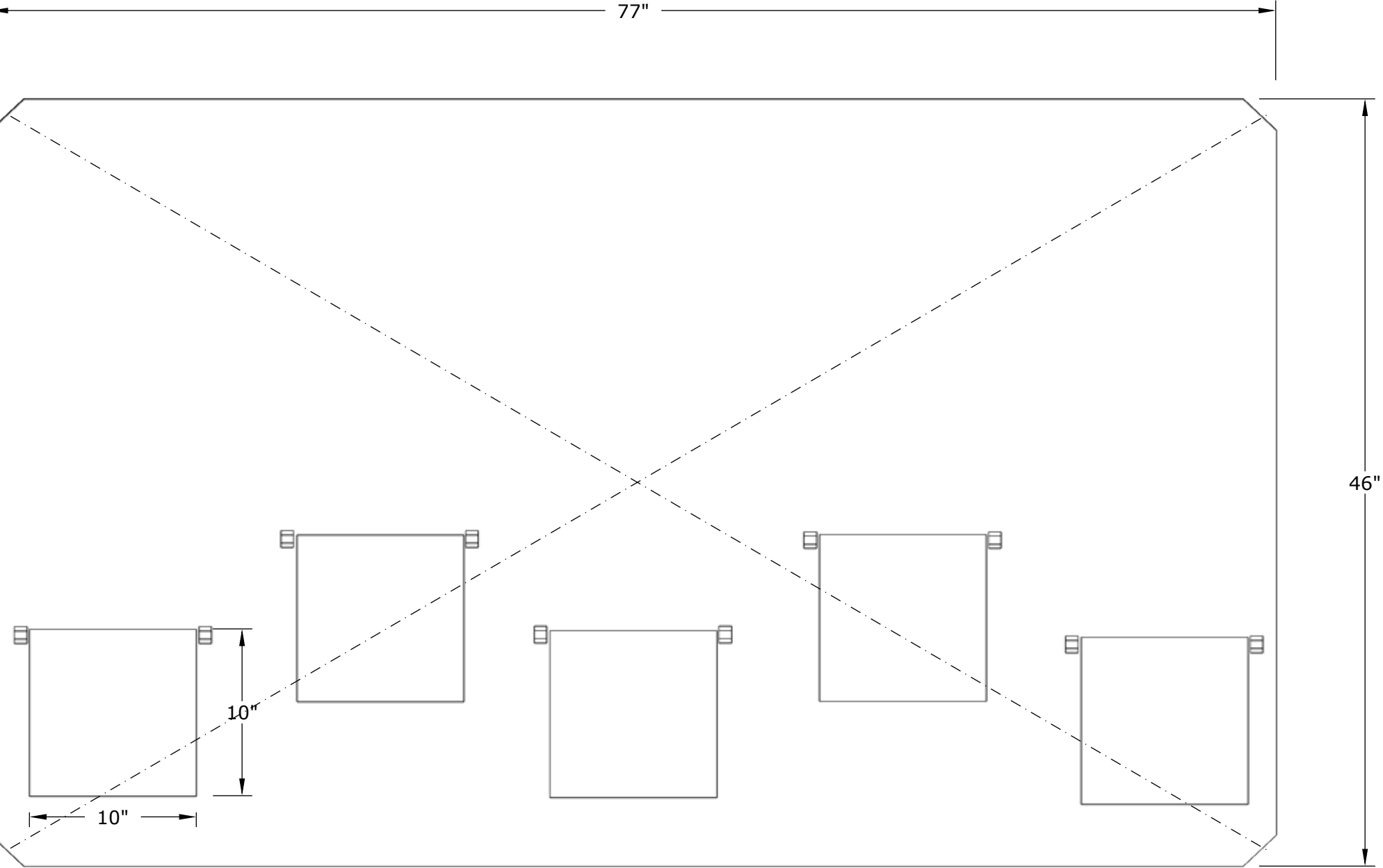
3 Right View
Scale: 1/4" = 1'



1 Top View
Scale: 1/2" = 1'

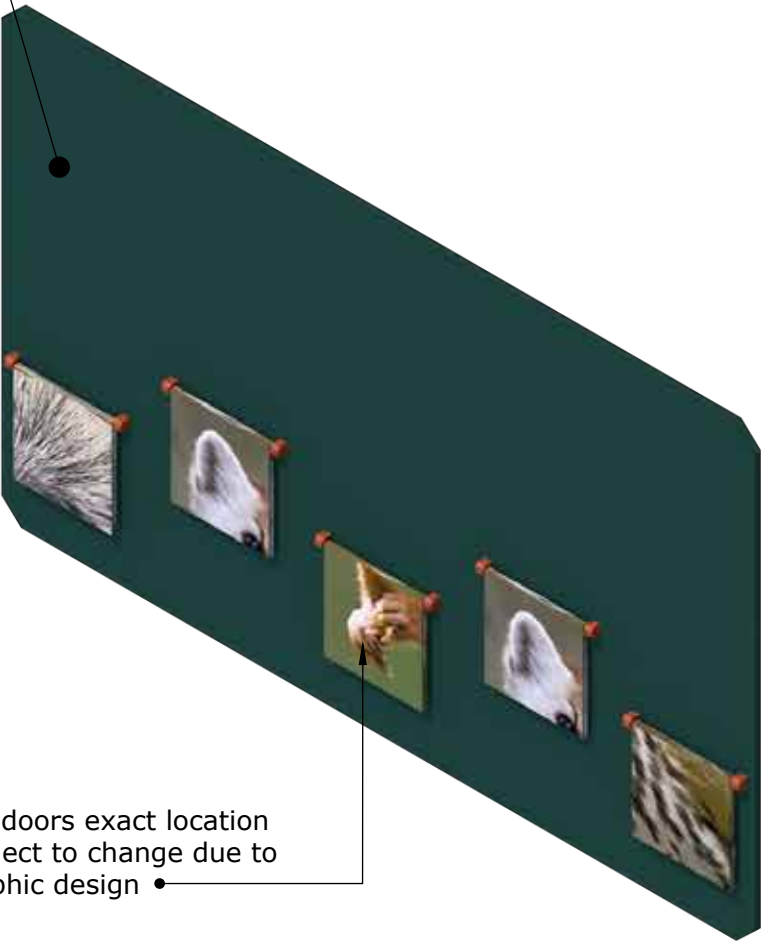


4 Isometric View
Scale: NTS



1 Front View
Scale: 1 1/2" = 1'

• C.20 Guess the Species from the Body Part graphic interactive



Flip doors exact location
subject to change due to
graphic design

NOTES:
A wall mounted interactive where visitors are asked to identify one of the "hero" species at Hartwick Pines State Park through a close-up photo of that animals predominant feature. The answer would be revealed under a vertical flip door.

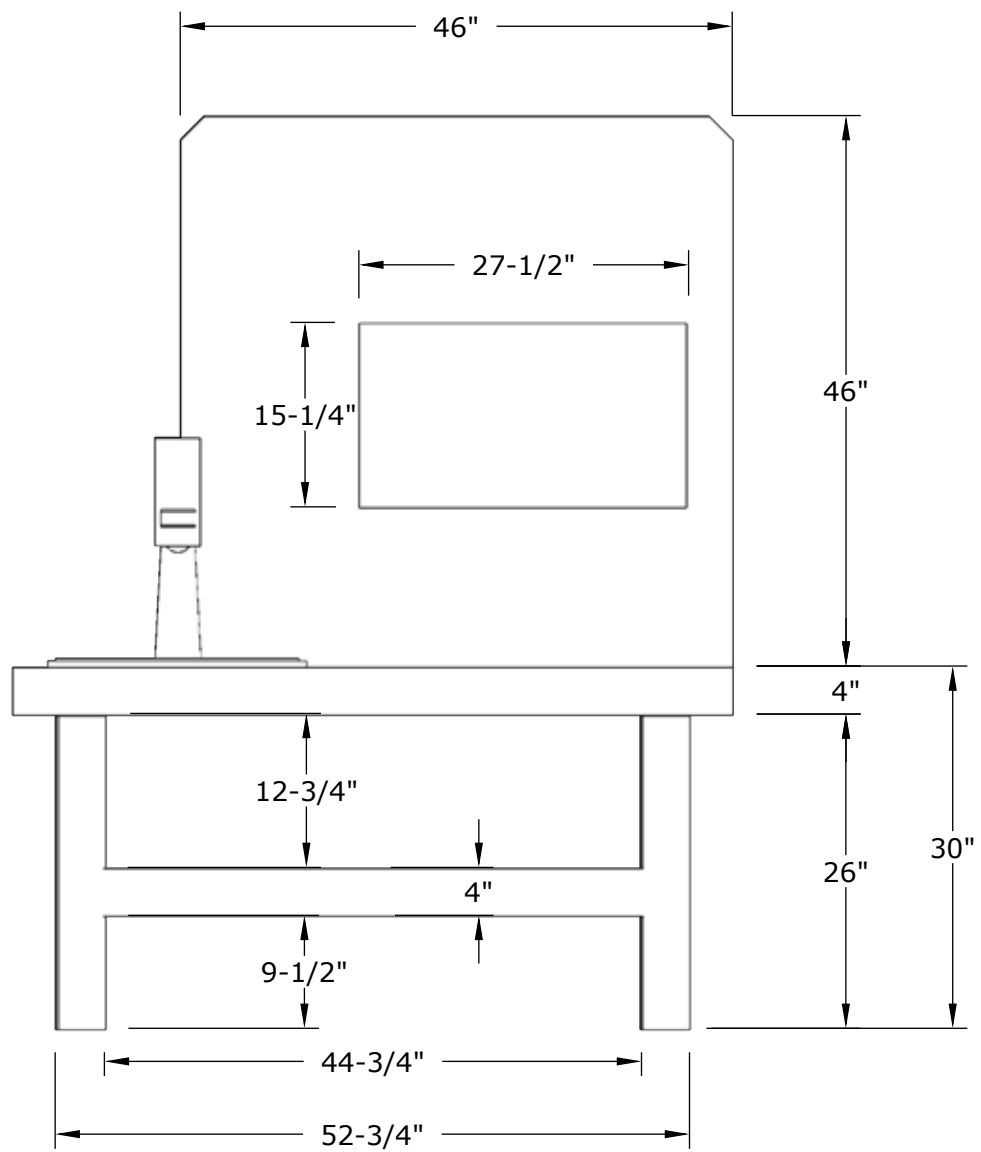
2 Isometric View
Scale: NTS

NOTES:

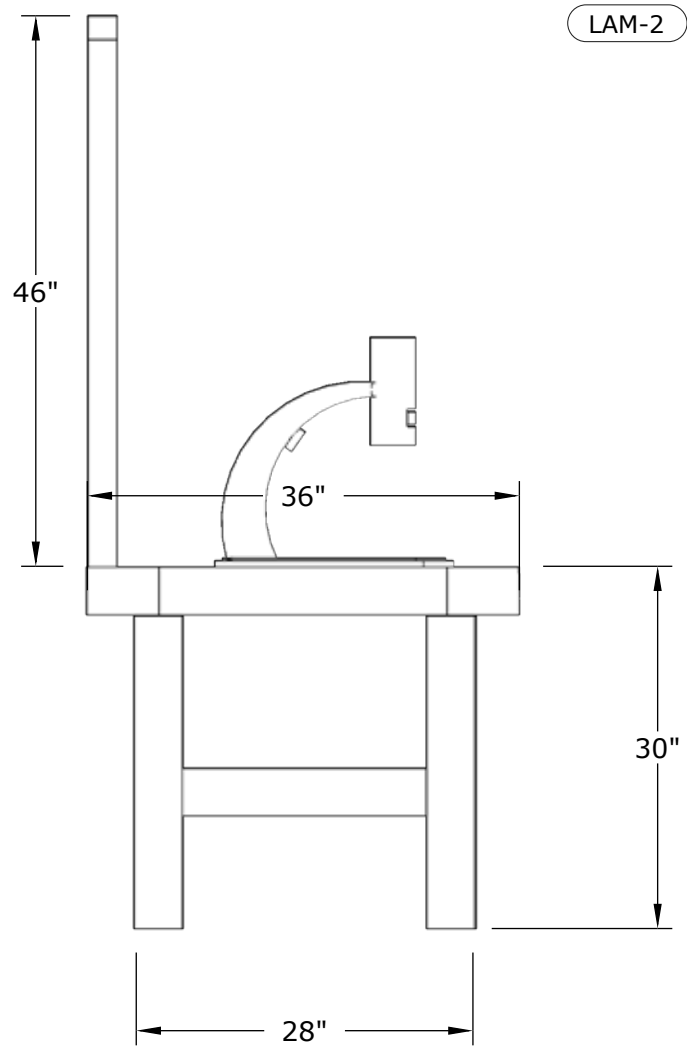
Laminated table with "log" legs.

Digital microscope connected to a monitor so multiple people can experience at once.

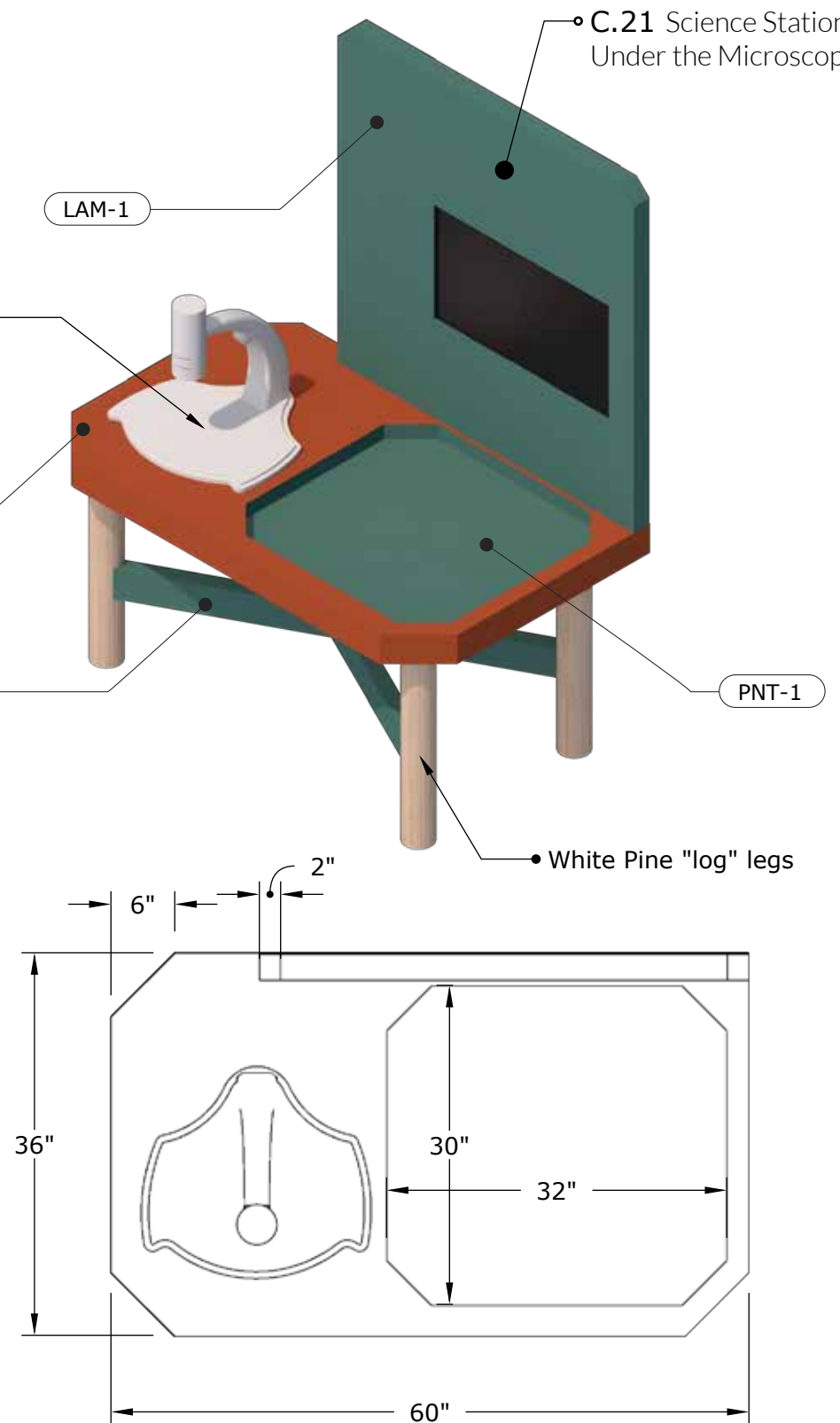
SRS will create poured resin cubes of client provided specimens



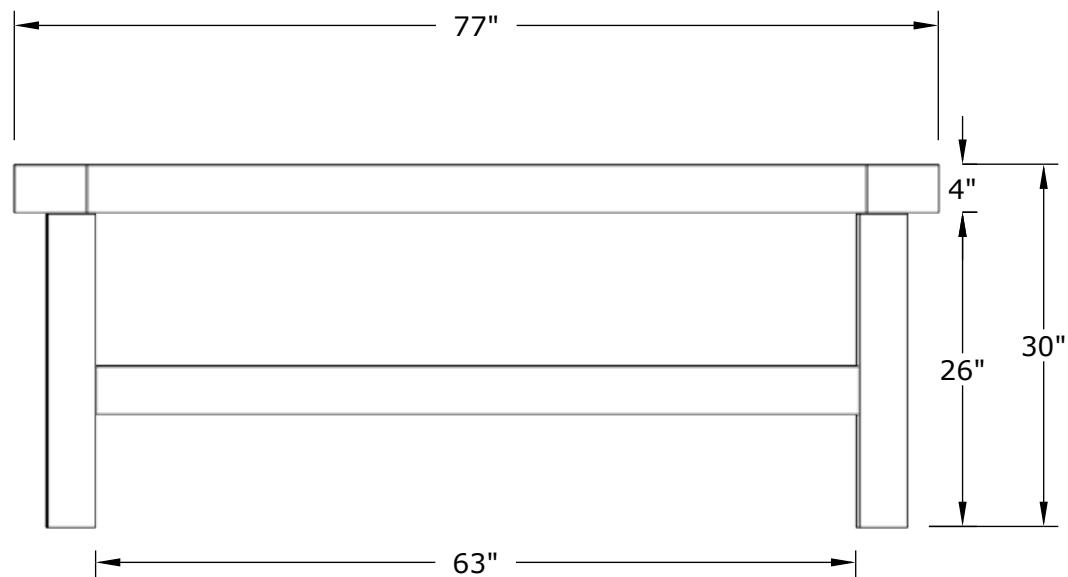
1 Front View
Scale: 3/4" = 1'



2 Left View
Scale: 3/4"=1'



3 Top View
Scale: 3/4" = 1'

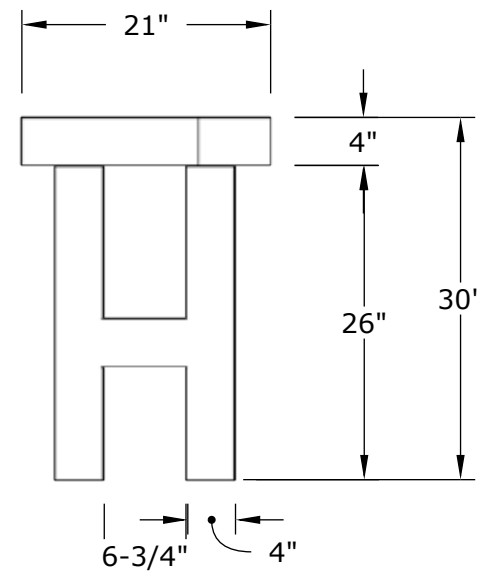


NOTES:

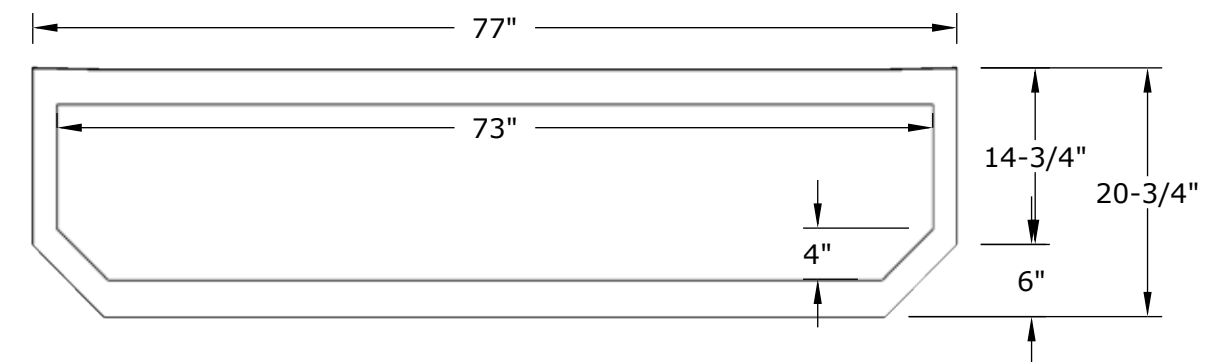
Laminated table with "log" legs.

A table for visitors to touch client provided nature specimen.

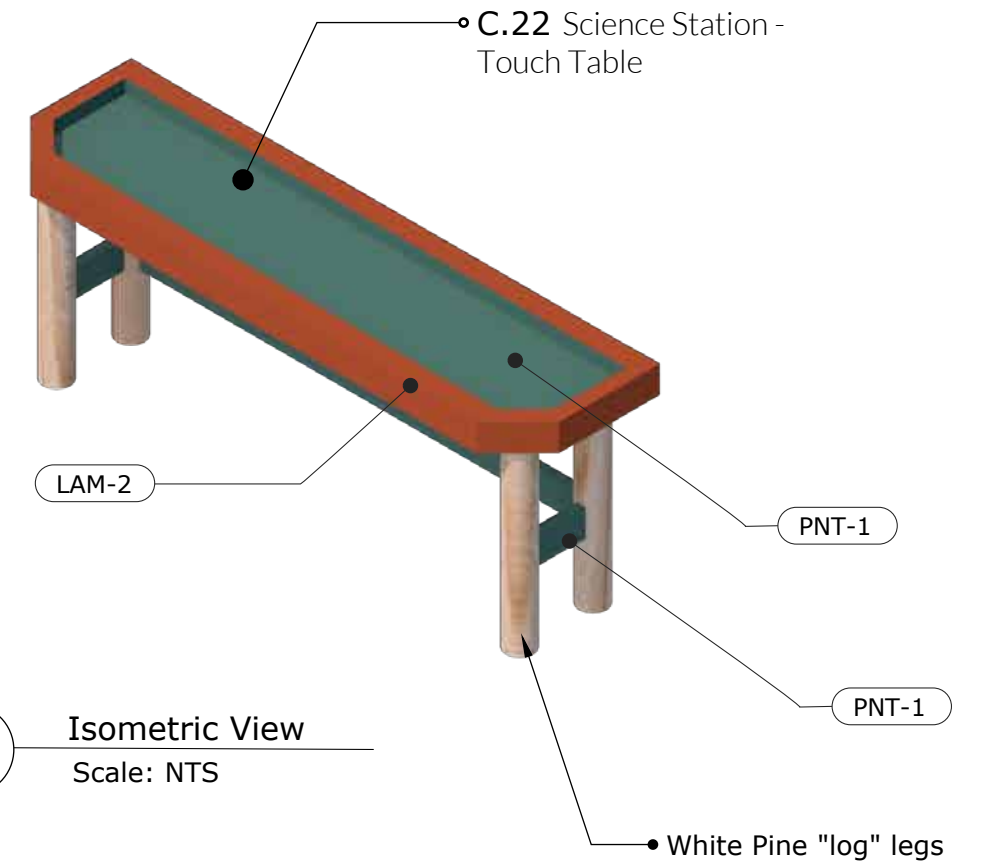
1 Front View
Scale: 3/4" = 1'



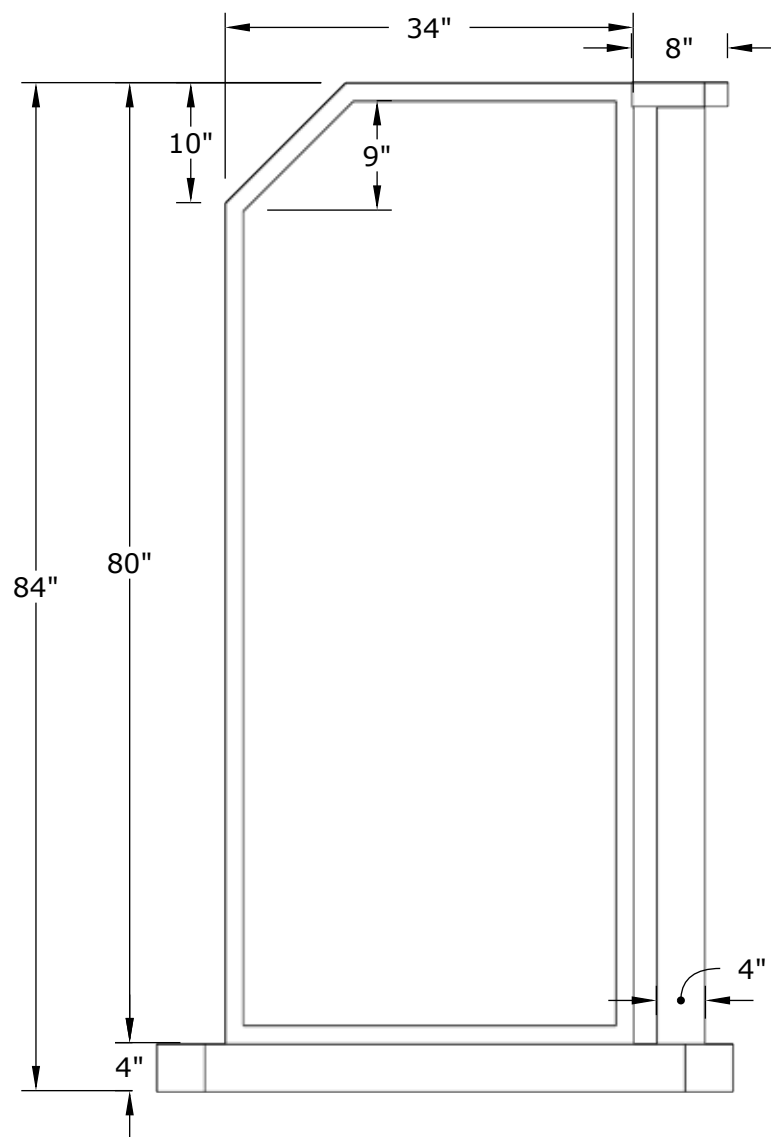
2 Left View
Scale: 3/4"=1'



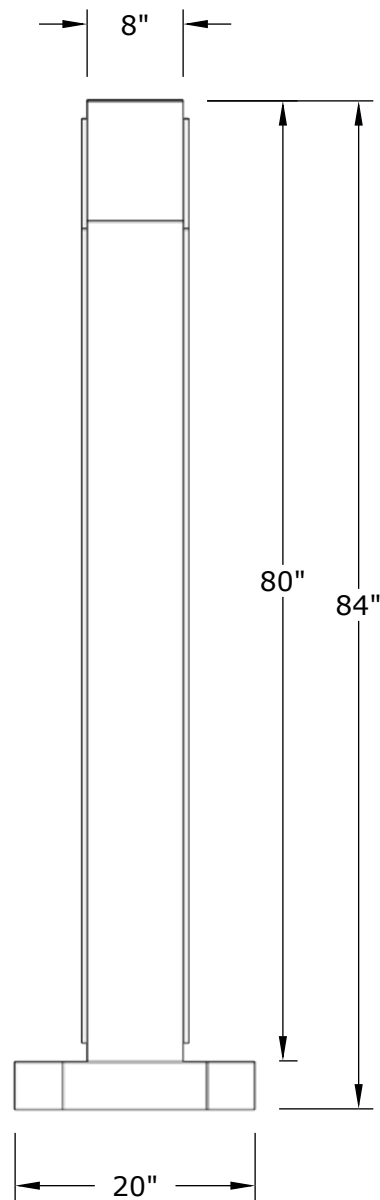
3 Top View
Scale: 3/4" = 1'



4 Isometric View
Scale: NTS



1 Front View
Scale: 3/4" = 1'



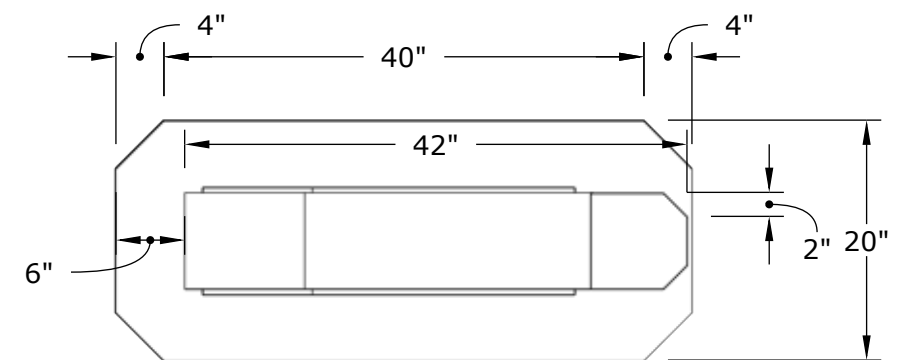
2 Left View
Scale: 3/4"=1'

NOTES:
Laminated kiosk with a core sample inside of a plexi tube mounted to the side of it.

Surface mounted graphic

LAM-2

4 Isometric View
Scale: NTS

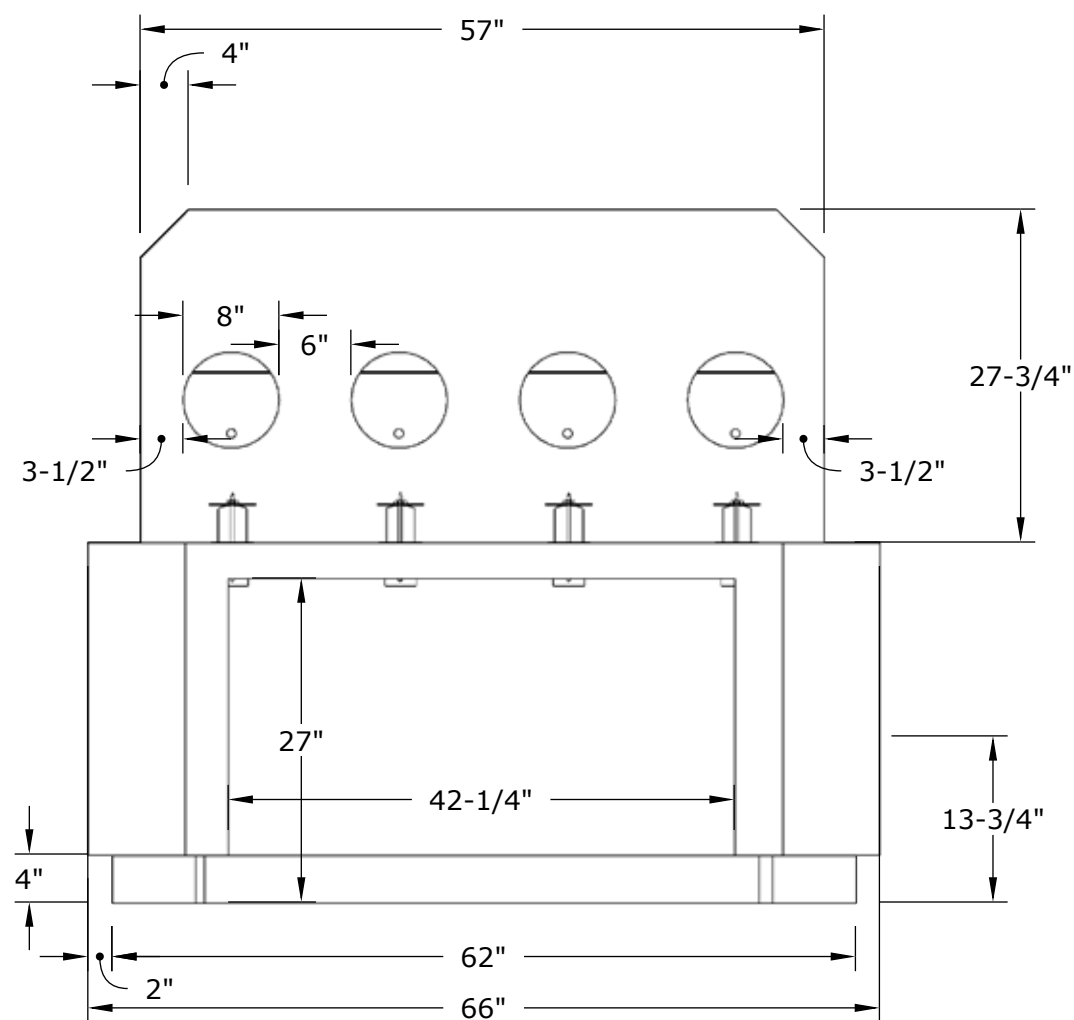


3 Top View
Scale: 3/4" = 1'

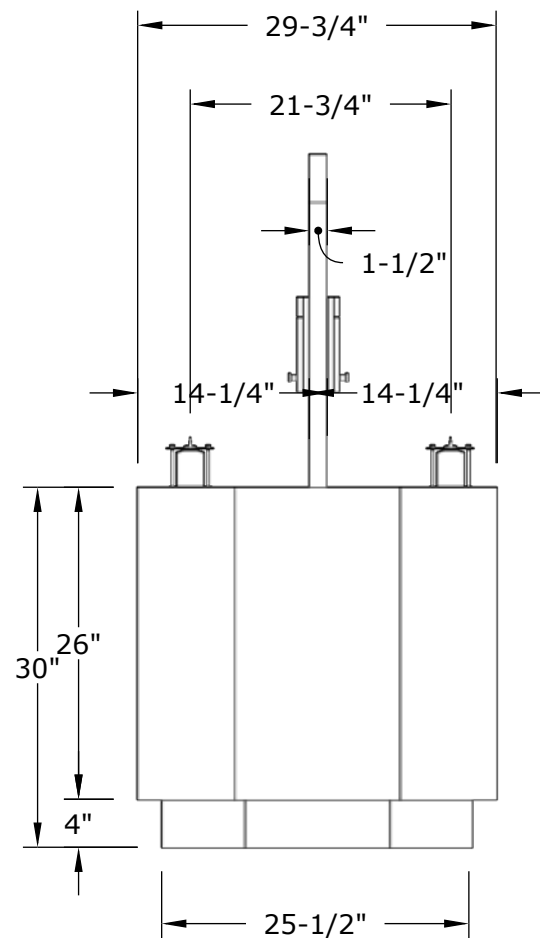
NOTES:

Laminated kiosk with 8 squeeze bottle smell stations. These smells could be switched out seasonally or around special events.

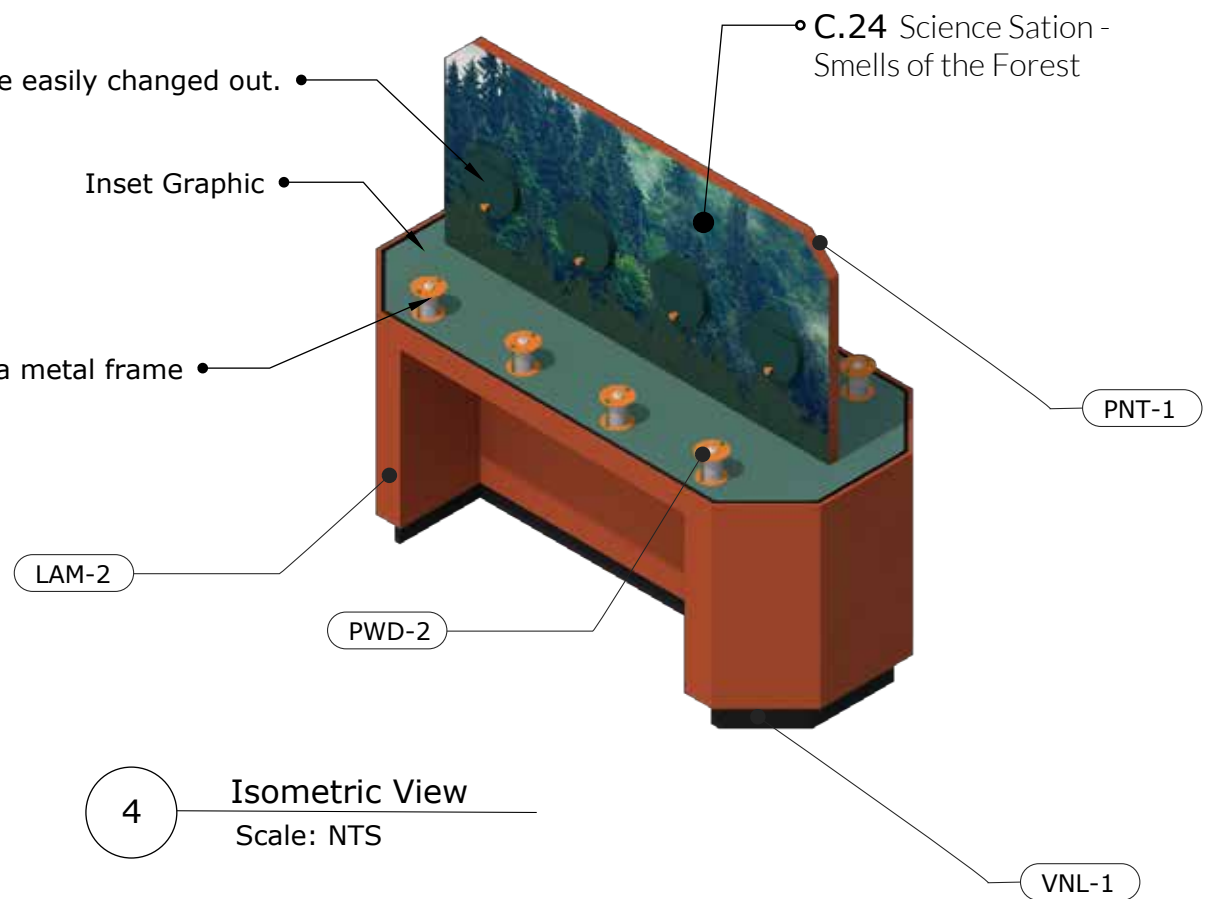
The circular graphics rotate to reveal what smells you are smelling. Both the rotating graphic and the reveal would need to be removed and then the reveal graphic changed when the smells change.



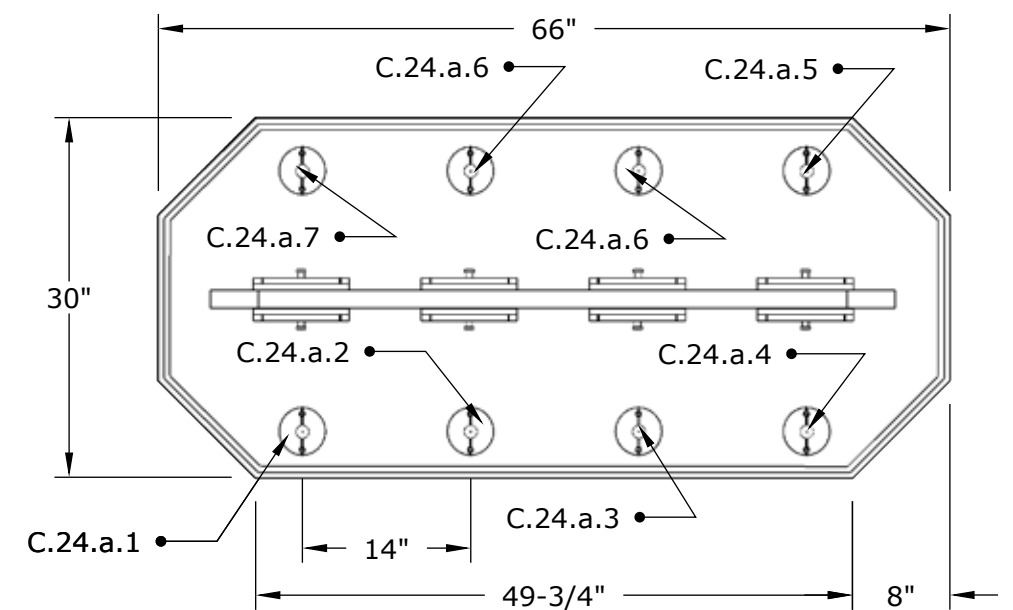
1 Front View
Scale: 3/4" = 1'



2 Left View
Scale: 3/4"=1'

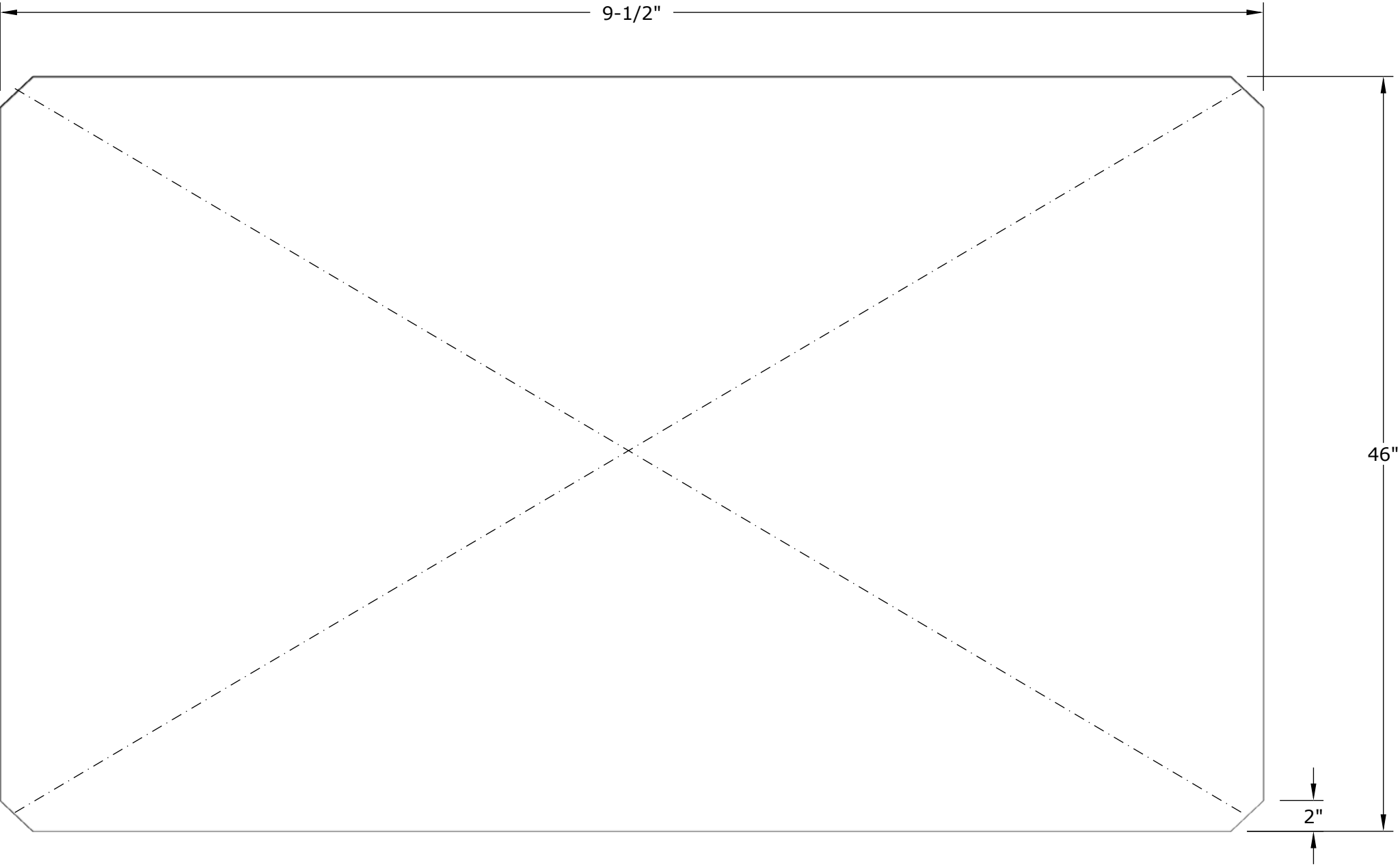


4 Isometric View
Scale: NTS



3 Top View
Scale: 3/4" = 1'

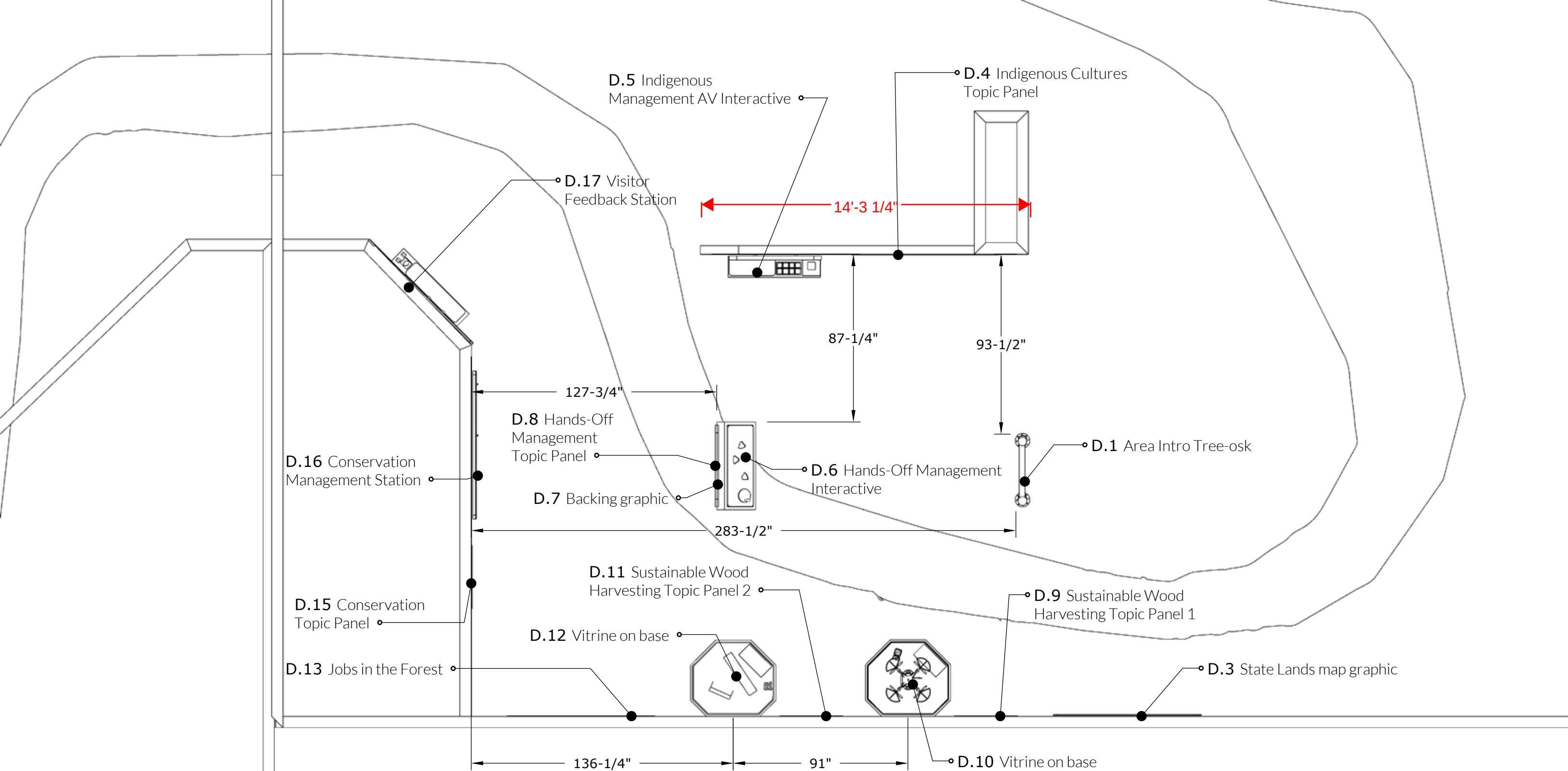
X4



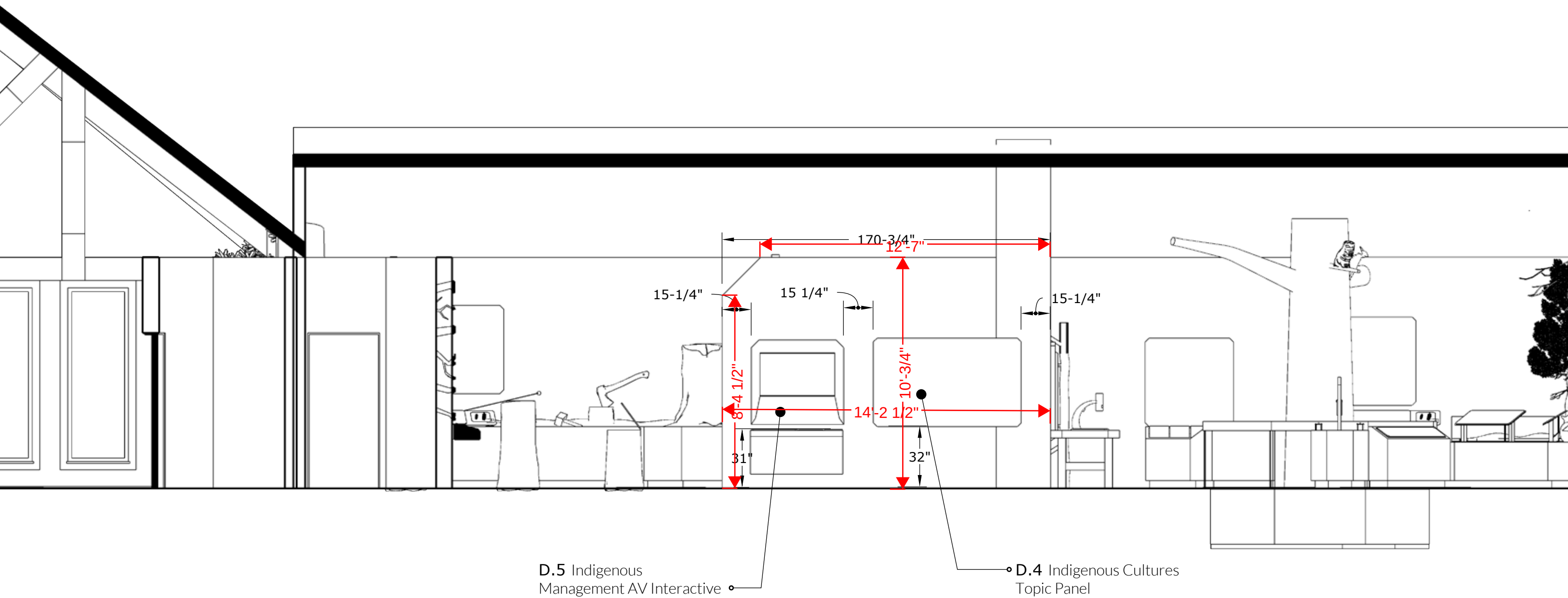
1 Front View
Scale: 1 1/2" = 1'



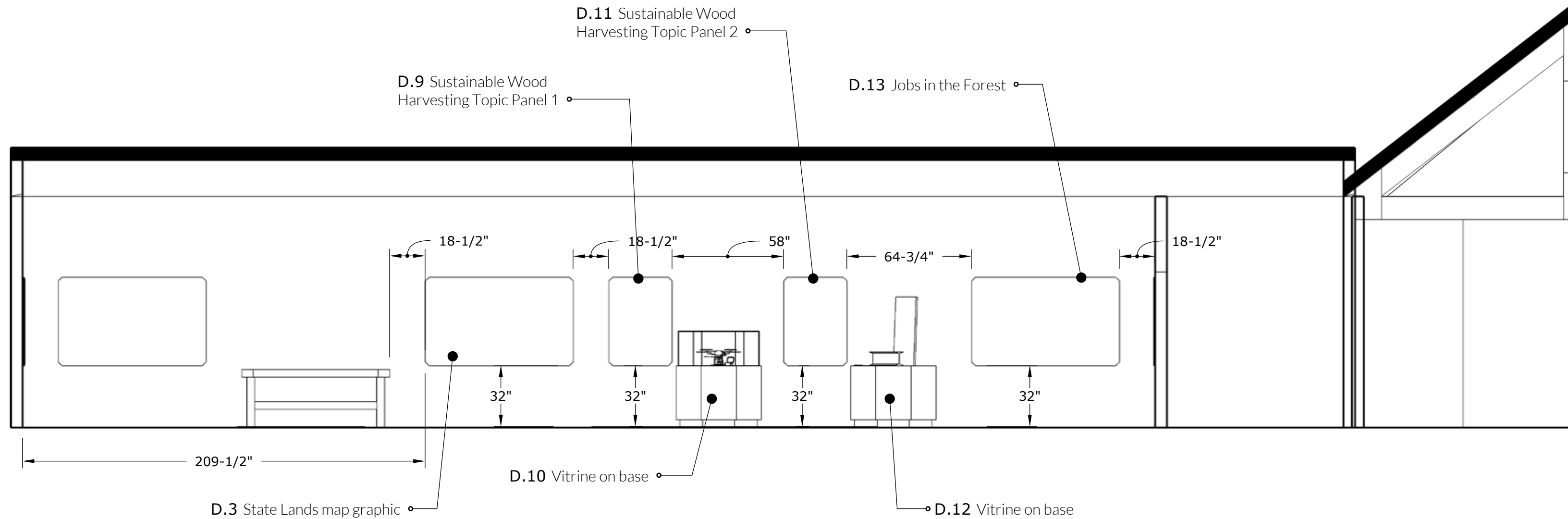
2 Isometric View
Scale: NTS



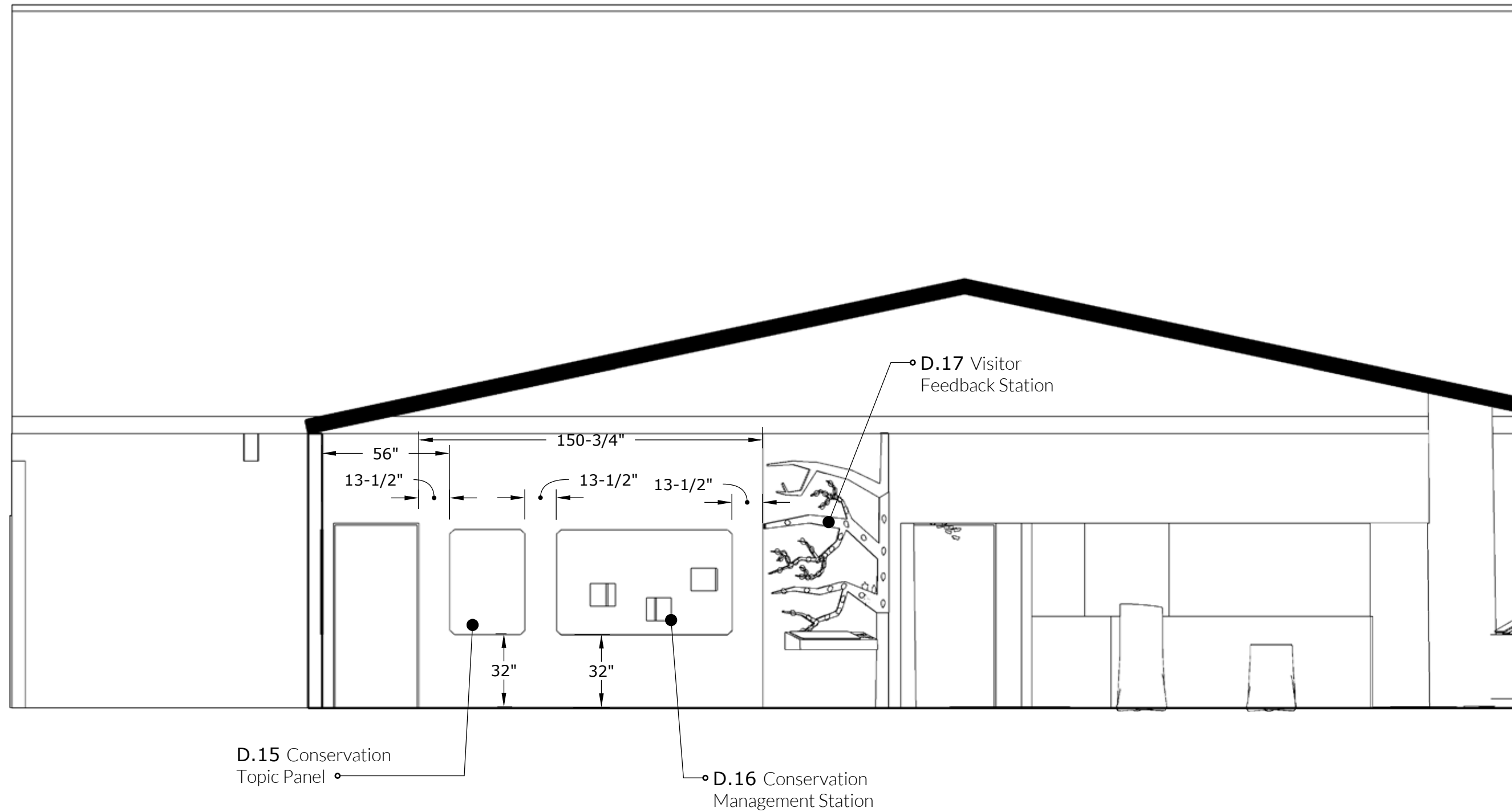
1 Area D Plan View
Scale: 1/4" = 1'



1 Area D Elevation (6) 1
Scale: 1/4" = 1'



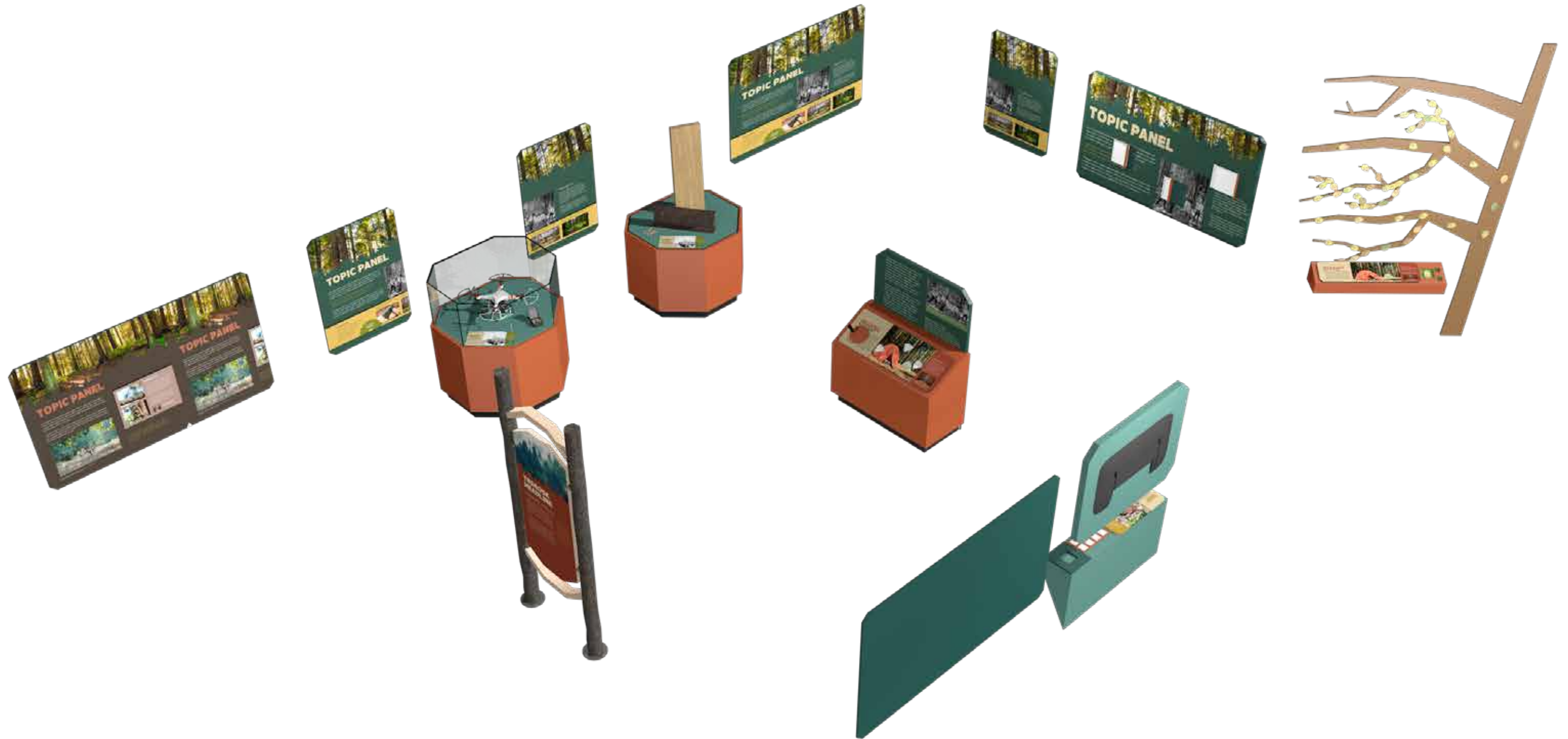
1 Area C Elevation (3) 2
Scale: 1/4" = 1'



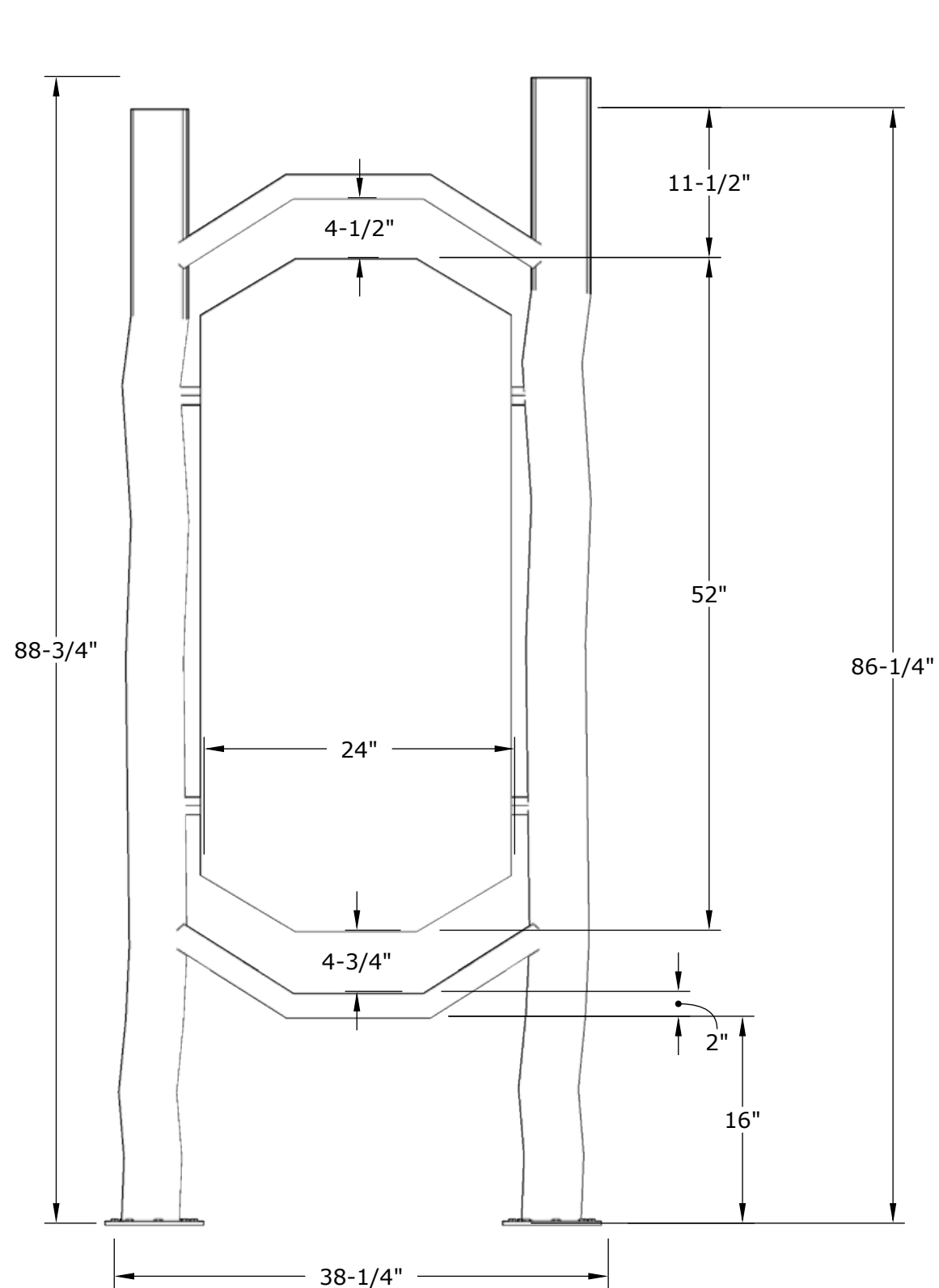
1 Area C Elevation (4) 3
Scale: 1/4" = 1'



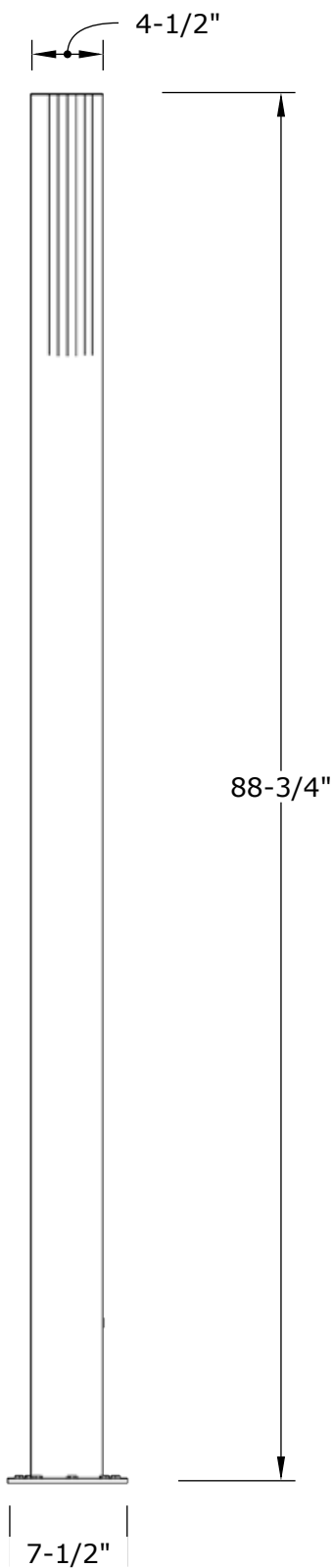




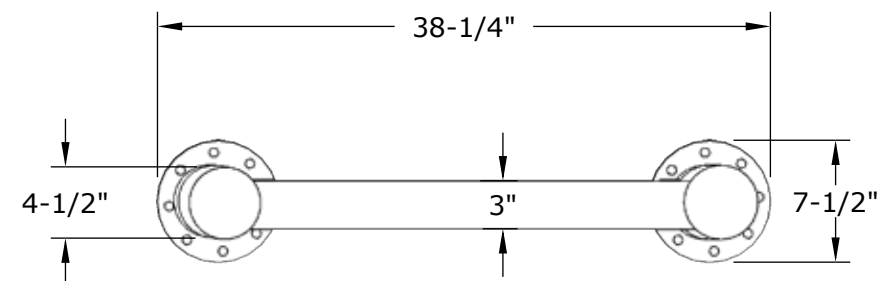




1 Front View
Scale: 1" = 1'



2 Right View
Scale: 1"=1'



3 Top View
Scale: 1" = 1'



4 Isometric View
Scale: NTS

NOTES:

Currently priced to be sculpted legs resembling real bark of a sugar maple.

Double sided graphic

Bolted to the ground.

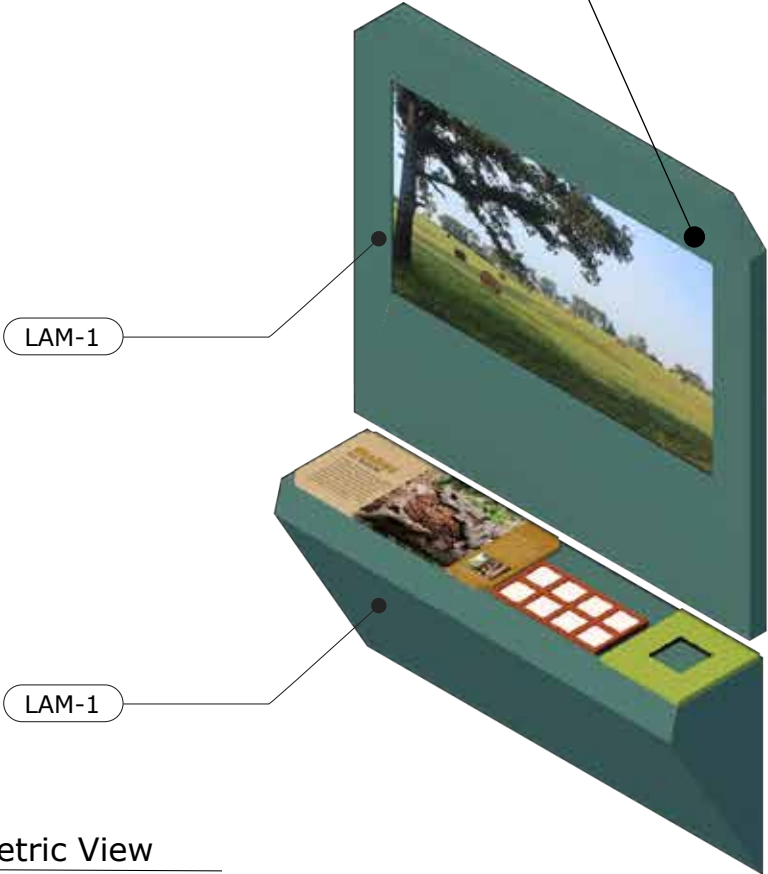
NOTES:

Laminated wall mounted kiosk with a 50" monitor in it. On the kiosk would be several RFID cubes showing various animals and plants of the eco system. Removing a cube and placing it on the space to the right (RFID Reader under the table) would trigger a slide to change that shows what happens to the eco system without that component of nature.

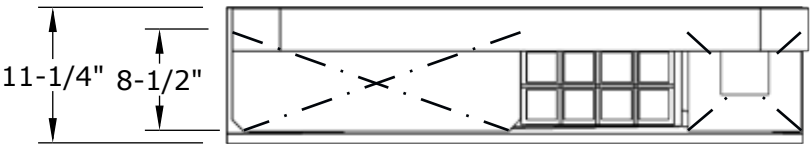
If not played with after a certain amount of time a slideshow of images would play of area wildlife. This would act as the attract screen.

This Interactive would require a brightsign player (or equivalent) a controller and the non touch monitor, along with an RFID reader and several chips laminated into graphics

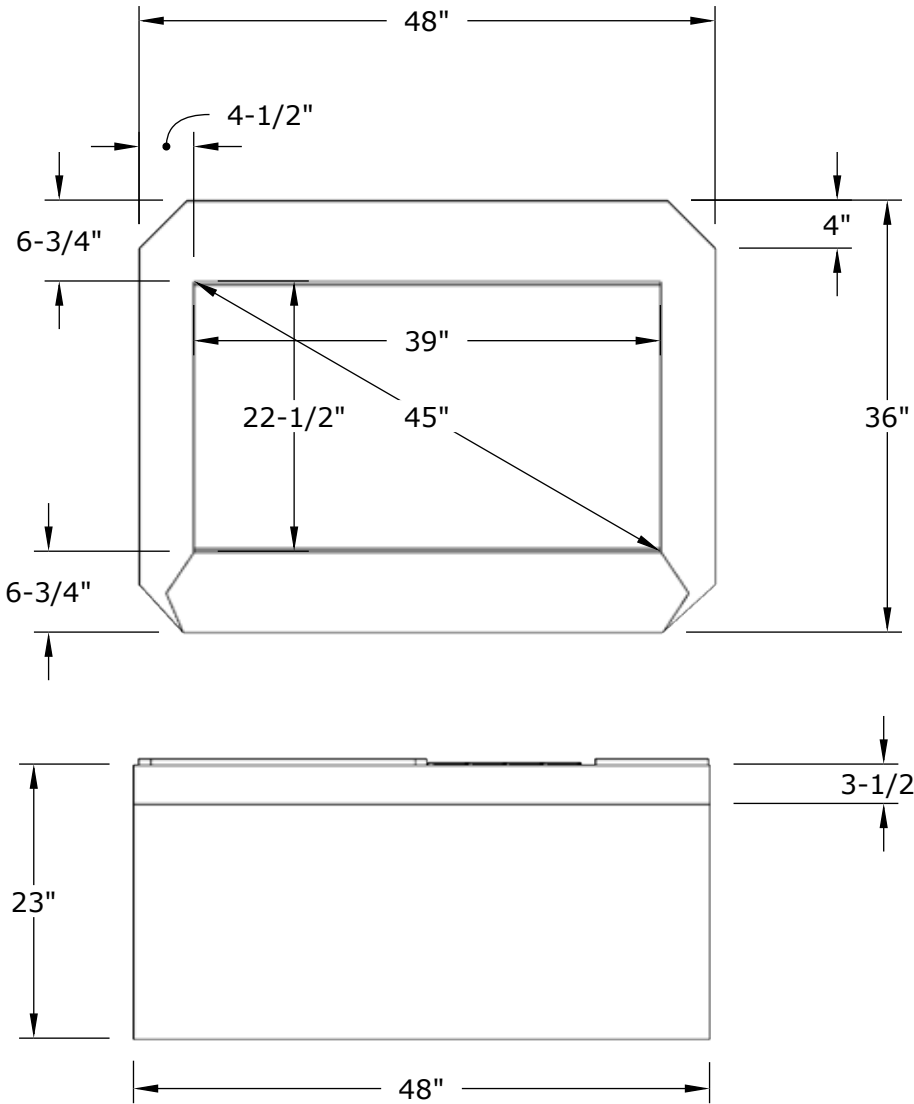
**D.5 Indigenous
Management AV Interactive**



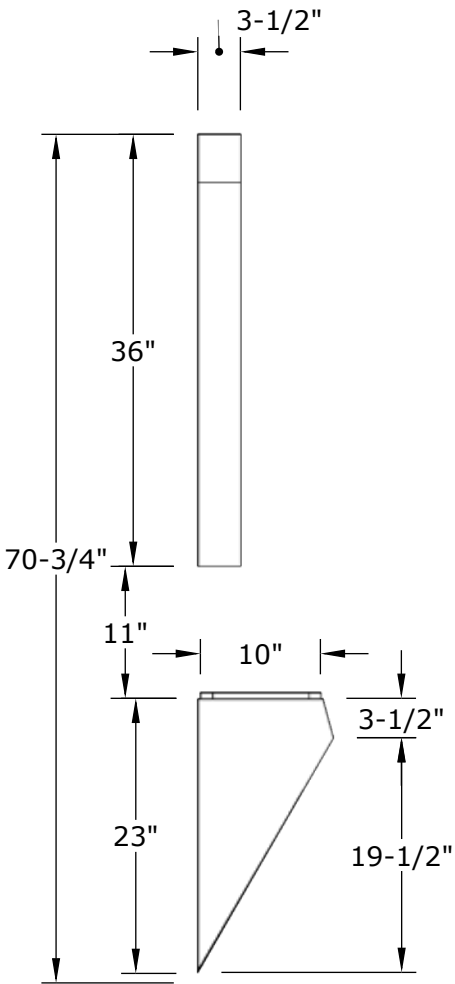
4 Isometric View
Scale: NTS



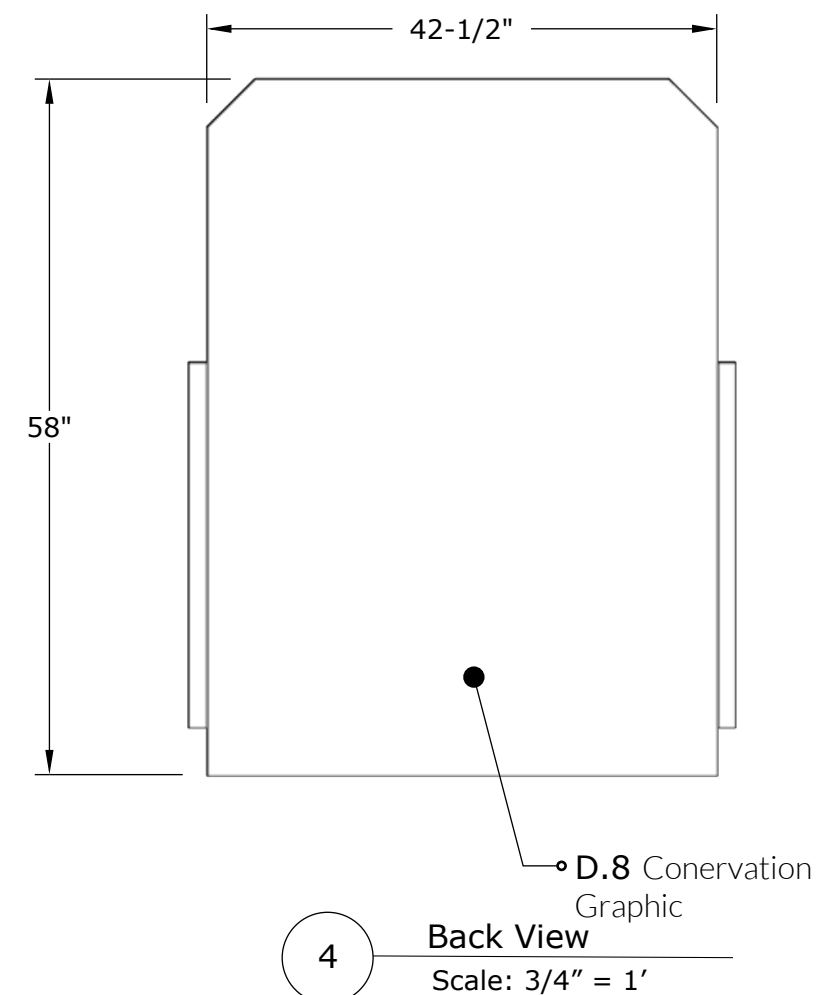
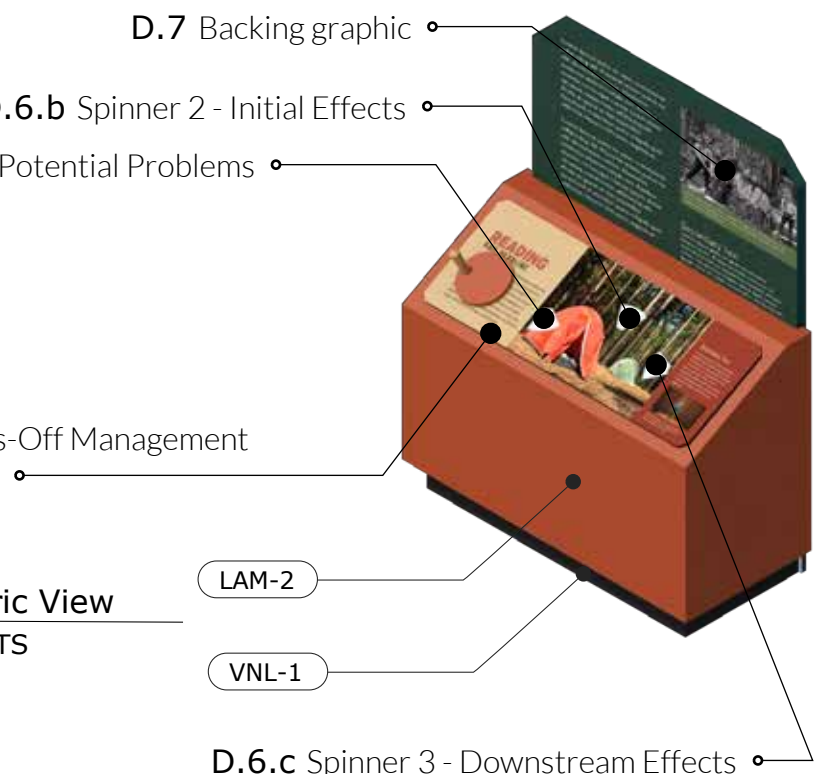
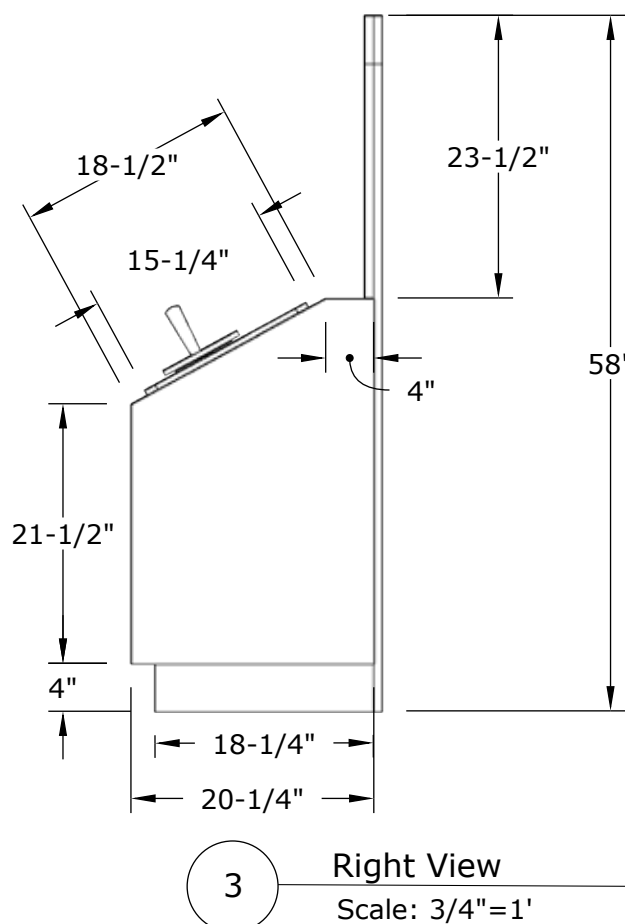
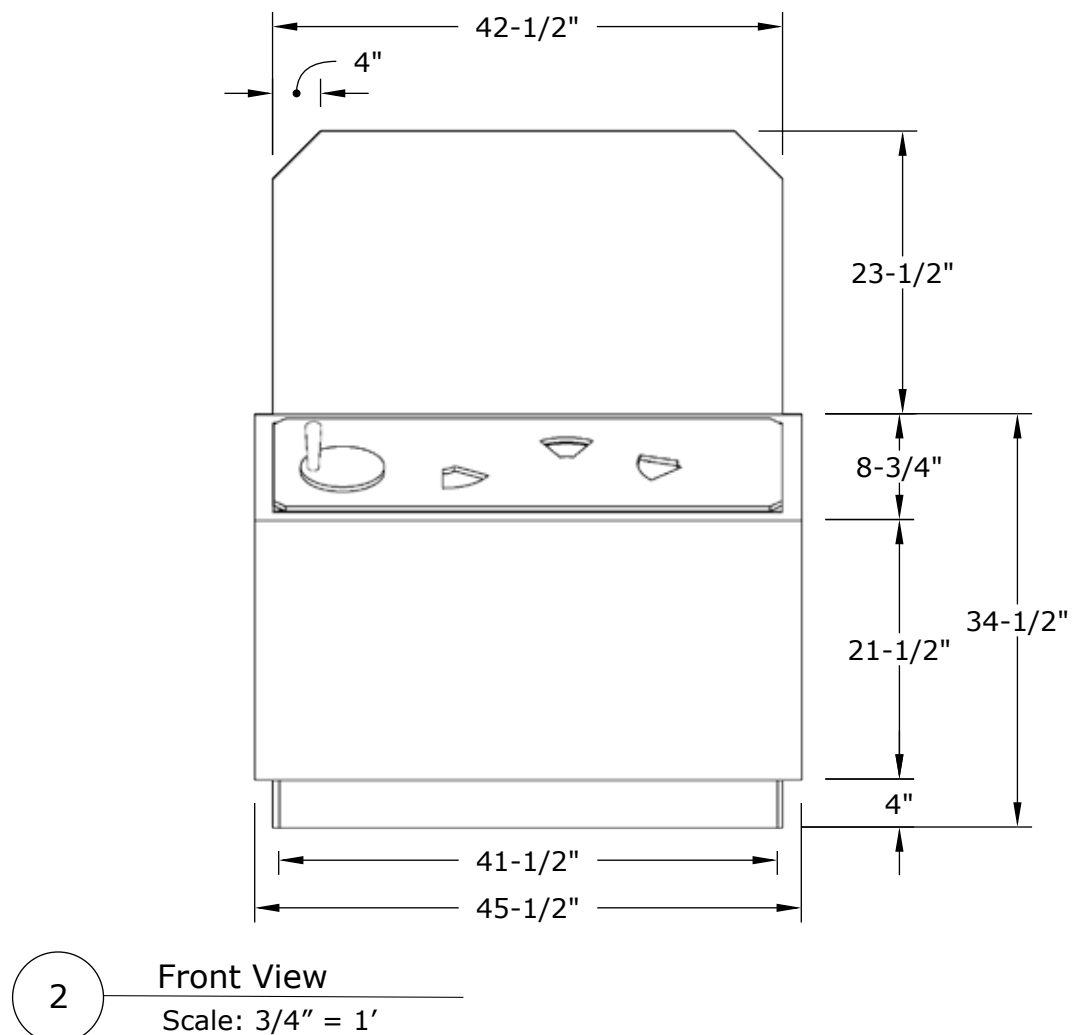
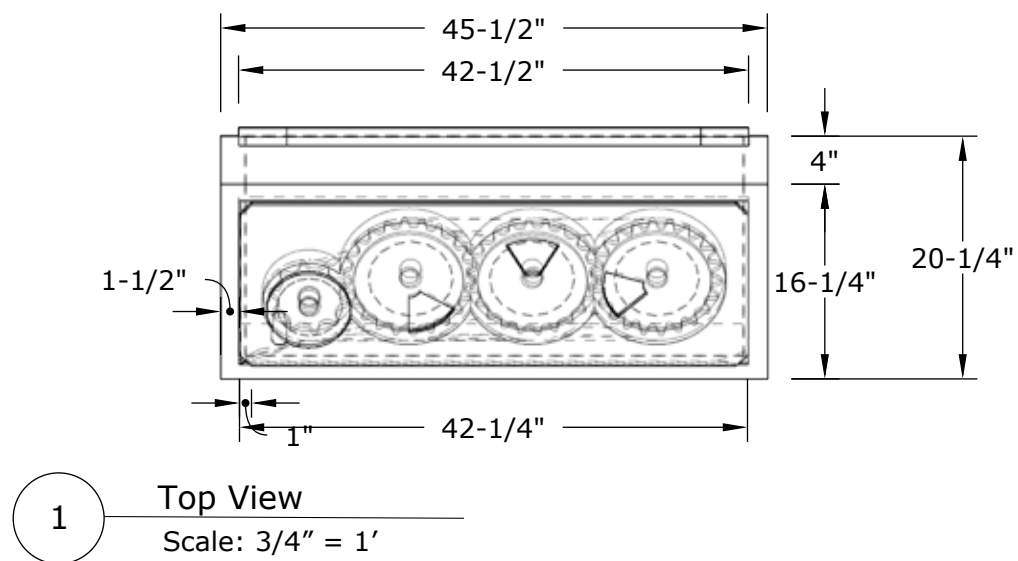
3 Top View
Scale: 3/4" = 1'



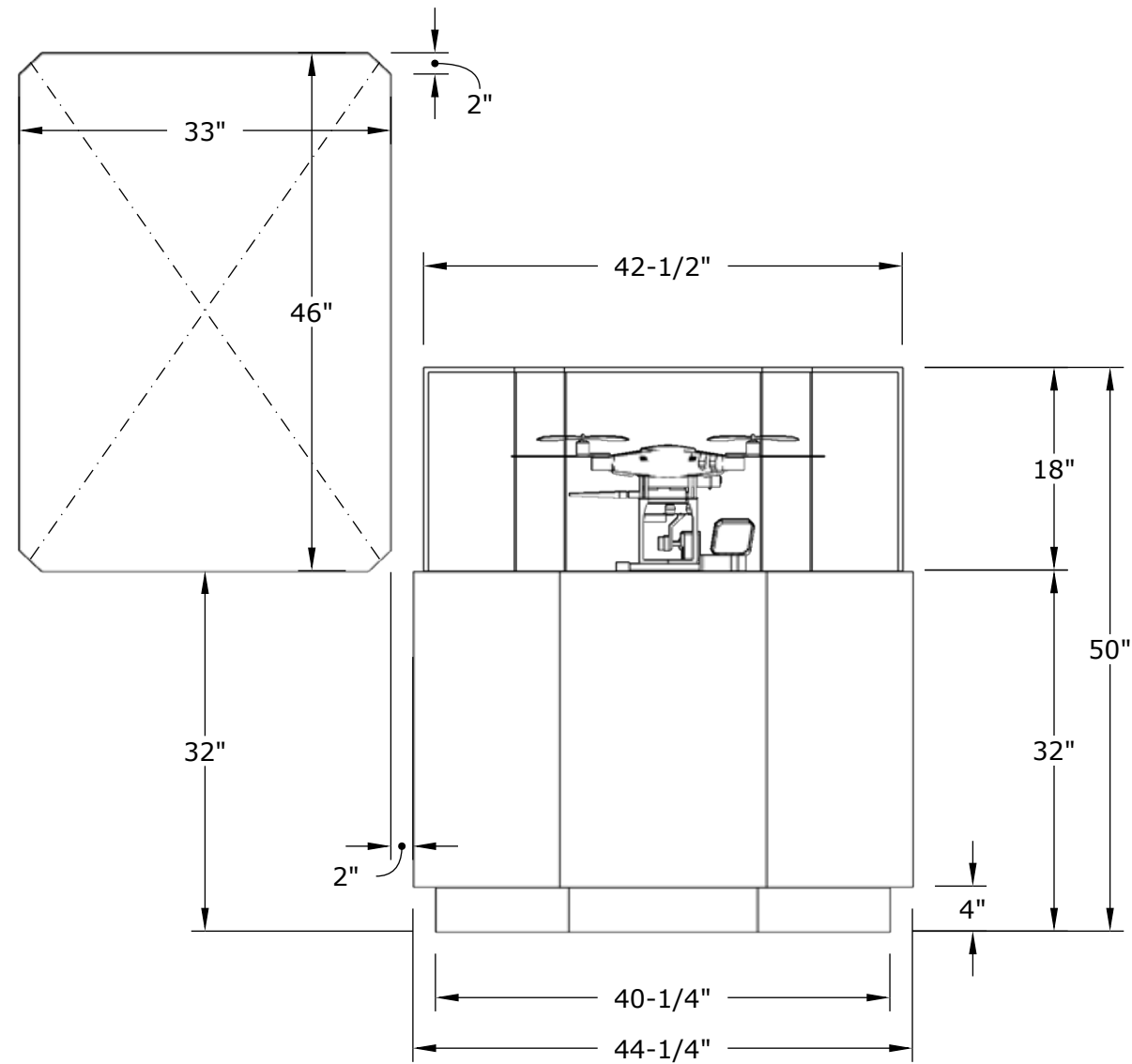
1 Front View
Scale: 3/4" = 1'



2 Left View
Scale: 3/4"=1'

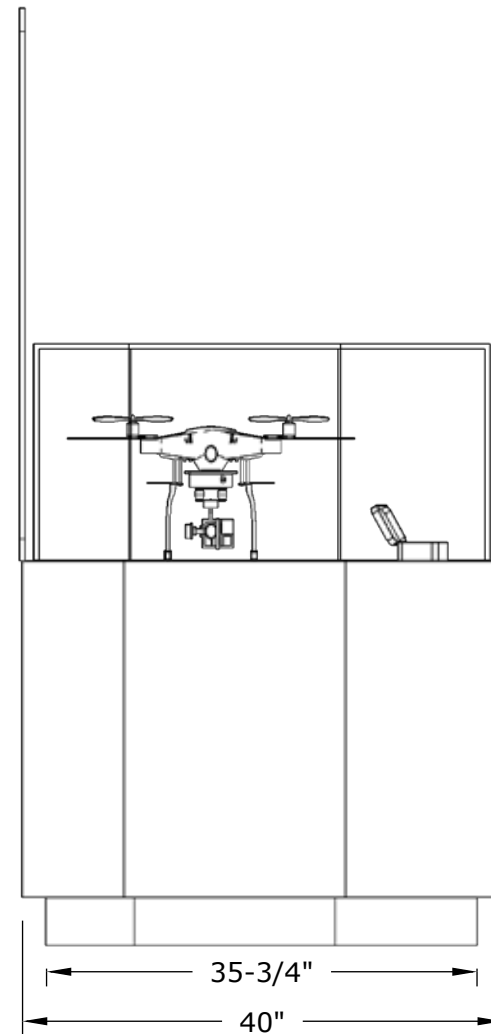


NOTES:
Laminated kiosk with a hand crank. When the visitor spins the handle a geared series of graphics rotate in series to the right. This shows a cause and effect of certain hands-off management processes.

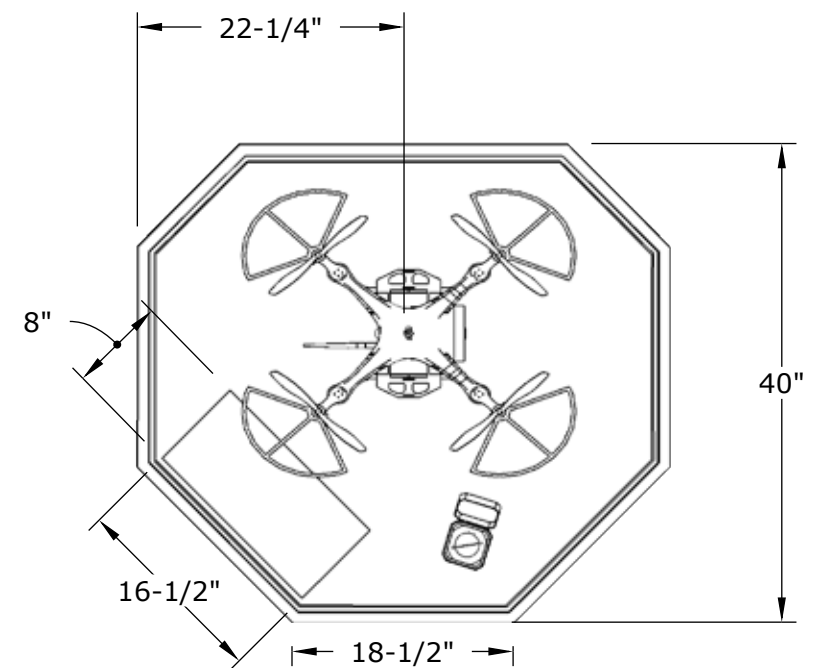
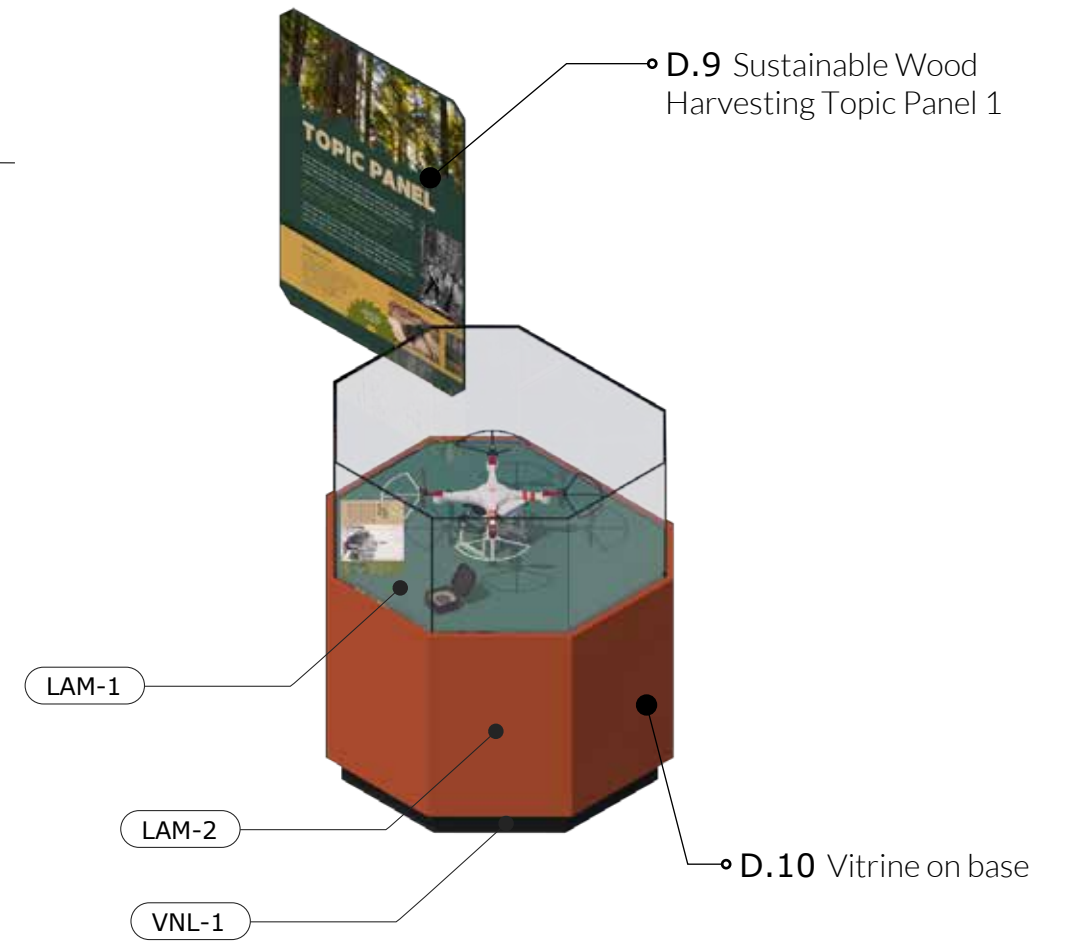


1 Front View
Scale: 3/4" = 1'

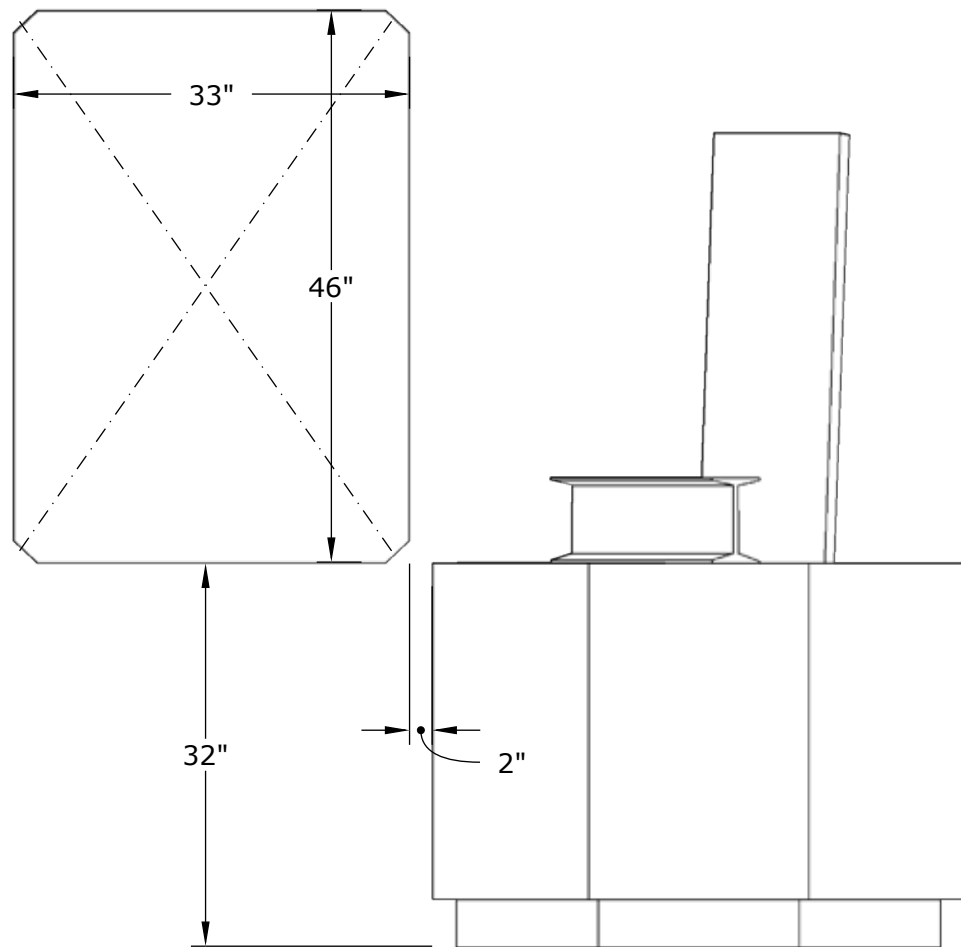
4 Isometric View
Scale: NTS



2 Left View
Scale: 3/4"=1'

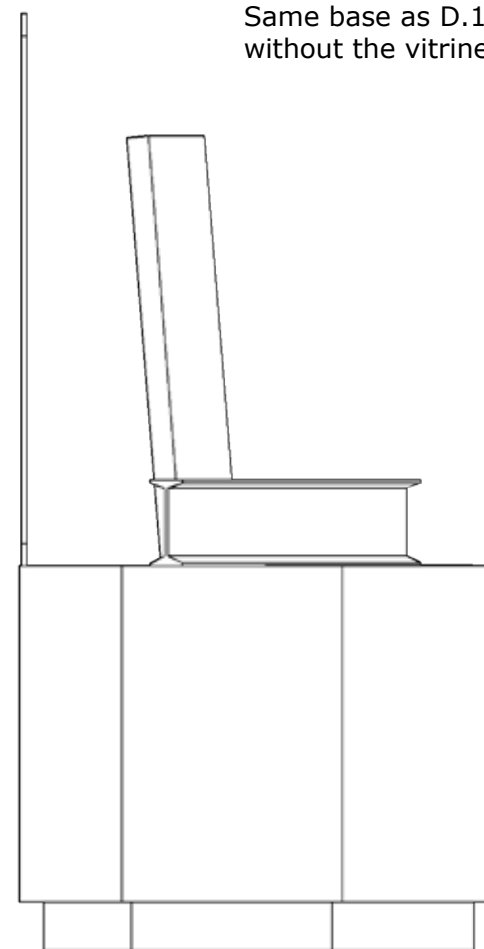


3 Top View
Scale: 3/4" = 1'

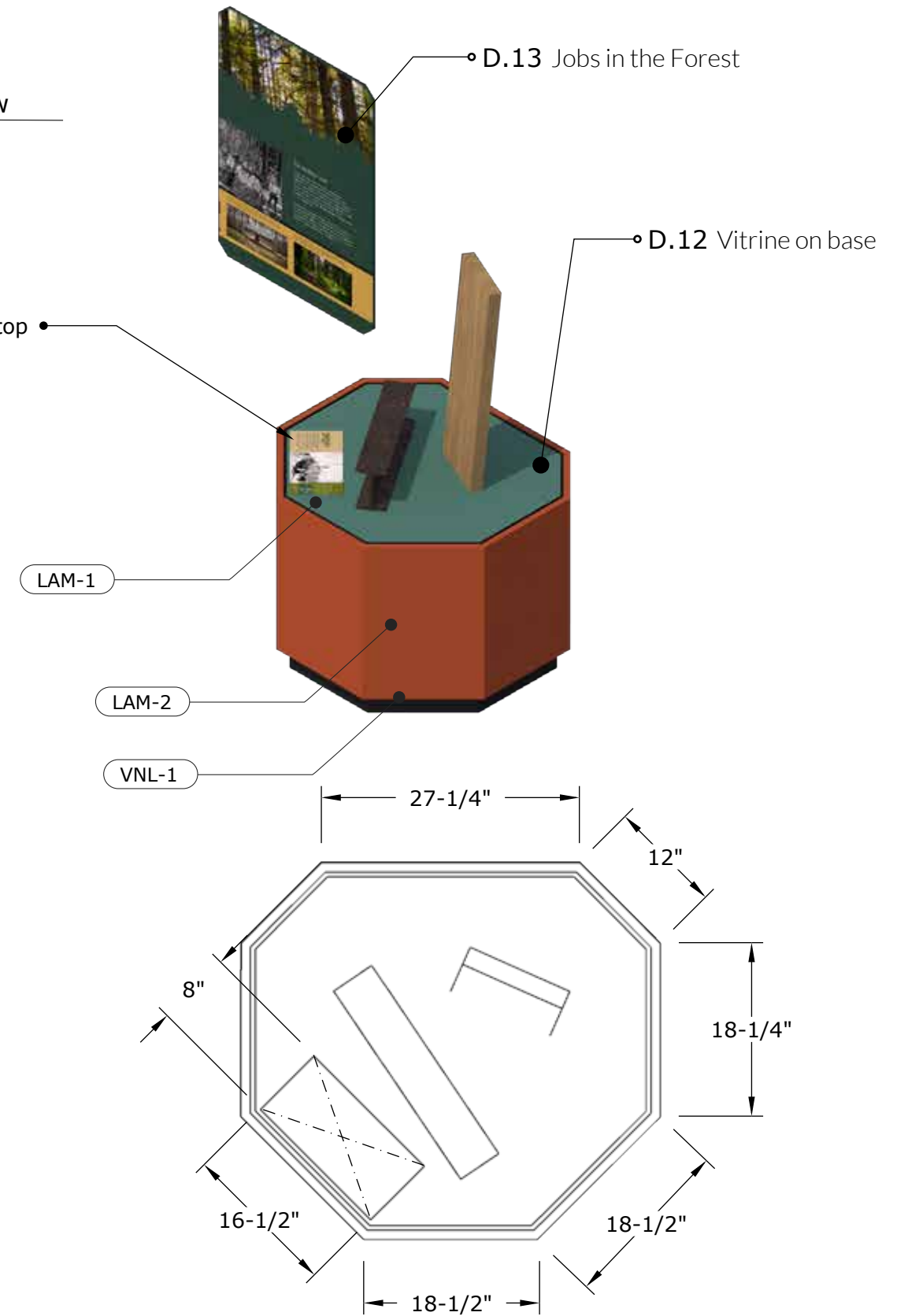


1 Front View
Scale: 3/4" = 1'

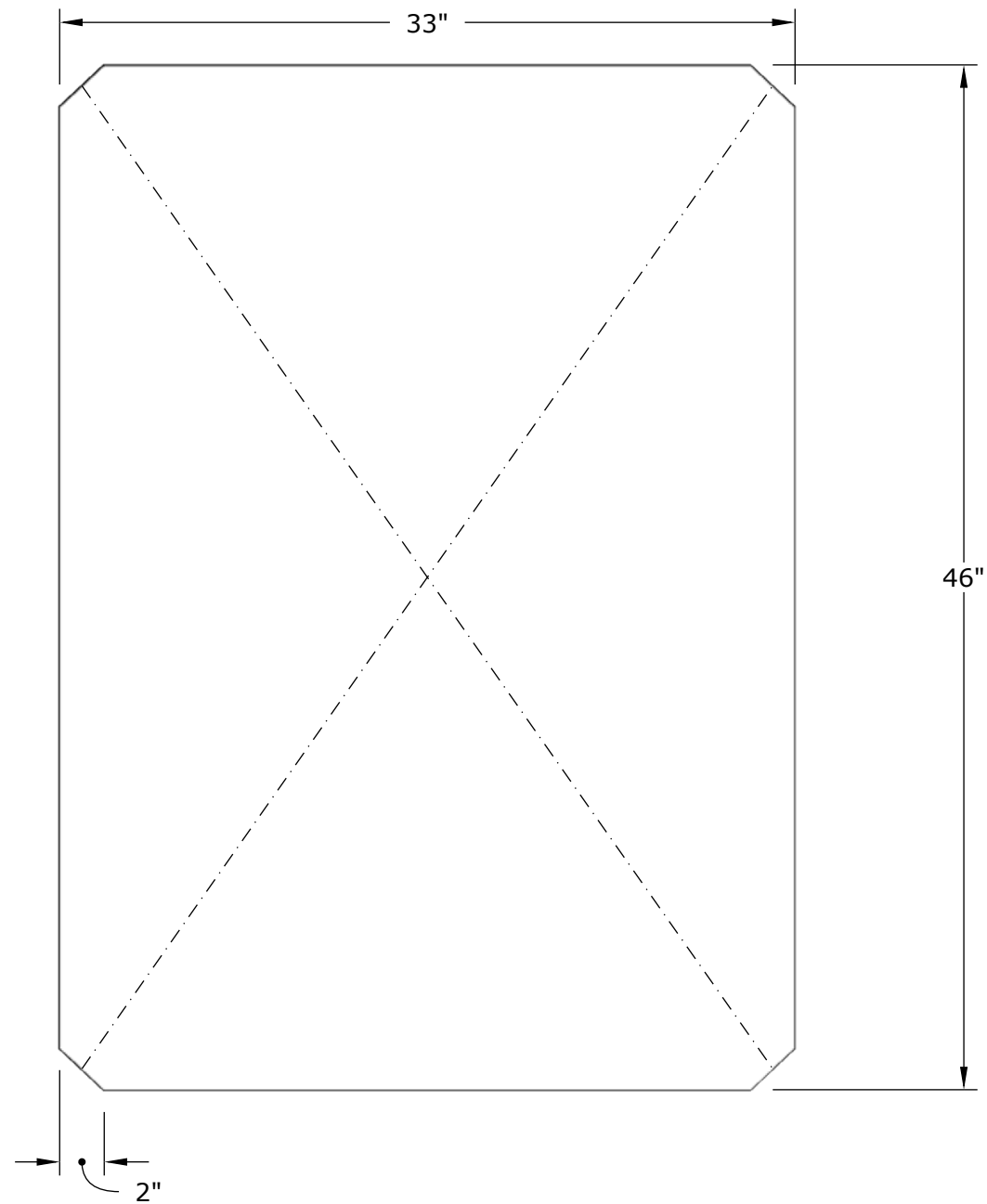
4 Isometric View
Scale: NTS



2 Left View
Scale: 3/4"=1'



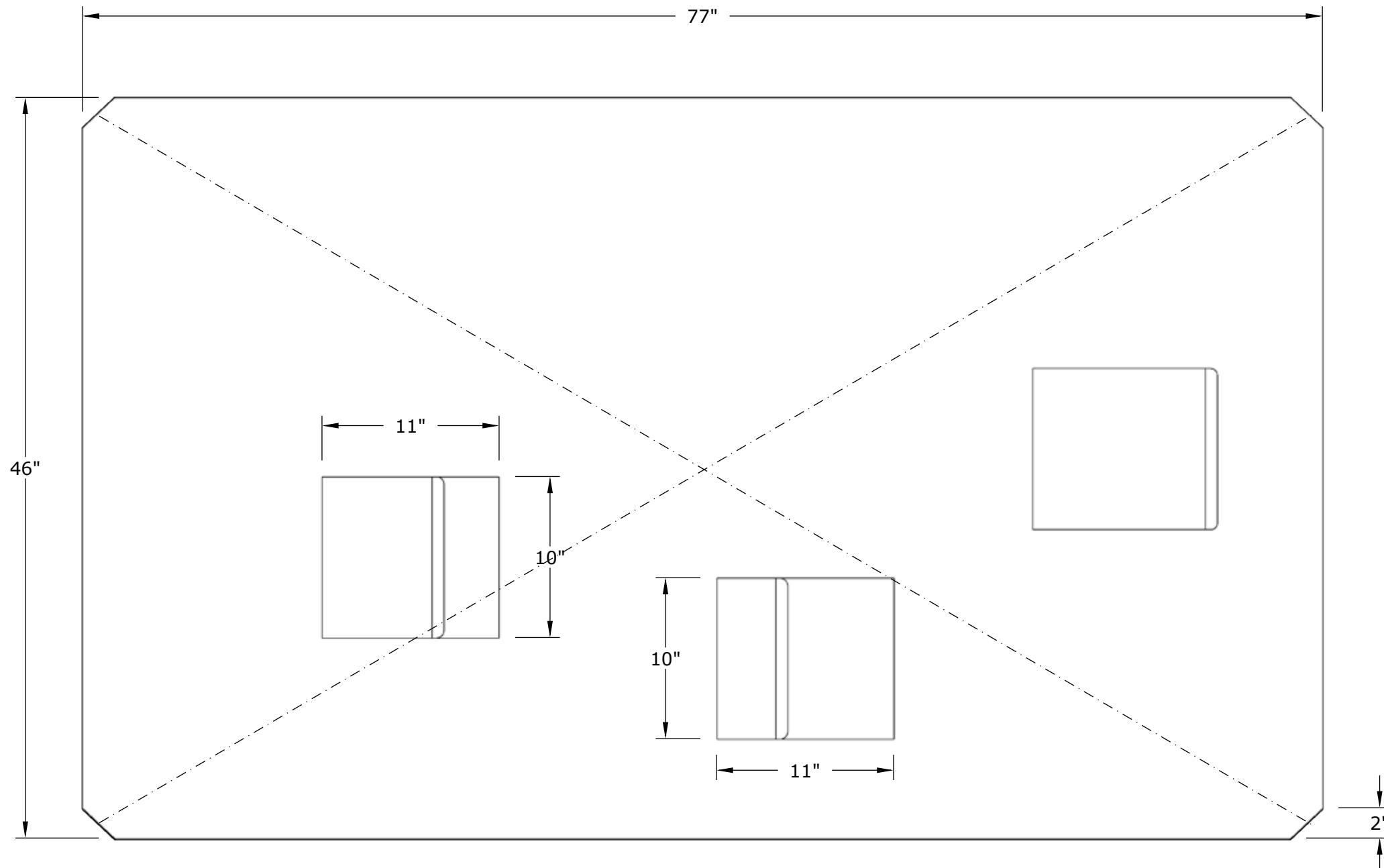
3 Top View
Scale: 3/4" = 1'



1 Front View
Scale: 1 1/2" = 1'

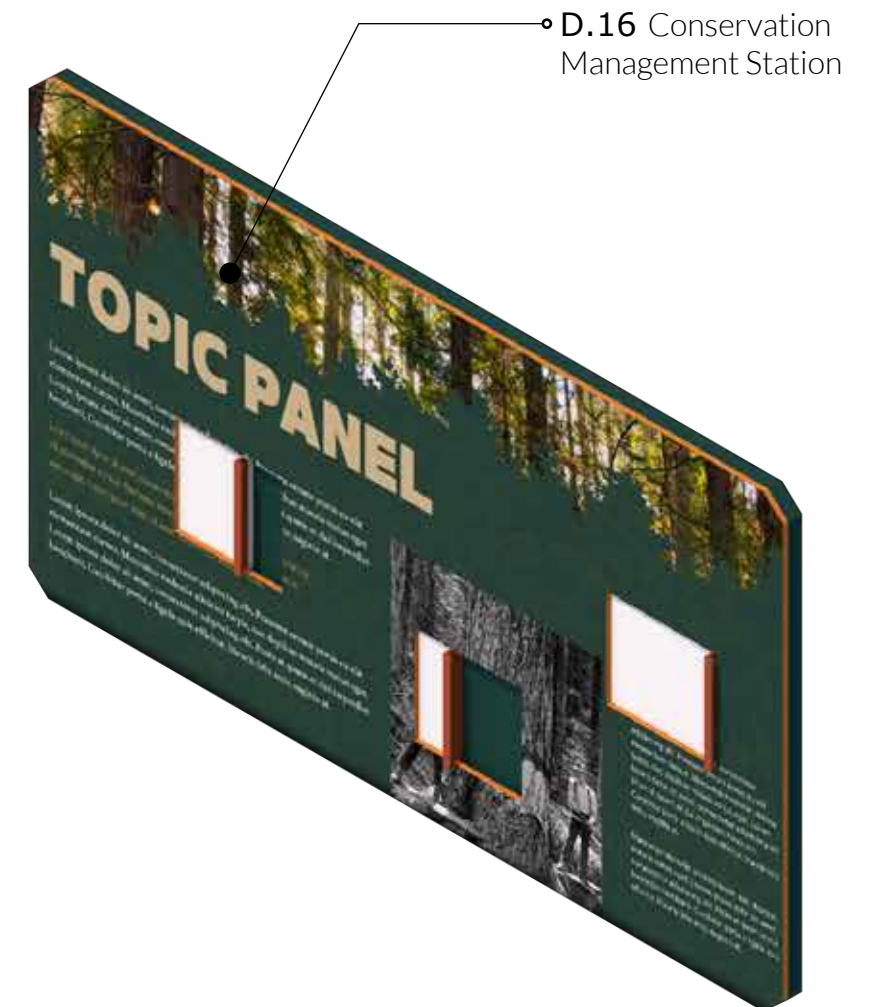


2 Isometric View
Scale: NTS

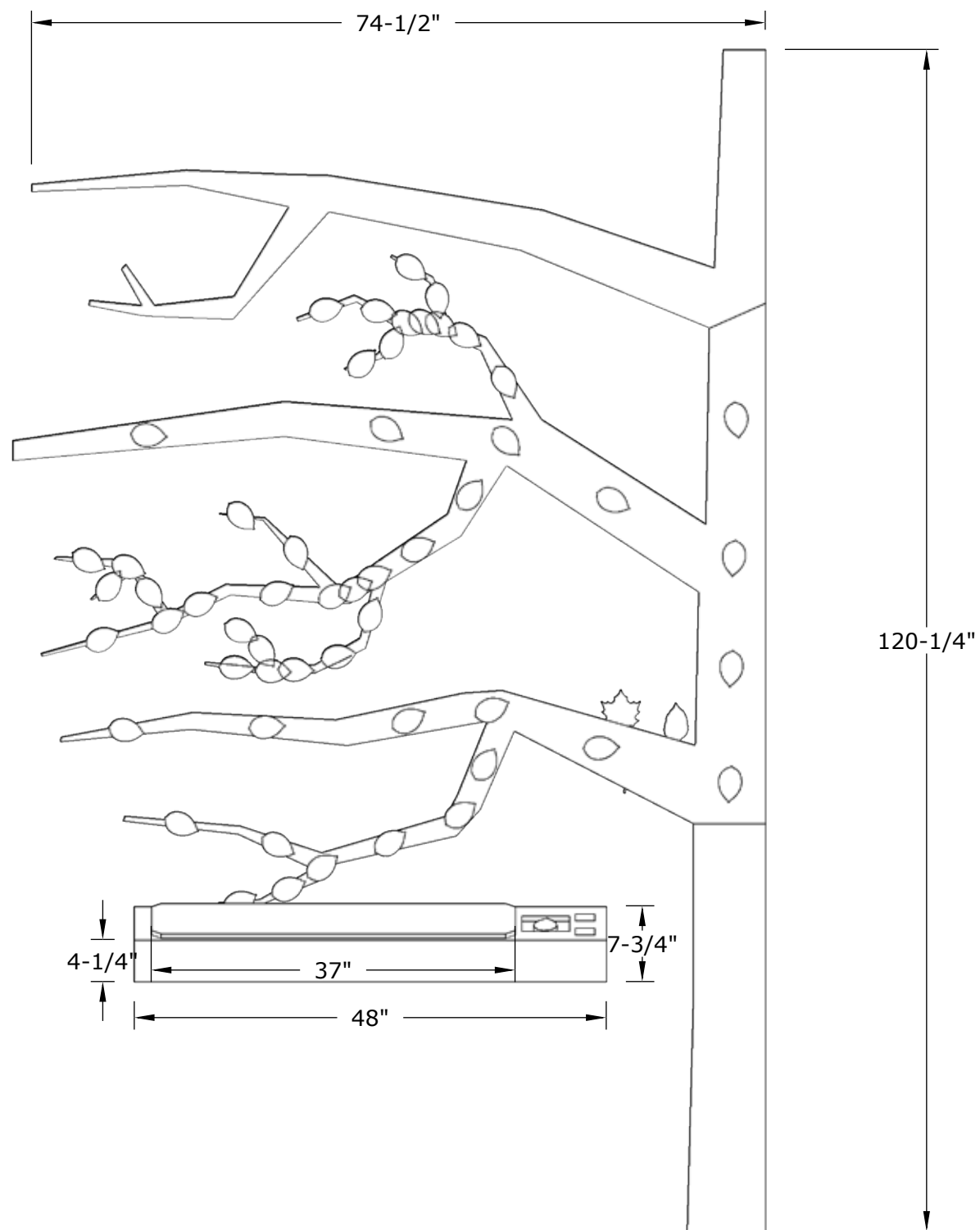


1 Front View
Scale: 1 1/2" = 1'

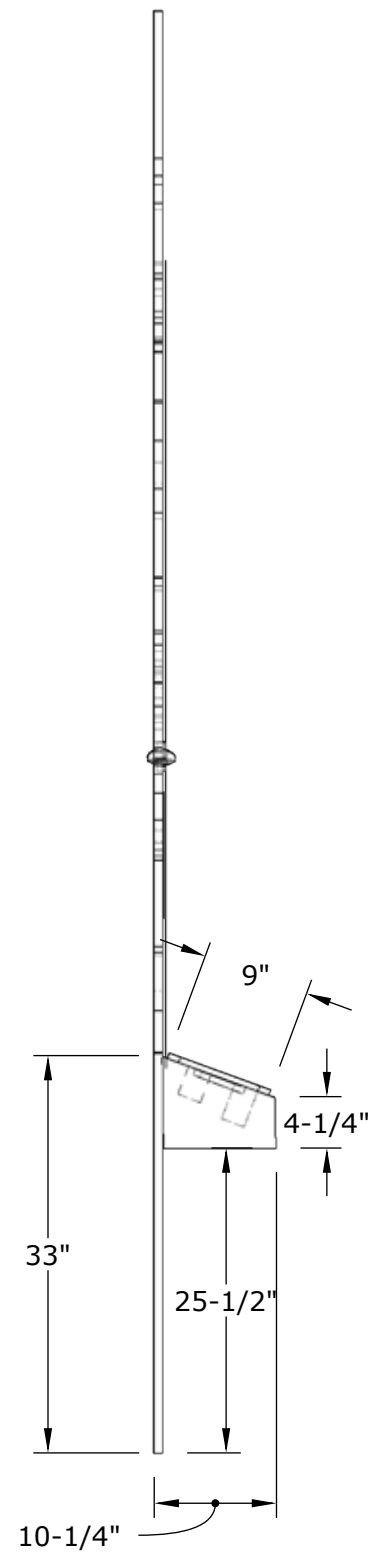
NOTES:
Thicker wall graphic with sliding doors built into it. Sliding the door reveals additional information under.



2 Isometric View
Scale: NTS

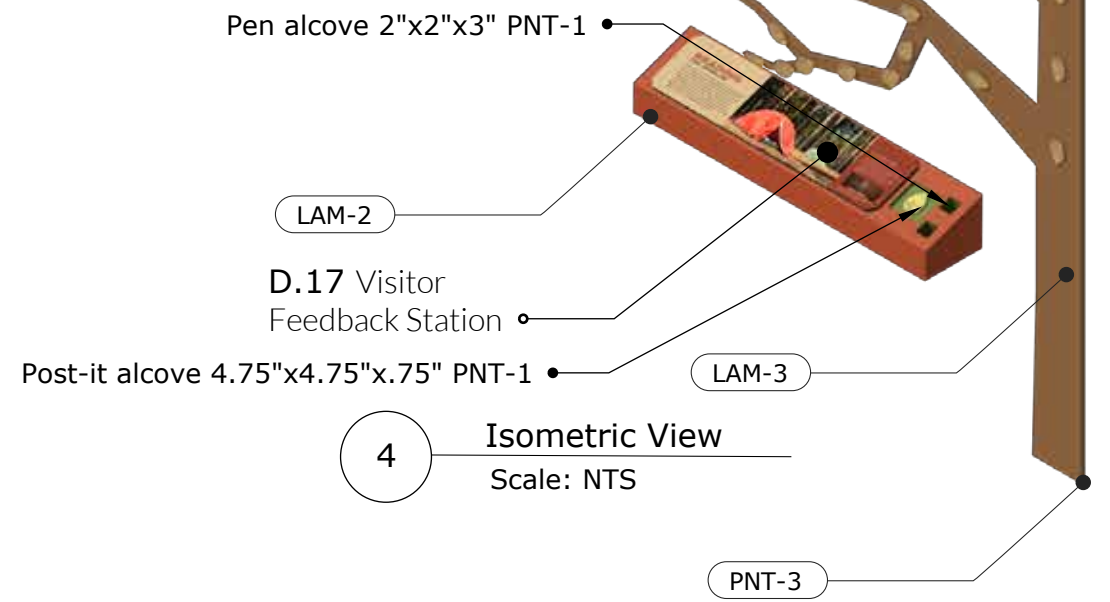


1 Front View
Scale: 3/4" = 1'

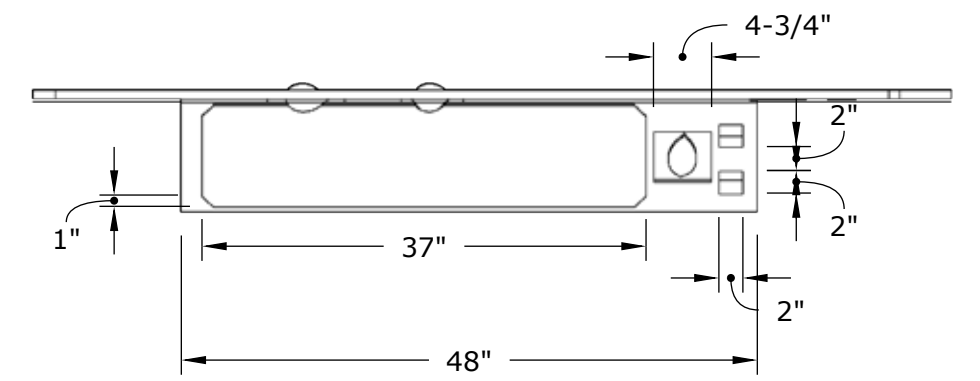


2 Left View
Scale: 3/4"=1'

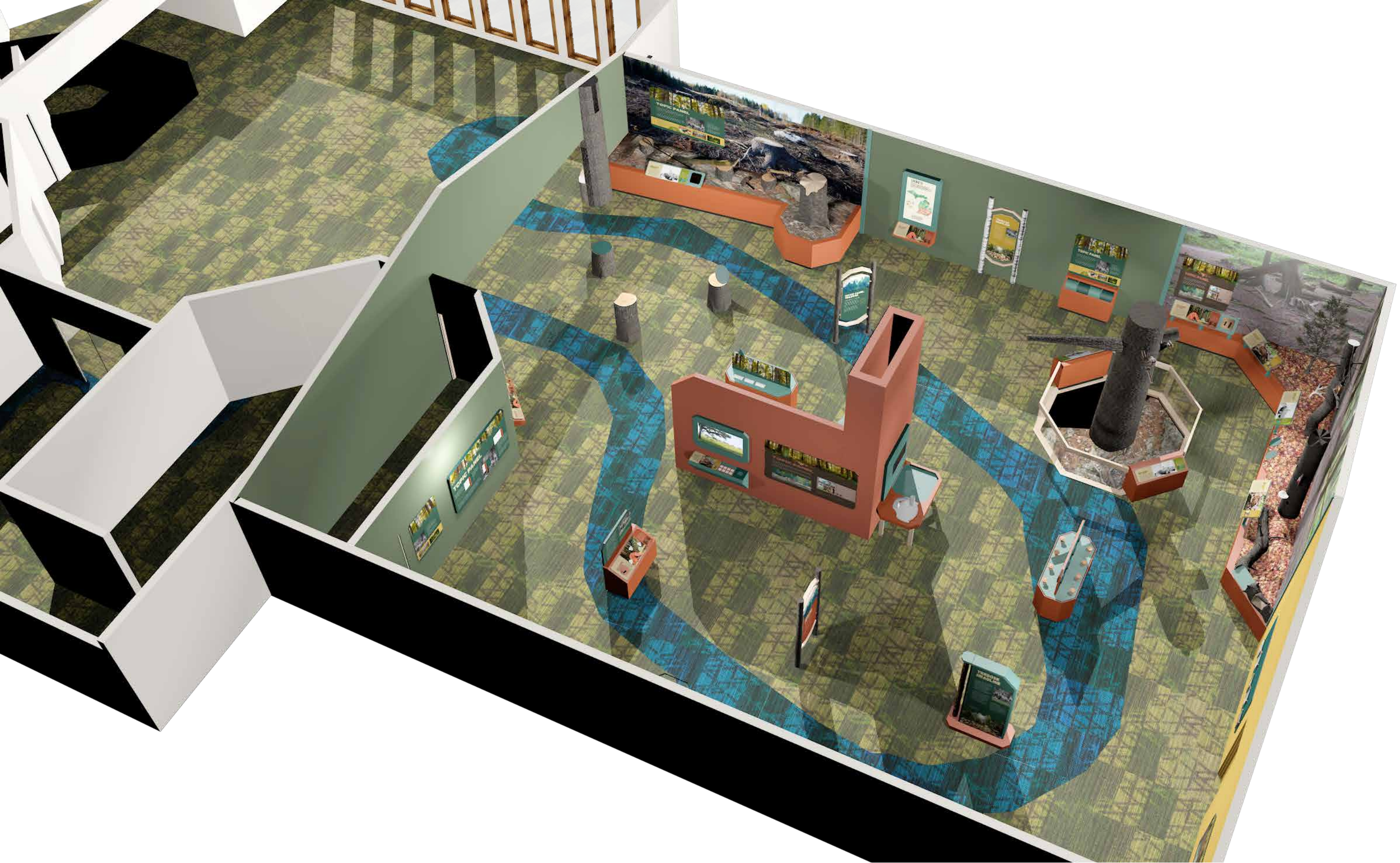
NOTES:
A profile cut graphic mounted to the wall along with a small writing station. Leaf cut post it notes (store purchased) would be available for visitors to write on, answering a change-able question posed by the staff. Visitor would then place the post-it on the wall to build a tree with leaves.



4 Isometric View
Scale: NTS



3 Top View
Scale: 3/4" = 1'







**THANK YOU
HARTWICK
PINES
STATE PARK**

APPENDIX VI – ASBESTOS AND LEAD SURVEY REPORT

DATED AUGUST 26, 2024



PRE-RENOVATION ASBESTOS AND LIMITED LEAD-CONTAINING PAINT SURVEY

**VISITOR CENTER
HARTWICK PINES STATE PARK
3612 STATE PARK DRIVE
GRAYLING, MICHIGAN 49738**

Project 188BS24516

PREPARED FOR:

Michigan Department of Natural Resources

PREPARED BY:

Atlas Technical Consultants LLC
46555 Humboldt Drive, Suite 100
Novi, Michigan 48377

August 26, 2024



September 30, 2024

Ms. Leasa Tulgetske
Accounting Assistant
Hartwick Pines State Park
3612 State Park Drive
Grayling, MI 49738

**SUBJECT: PRE-RENOVATION ASBESTOS AND LIMITED LEAD-CONTAINING
PAINT SURVEY
Visitor Center
Hartwick Pines State Park
3612 State Park Drive
Grayling, MICHIGAN 49738**

Dear Ms. Tulgetske:

Atlas is pleased to present this report detailing the findings of the pre-renovation asbestos and limited lead-containing paint surveys performed at the Visitor Center located in Hartwick Pines State Park. The purpose of this sampling was to identify and collect samples of suspect asbestos-containing materials (ACMs), and lead-containing paint (LCP) on building materials prior to renovation activities.

The pre-renovation asbestos and limited lead-containing paint surveys was conducted on August 29, 2024, by Industrial Hygienist, Mr. Matt Kreuyer, a State of Michigan certified Asbestos Inspector. The sampling was conducted in accordance with sampling criteria specified in the Occupational Safety and Health Administration's (OSHA) Asbestos Construction Industry Standard (29 CFR 1926.1101), and the Asbestos Hazard and Emergency Response Act of 1987 (AHERA).

If you have any questions, please call us at 248.669.5140.

Respectfully submitted,

A handwritten signature in cursive script that reads "Matthew Kreuyer".

Matthew Kreuyer
State of Michigan Asbestos Inspector
Atlas Technical Consultants LLC

A handwritten signature in cursive script that reads "Martin H. Gamble".

Martin Gamble
Sr. Project Manager
Atlas Technical Consultants LLC

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APPENDICES

Appendix A	Asbestos Laboratory Report
Appendix B	Lead-Containing Paint Laboratory Report



EXECUTIVE SUMMARY

Atlas representative Mr. Matt Kreuyer completed the pre-renovation asbestos and limited lead-containing paint survey at the Visitor Center, located in Mitchell State Park at 6090 E. M-115, Cadillac, Michigan 49601.

Ninety-six (96) asbestos bulk samples, taken from thirty-two (32) homogenous areas, were collected and submitted for analysis by PLM. Of the 96 samples submitted, one hundred and fifty-three sample layers were analysed. The results of laboratory testing indicated that **none of the samples analysed contain asbestos.**

If any additional materials are discovered during renovation/demolition activities, such materials must be assumed to contain asbestos until sampling and analysis proves otherwise.

Four (4) paint chip samples were collected and submitted to Accurate Analytical Testing Laboratory, 30105 Beverly Road, Romulus, Michigan for lead analysis by Flame AAS. The results of laboratory analysis indicated that both of the samples contained lead greater than the laboratory reporting limits.

Sample ID	Sample Location	Color	Lead Content (%)	Reporting Limit (%)
PC1	Exterior	Brown	0.000809	0.000546
PC2	Interior	White	0.00305	0.000604
PC3	Interior	Green	0.00110	0.000693
PC4	Interior	Black	0.000947	0.000842

The presence of lead-containing paint requires, under OSHA 1926.62 requirements, that the contractor performing renovation/demolition, surface preparation, and other activities that impact or potentially impact the lead-coated components, evaluate potential worker exposures to airborne lead. This evaluation can be based, for the specific activities denoted in 1926.62, on objective data obtained by the contractor on other, similar, worksites within the prior calendar year. In addition, lead-containing paint and lead-coated waste and construction debris must be evaluated and, on a case-by-case basis depending on this evaluation, quantitative analysis be performed on these waste streams to ensure compliance with EPA waste disposal regulations.



1. INTRODUCTION

1.1 Purpose

The purpose of this project was to conduct a pre-renovation asbestos and limited lead-containing paint survey of the Visitor Center, located in Hartwick Pines State Park at 3612 State Park Drive, Grayling, Michigan 49738.

1.2 Pre-Renovation Asbestos Survey

The scope of the pre-renovation asbestos survey included the following:

- Review of existing asbestos reports for the building, if available;
- Survey of the property building(s);
- Identification of accessible suspect asbestos-containing materials (ACMs);
- Collection and analysis of bulk samples of suspect friable and non-friable materials.

2. GENERAL SITE CONDITIONS

2.1 General Property and Building Information

The purpose of this project was to conduct a pre-renovation asbestos and limited lead-containing paint survey of the Visitor Center.

General property and building information is presented in the following table:

General Property and Building Information

Date of Inspection:	August 29, 2024
Inspectors	Matt Kreuyer, Inspector # A50072
Property Address:	3612 State Park Drive, Grayling, Michigan 49738
Property Owner	State of Michigan
Building Description:	Visitor Center

3. PRE-RENOVATION ASBESTOS SURVEY

Atlas representative Mr. Matt Kreuyer conducted the pre-renovation asbestos inspection of the Visitor Center, located in Hartwick Pines State Park at 3612 State Park Drive, Grayling, Michigan 49738. Mr. Kreuyer is a State of Michigan Certified Asbestos Inspector (Certification No. A50072). The building was visually inspected for the presence of building materials that are suspected to contain asbestos. Bulk samples of suspect ACMs were collected and placed into individual containers for transport to a National Voluntary Lab Accreditation Program (NVLAP)-accredited laboratory for analysis. Materials typically known as non-asbestos items (i.e. fibrous glass, foam rubber, wood, etc.) were not sampled. The asbestos inspection consisted of the following three basic procedures:



- > Conducting a visual inspection of the structure;
- > Identifying homogeneous areas (HAs) of suspect surfacing, thermal system insulation, and miscellaneous materials; and
- > Sampling accessible, friable and non-friable suspect materials.

3.1 Homogeneous Areas

Prior to collecting any samples, homogenous areas (HAs) were identified. A homogeneous sampling area can be described as one or more areas of material that are similar in appearance and texture and that have the same apparent installation date, appearance and function. Actual number of samples collected from each homogeneous sampling area may vary, based on the type of material and professional opinion of the inspector.

3.2 Hazard Assessment Factors

From the list of suspect homogeneous areas, a physical assessment was performed for each material on the list. A physical assessment includes evaluating the condition, assessing the potential for disturbance, and determining the friability of each material. By definition, "friable" materials are those that can be crumbled or reduced to powder by hand pressure when dry. Each material identified was further classified into one of three categories: surfacing materials, thermal systems insulation (TSI) and miscellaneous materials. Each of the three categories have specific sampling requirements, outlined below.

- *Surfacing Materials*: Refers to spray-applied or troweled surfaces such as plaster ceilings and walls, fireproofing, textured paints, textured plasters, and spray-applied acoustical surfaces.
- *Thermal System Insulation*: Refers to insulation used to inhibit heat gain or loss on pipes, boilers, tanks, ducts, and various other building components.
- *Miscellaneous Materials*: Refers to friable and non-friable products and materials that do not fit in any of the above two categories such as resilient floor covering, baseboards, mastics, adhesives, roofing material, caulking, glazing, and siding. This category also contains wallboard and ceiling tile.

3.3 Laboratory Analytical Methodology

Bulk samples were analyzed by Environmental Testing Laboratories, Inc. (ETL) using polarized-light microscopy (PLM) and dispersion staining (Method Reference: 40 CFR Part 763, Volume 47, No. 103, May 27, 1982 pg. 23376). This laboratory participates in the National Voluntary Laboratory Accreditation Program (NVLAP #201028-0), a quality assurance program for PLM analysis, and is accredited by the National Institute of Standards and Technology (NIST) as well as accreditation requirements under 15 CFR Part 25.

Copies of the laboratory analytical report and corresponding chain-of-custody forms are included in **Appendix C**. Positive sample results are reported in percent asbestos by volume of the sample and the type of asbestos material within the sample. Other common non-asbestos components may also be noted on the analytical reports.

3.4 Sampling Results

Bulk samples were collected from the site building and analyzed by polarized light microscopy (PLM), EPA Method 600/R-93/116. The following table provides a summary of accessible suspect and confirmed ACMs from the Site building:



Suspect Materials Sampling Results
Visitor Center
Hartwick Pines State Park

Sample ID/Material	Material	Material Locations	Estimated Quantity	Asbestos Content
1-RM-A,B,C	Roofing Materials: Shingles	Ext	NA	ND
2-VP-A,B,C	Vapor Paper: Roofing	Ext	NA	ND
3-M-A,B,C	Exterior Mortar: Gray Between Natural Stone	Ext	NA	ND
4-WP-A,B,C	Copper Sheeting with Waterproofing- Between Mortar and Poured Foundation	Ext	NA	ND
5-EC-A,B,C	Penetration Caulk: Exterior Pipes	Ext	NA	ND
6-EC-A,B,C	Exterior Caulk: Red/Brown- On Metal and Wood Siding	Ext	NA	ND
7-CC-A,B,C	Concrete Chip: Floor	Ext	NA	ND
8-CC-A,B,C	Concrete Chip: Poured Foundation Walls	Ext	NA	ND
9-DW-A,B,C	Duct Wrap- Fiberglass Wrapped in Foil	Int	NA	ND
10-PI-A,B,C	Pipe Insulation: Yellow Fiberglass	Throughout	NA	ND
11-WBS-A,B,C	Wallboard System	Throughout	NA	ND
12-CA-A,B,C	Construction Adhesive Behind Marble Window Ledge/Sill	Main Windows	NA	ND
13-IC-A,B,C	Interior Caulk: Window Caulk-White	Interior Windows	NA	ND
14-WG-A,B,C	Window Glaze- Gray; Tacky	Windows	NA	ND
15-CB-A,B,C	Cove Base: Stairwell 12" Beige	STRWL	NA	ND
16-CA-A,B,C	Stair Tread Beige with Black Adhesive	STRWL	NA	ND
17-CM-A,B,C	Carpet Mastic- Yellow	Display Area	NA	ND
18-CB-A,B,C	Cove Base 4" Red/Brown	Int	NA	ND
19-VF-A,B,C	Vinyl Flooring: Pebble Pattern with Blue and Red	Int	NA	ND
20-CB-A,B,C	Cove Base: 4" Red/Brown	Int	NA	ND
21-IC-A,B,C	Interior Caulk: Kitchen Backsplash	Int	NA	ND
22-CA-A,B,C	Construction Adhesive: Yellow on Red Acoustical Wall Covering	Int	NA	ND
23-WP-A,B,C	Wallpaper: Reddish Brown with Yellow Adhesive	Chapel	NA	ND
24-CT-A,B,C	Ceiling Tile: Gray 1'x1' Rough with Brown Glue Pods	Int	NA	ND



Sample ID/Material	Material	Material Locations	Estimated Quantity	Asbestos Content
25-CP-A,B,C	Ceiling Panel: 1'x1' Rough with Gouges	Int	NA	ND
26-CT-A,B,C	Ceramic Tile 6"x6" Beige with Grout and Mortar	Lobby	NA	ND
27-CT-A,B,C	Ceramic Tile: 4"x4" White with Grout and Mortar	Restrooms	NA	ND
28-RI-A,B,C	Rolled-In-Insulation: White with Brown Paper Backing	Int	NA	ND
29-IC-A,B,C	Interior Caulk: White around Toilets and Sinks	Int	NA	ND
30-IC-A,B,C	Interior Caulk: Black between Windows and Frames/Walls	Int	NA	ND
31-TP-A,B,C	Textured Plaster- On Drywall Systsem: White	Int	NA	ND
32-WP-A,B,C	Wallpaper: cream with Red and Blue Splotches with Yellow Adhesive	Int	NA	ND

EA=Exterior Area

FS Functional Space

NA=Not Applicable ND= None Detected

UNQ=Not Quantified

In the event additional suspect material is discovered during renovation activities, this material should be treated as presumed asbestos-containing material (PACM) in accordance with regulations 29 CFR 1926.1101 and 1910.1001 and other applicable state and local regulations and either sampled to confirm or nullify asbestos content or be treated as ACM and handled accordingly.

Copies of the laboratory analytical report and corresponding chain-of-custody forms are included in **Appendix A**.

4. LEAD-CONTAINING PAINT SAMPLING

Atlas representative Mr. Matt Kreuyer conducted the lead-containing paint (LCP) sampling of the Visitor Center August 29, 2024. The sampling included physical sampling of paint coatings that were deemed representative of the predominant paint coatings observed.

Four (4) paint chip samples were collected and submitted to Accurate Analytical Testing Laboratory, 30105 Beverly Road, Romulus, Michigan for lead analysis. Bulk samples were analyzed using the Environmental Protection Agency's Test Method SW 846-7420 and 3050B using Flame AAS to determine lead concentration in percent (%) by weight. Copies of the laboratory analytical report and corresponding chain-of-custody forms are included in **Appendix B**.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Asbestos-Containing Materials

The results of laboratory testing during the pre-renovations asbestos survey conducted at the property indicate that **none of the samples analyzed contained asbestos.**

If any additional suspect materials are discovered during renovation/demolition activities, such materials must be assumed to contain asbestos until sampling and analysis proves otherwise.



5.2 Lead-Containing Paint

Four (4) representative samples of paint, taken from the exterior of the building, was collected, and submitted for analysis by Flame AAS. The results of laboratory analysis indicate that the samples contained levels of lead greater than the laboratory reporting limits.

The following table provides a summary of the LCP sampling:

Lead-Containing Paint Sampling Results

Sample ID	Sample Location	Color	Lead Content (%)	Reporting Limit (%)
PC1	Exterior	Brown	0.000809	0.000546
PC2	Interior	White	0.00305	0.000604
PC3	Interior	Green	0.00110	0.000693
PC4	Interior	Black	0.000947	0.000842

The presence of lead-containing paint requires, under OSHA 1926.62 requirements, that the contractor performing renovation/demolition, surface preparation, and other activities that impact or potentially impact the lead-coated components, evaluate potential worker exposures to airborne lead. This evaluation can be based, for the specific activities denoted in 1926.62, on objective data obtained by the contractor on other, similar, worksites within the prior calendar year. In addition, lead-containing paint and lead-coated waste and construction debris must be evaluated and, on a case-by-case basis depending on this evaluation, quantitative analysis be performed on these waste streams to ensure compliance with EPA waste disposal regulations.

The presence of Lead-Containing Paint (LCP) and/or Lead-Based Paint (LBP) does not, in itself, trigger regulatory compliance actions. However, when these materials are disturbed, the requirements of OSHA (1926.1101) and EPA may become operative. Appropriate actions in terms of removal methods, emissions control, worker protection, and waste disposal should be considered by the general contractor and applicable subcontractors while completing renovation/demolition activities.

6. ASSUMPTIONS AND LIMITATIONS

The results, findings, conclusions, and recommendations expressed in the report are based only on conditions that were noted during the NESHAP inspections conducted on August 29th, 2024, performed by Atlas. Selection of sample locations and frequency of sampling were based on EPA Guidance documents, Atlas's observations, and the assumption that building vintage and demolition history information presented to Atlas allowed the proper designation of homogenous materials for each building.

This document does not contain the elements necessary for an Abatement Work plan, and this document does not contain, nor should it take the place of technical specifications for ACM removal.

Our professional services have been performed, our findings obtained, and our conclusions and recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against changes to material from future operations or conditions, nor does it warrant against operations or conditions against present ACM material in locations not investigated. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.



APPENDIX A

ASBESTOS LABORATORY RESULTS



**ENVIRONMENTAL TESTING
LABORATORIES, INC.**

37575 W HURON RIVER DRIVE
ROMULUS, MICHIGAN 48174
(734) 955-6600
FAX: (734) 955-6604

To: Atlas - Novi
46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

ETL Job: 272101
Client Project: 188BS24516

Attention: Ryan Rae
Project Location: Hartwick Pines
DNR

Lab Sample Number	Client Sample Number	Sample Type	Completed
1699831	1-RM-A	Asbestos	09/04/2024
1699832	1-RM-B	Asbestos	09/04/2024
1699833	1-RM-C	Asbestos	09/04/2024
1699834	2-VP-A	Asbestos	09/04/2024
1699835	2-VP-B	Asbestos	09/04/2024
1699836	2-VP-C	Asbestos	09/04/2024
1699837	3-M-A	Asbestos	09/04/2024
1699838	3-M-B	Asbestos	09/04/2024
1699839	3-M-C	Asbestos	09/04/2024
1699840	4-WP-A	Asbestos	09/04/2024
1699841	4-WP-B	Asbestos	09/04/2024
1699842	4-WP-C	Asbestos	09/04/2024
1699843	5-EC-A	Asbestos	09/04/2024
1699844	5-EC-B	Asbestos	09/04/2024
1699845	5-EC-C	Asbestos	09/04/2024
1699846	6-EC-A	Asbestos	09/04/2024

Lab Sample Number	Client Sample Number	Sample Type	Completed
1699847	6-EC-B	Asbestos	09/04/2024
1699848	6-EC-C	Asbestos	09/04/2024
1699849	7-CC-A	Asbestos	09/04/2024
1699850	7-CC-B	Asbestos	09/04/2024
1699851	7-CC-C	Asbestos	09/04/2024
1699852	8-CC-A	Asbestos	09/04/2024
1699853	8-CC-B	Asbestos	09/04/2024
1699854	8-CC-C	Asbestos	09/04/2024
1699855	9-DW-A	Asbestos	09/04/2024
1699856	9-DW-B	Asbestos	09/04/2024
1699857	9-DW-C	Asbestos	09/04/2024
1699858	10-PI-A	Asbestos	09/05/2024
1699859	10-PI-B	Asbestos	09/05/2024
1699860	10-PI-C	Asbestos	09/05/2024
1699861	11-WBS-A	Asbestos	09/05/2024
1699862	11-WBS-B	Asbestos	09/05/2024
1699863	11-WBS-C	Asbestos	09/05/2024
1699864	12-CA-A	Asbestos	09/05/2024
1699865	12-CA-B	Asbestos	09/05/2024
1699866	12-CA-C	Asbestos	09/05/2024
1699867	13-IC-A	Asbestos	09/05/2024
1699868	13-IC-B	Asbestos	09/05/2024
1699869	13-IC-C	Asbestos	09/05/2024
1699870	14-WG-A	Asbestos	09/05/2024
1699871	14-WG-B	Asbestos	09/05/2024
1699872	14-WG-C	Asbestos	09/05/2024

Lab Sample Number	Client Sample Number	Sample Type	Completed
1699873	15-CB-A	Asbestos	09/05/2024
1699874	15-CB-B	Asbestos	09/05/2024
1699875	15-CB-C	Asbestos	09/05/2024
1699876	16-CA-A	Asbestos	09/05/2024
1699877	16-CA-B	Asbestos	09/05/2024
1699878	16-CA-C	Asbestos	09/05/2024
1699879	17-CM-A	Asbestos	09/05/2024
1699880	17-CM-B	Asbestos	09/05/2024
1699881	17-CM-C	Asbestos	09/05/2024
1699882	18-CB-A	Asbestos	09/05/2024
1699883	18-CB-B	Asbestos	09/05/2024
1699884	18-CB-C	Asbestos	09/05/2024
1699885	19-VF-A	Asbestos	09/05/2024
1699886	19-VF-B	Asbestos	09/05/2024
1699887	19-VF-C	Asbestos	09/05/2024
1699888	20-CB-A	Asbestos	09/05/2024
1699889	20-CB-B	Asbestos	09/05/2024
1699890	20-CB-C	Asbestos	09/05/2024
1699891	21-IC-A	Asbestos	09/05/2024
1699892	21-IC-B	Asbestos	09/05/2024
1699893	21-IC-C	Asbestos	09/05/2024
1699894	22-CA-A	Asbestos	09/05/2024
1699895	22-CA-B	Asbestos	09/05/2024
1699896	22-CA-C	Asbestos	09/05/2024
1699897	23-WP-A	Asbestos	09/05/2024
1699898	23-WP-B	Asbestos	09/05/2024

Lab Sample Number	Client Sample Number	Sample Type	Completed
1699899	23-WP-C	Asbestos	09/05/2024
1699900	24-CT-A	Asbestos	09/05/2024
1699901	24-CT-B	Asbestos	09/05/2024
1699902	24-CT-C	Asbestos	09/05/2024
1699903	25-CP-A	Asbestos	09/05/2024
1699904	25-CP-B	Asbestos	09/05/2024
1699905	25-CP-C	Asbestos	09/05/2024
1699906	26-CT-A	Asbestos	09/05/2024
1699907	26-CT-B	Asbestos	09/05/2024
1699908	26-CT-C	Asbestos	09/05/2024
1699909	27-CT-A	Asbestos	09/05/2024
1699910	27-CT-B	Asbestos	09/05/2024
1699911	27-CT-C	Asbestos	09/05/2024
1699912	28-RI-A	Asbestos	09/05/2024
1699913	28-RI-B	Asbestos	09/05/2024
1699914	28-RI-C	Asbestos	09/05/2024
1699915	29-IC-A	Asbestos	09/05/2024
1699916	29-IC-B	Asbestos	09/05/2024
1699917	29-IC-C	Asbestos	09/05/2024
1699918	30-IC-A	Asbestos	09/05/2024
1699919	30-IC-B	Asbestos	09/05/2024
1699920	30-IC-C	Asbestos	09/05/2024
1699921	31-TP-A	Asbestos	09/05/2024
1699922	31-TP-B	Asbestos	09/05/2024
1699923	31-TP-C	Asbestos	09/05/2024
1699924	32-WP-A	Asbestos	09/05/2024

Lab Sample Number	Client Sample Number	Sample Type	Completed
1699925	32-WP-B	Asbestos	09/05/2024
1699926	32-WP-C	Asbestos	09/05/2024

Reviewed by: 
Emily Schroeder

<u>Summary</u>			
Method	Sample	Layer	Mastic
PLM	135	18	

Polarized Light Microscopy Asbestos Analysis Report

To : Atlas - Novi
 46555 Humboldt Dr. Suite 100
 Novi, Michigan 48377

Location : Hartwick Pines
 DNR

ETL Job : 272101

Client Project : 188BS24516

Date Collected : 08/29/2024

Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699831 1-RM-A	Shingle	Brown / Orange Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699831 1-RM-A	Shingle	Orange Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699831 1-RM-A	Shingle	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699832 1-RM-B	Shingle	Brown / Orange Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699832 1-RM-B	Shingle	Orange Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699832 1-RM-B	Shingle	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/04/2024					

Polarized Light Microscopy Asbestos Analysis Report

To : Atlas - Novi
 46555 Humboldt Dr. Suite 100
 Novi, Michigan 48377

Location : Hartwick Pines
 DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699833 1-RM-C	Shingle	Brown / Orange Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699833 1-RM-C	Shingle	Orange Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699833 1-RM-C	Shingle	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699834 2-VP-A	Vapor Paper	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699835 2-VP-B	Vapor Paper	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699836 2-VP-C	Vapor Paper	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					

Polarized Light Microscopy Asbestos Analysis Report

To : Atlas - Novi
46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

Location : Hartwick Pines
DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699837 3-M-A	Mortar	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699838 3-M-B	Mortar	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699839 3-M-C	Mortar	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699840 4-WP-A	Waterproofing	Black Fibrous Homogenous	PLM 88% Cellulose	PLM 12% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699841 4-WP-B	Waterproofing	Black Fibrous Homogenous	PLM 88% Cellulose	PLM 12% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699842 4-WP-C	Waterproofing	Black Fibrous Homogenous	PLM 88% Cellulose	PLM 12% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					

Polarized Light Microscopy Asbestos Analysis Report

To : Atlas - Novi
46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

Location : Hartwick Pines
DNR

ETL Job : 272101

Client Project : 188BS24516

Date Collected : 08/29/2024

Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699843 5-EC-A	Penetration Caulk	Red Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected

Layer-1 Analyst: Ben Jones
Date Analyzed : 09/04/2024

1699844 5-EC-B	Penetration Caulk	Red Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
Date Analyzed : 09/04/2024

1699845 5-EC-C	Penetration Caulk	Red Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
Date Analyzed : 09/04/2024

1699846 6-EC-A	Caulk	Red/Brown Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
Date Analyzed : 09/04/2024

1699847 6-EC-B	Caulk	Red/Brown Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
Date Analyzed : 09/04/2024

1699848 6-EC-C	Caulk	Red/Brown Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
Date Analyzed : 09/04/2024

Polarized Light Microscopy Asbestos Analysis Report

To : Atlas - Novi
46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

Location : Hartwick Pines
DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699849 7-CC-A	Concrete Floor	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699850 7-CC-B	Concrete Floor	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699851 7-CC-C	Concrete Floor	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699852 8-CC-A	Concrete	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699853 8-CC-B	Concrete	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699854 8-CC-C	Concrete	Gray Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699855 9-DW-A	Duct Wrap	Yellow Fibrous Homogenous	PLM Trace Cellulose PLM 94% Fiberglass	PLM 6% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699855 9-DW-A	Fibrous Material	White Fibrous Homogenous	PLM 98% Cellulose	PLM 2% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699856 9-DW-B	Duct Wrap	Yellow Fibrous Homogenous	PLM Trace Cellulose PLM 94% Fiberglass	PLM 6% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699856 9-DW-B	Fibrous Material	White Fibrous Homogenous	PLM 98% Cellulose	PLM 2% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699857 9-DW-C	Duct Wrap	Yellow Fibrous Homogenous	PLM Trace Cellulose PLM 94% Fiberglass	PLM 6% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/04/2024					
1699857 9-DW-C	Fibrous Material	White Fibrous Homogenous	PLM 98% Cellulose	PLM 2% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/04/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
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1699858 10-PI-A	Pipe Insulation	Yellow Fibrous Homogenous	PLM Trace Cellulose PLM 95% Fiberglass	PLM 5% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
 Date Analyzed : 09/05/2024

1699858 10-PI-A	Fibrous Material	White Fibrous Homogenous	PLM 89% Cellulose	PLM 11% Other	PLM None Detected
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Layer-2 Analyst: Ben Jones
 Date Analyzed : 09/05/2024

1699859 10-PI-B	Pipe Insulation	Yellow Fibrous Homogenous	PLM Trace Cellulose PLM 95% Fiberglass	PLM 5% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
 Date Analyzed : 09/05/2024

1699859 10-PI-B	Fibrous Material	White Fibrous Homogenous	PLM 89% Cellulose	PLM 11% Other	PLM None Detected
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Layer-2 Analyst: Ben Jones
 Date Analyzed : 09/05/2024

1699860 10-PI-C	Pipe Insulation	Yellow Fibrous Homogenous	PLM Trace Cellulose PLM 95% Fiberglass	PLM 5% Other	PLM None Detected
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Layer-1 Analyst: Ben Jones
 Date Analyzed : 09/05/2024

1699860 10-PI-C	Fibrous Material	White Fibrous Homogenous	PLM 89% Cellulose	PLM 11% Other	PLM None Detected
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Layer-2 Analyst: Ben Jones
 Date Analyzed : 09/05/2024

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699861 11-WBS-A	Drywall	White Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699861 11-WBS-A	Mud	White Non-Fibrous Homogenous	PLM 6% Cellulose	PLM 94% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699862 11-WBS-B	Drywall	White Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699862 11-WBS-B	Mud	White Non-Fibrous Homogenous	PLM 6% Cellulose	PLM 94% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699863 11-WBS-C	Drywall	White Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699863 11-WBS-C	Mud	White Non-Fibrous Homogenous	PLM 6% Cellulose	PLM 94% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699864 12-CA-A	Construction Adhesive	Brown Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699865 12-CA-B	Construction Adhesive	Brown Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699866 12-CA-C	Construction Adhesive	Brown Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699867 13-IC-A	Caulk	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699868 13-IC-B	Caulk	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699869 13-IC-C	Caulk	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699870 14-WG-A	Window Glaze	Gray Non-Fibrous Homogenous		PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699871 14-WG-B	Window Glaze	Gray Non-Fibrous Homogenous		PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699872 14-WG-C	Window Glaze	Gray Non-Fibrous Homogenous		PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699873 15-CB-A	Cove Base	Beige Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699873 15-CB-A	Adhesive	Cream Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699873 15-CB-A	Fibrous Material	White Fibrous Homogenous	PLM 96% Cellulose	PLM 4% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699874 15-CB-B	Cove Base	Beige Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699874 15-CB-B	Adhesive	Cream Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699874 15-CB-B	Fibrous Material	White Fibrous Homogenous	PLM 96% Cellulose	PLM 4% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699875 15-CB-C	Cove Base	Beige Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699875 15-CB-C	Adhesive	Cream Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699875 15-CB-C	Fibrous Material	White Fibrous Homogenous	PLM 96% Cellulose	PLM 4% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699876 16-CA-A	Stair Tread	Beige Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699876 16-CA-A	Adhesive	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699877 16-CA-B	Stair Tread	Beige Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699877 16-CA-B	Adhesive	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699878 16-CA-C	Stair Tread	Beige Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699878 16-CA-C	Adhesive	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699879 17-CM-A	Carpet Mastic	Yellow Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699880 17-CM-B	Carpet Mastic	Yellow Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699881 17-CM-C	Carpet Mastic	Yellow Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699882 18-CB-A	Cove Base	Dark Tan Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699882 18-CB-A	Adhesive	Cream Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699882 18-CB-A	Brittle Material	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699883 18-CB-B	Cove Base	Dark Tan Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699883 18-CB-B	Adhesive	Cream Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699883 18-CB-B	Brittle Material	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699884 18-CB-C	Cove Base	Dark Tan Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699884 18-CB-C	Adhesive	Cream Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699884 18-CB-C	Brittle Material	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699885 19-VF-A	Vinyl Flooring	Light Brown Non-Fibrous Homogenous	PLM 3% Cellulose	PLM 97% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699885 19-VF-A	Fibrous Material	Brown Fibrous Homogenous	PLM 87% Cellulose	PLM 13% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699885 19-VF-A	Adhesive	Brown Non-Fibrous Homogenous	PLM 6% Cellulose	PLM 94% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699886 19-VF-B	Vinyl Flooring	Light Brown Non-Fibrous Homogenous	PLM 3% Cellulose	PLM 97% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699886 19-VF-B	Fibrous Material	Brown Fibrous Homogenous	PLM 87% Cellulose	PLM 13% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699886 19-VF-B	Adhesive	Brown Non-Fibrous Homogenous	PLM 6% Cellulose	PLM 94% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699887 19-VF-C	Vinyl Flooring	Light Brown Non-Fibrous Homogenous	PLM 3% Cellulose	PLM 97% Other	PLM None Detected
Layer-1 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699887 19-VF-C	Fibrous Material	Brown Fibrous Homogenous	PLM 87% Cellulose	PLM 13% Other	PLM None Detected
Layer-2 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699887 19-VF-C	Adhesive	Brown Non-Fibrous Homogenous	PLM 6% Cellulose	PLM 94% Other	PLM None Detected
Layer-3 Analyst: Ben Jones Date Analyzed : 09/05/2024					
1699888 20-CB-A	Cove Base	Red/Brown Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699888 20-CB-A	Adhesive	Tan Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699889 20-CB-B	Cove Base	Red/Brown Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699889 20-CB-B	Adhesive	Tan Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699890 20-CB-C	Cove Base	Red/Brown Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699890 20-CB-C	Adhesive	Tan Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699891 21-IC-A	Caulk	Clear Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699892 21-IC-B	Caulk	Clear Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699893 21-IC-C	Caulk	Clear Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699894 22-CA-A	Construction Adhesive	Yellow Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699895 22-CA-B	Construction Adhesive	Yellow Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699896 22-CA-C	Construction Adhesive	Yellow Non-Fibrous Homogenous	PLM 5% Cellulose	PLM 95% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699897 23-WP-A	Wallpaper	Red/Yellow Fibrous Non-Homogenous	PLM 10% Cellulose	PLM 90% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024 With Adhesive and Mesh Backing					
1699897 23-WP-A	Mud	White Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699898 23-WP-B	Wallpaper	Red/Yellow Fibrous Non-Homogenous	PLM 10% Cellulose	PLM 90% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024 With Adhesive and Mesh Backing					
1699898 23-WP-B	Mud	White Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699899 23-WP-C	Wallpaper	Red/Yellow Fibrous Non-Homogenous	PLM 10% Cellulose	PLM 90% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024 With Adhesive and Mesh Backing					
1699899 23-WP-C	Mud	White Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699900 24-CT-A	Ceiling Tile	Gray Fibrous Homogenous	PLM Trace Cellulose PLM 90% Fiberglass	PLM 10% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699900 24-CT-A	Glue Pod	Brown Non-Fibrous Homogenous	PLM 5% Cellulose PLM 5% Fiberglass	PLM 90% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699900 24-CT-A	Drywall	White Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-3 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699901 24-CT-B	Ceiling Tile	Gray Fibrous Homogenous	PLM Trace Cellulose PLM 90% Fiberglass	PLM 10% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699901 24-CT-B	Glue Pod	Brown Non-Fibrous Homogenous	PLM 5% Cellulose PLM 5% Fiberglass	PLM 90% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699901 24-CT-B	Drywall	White Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-3 Analyst: Chris Canilao Date Analyzed : 09/05/2024					

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Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699902 24-CT-C	Ceiling Tile	Gray Fibrous Homogenous	PLM Trace Cellulose PLM 90% Fiberglass	PLM 10% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699902 24-CT-C	Glue Pod	Brown Non-Fibrous Homogenous	PLM 5% Cellulose PLM 5% Fiberglass	PLM 90% Other	PLM None Detected
Layer-2 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699902 24-CT-C	Drywall	White Non-Fibrous Homogenous	PLM 2% Cellulose	PLM 98% Other	PLM None Detected
Layer-3 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699903 25-CP-A	Ceiling Panel	Gray Fibrous Homogenous	PLM Trace Cellulose PLM 90% Fiberglass	PLM 10% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699904 25-CP-B	Ceiling Panel	Gray Fibrous Homogenous	PLM Trace Cellulose PLM 90% Fiberglass	PLM 10% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					
1699905 25-CP-C	Ceiling Panel	Gray Fibrous Homogenous	PLM Trace Cellulose PLM 90% Fiberglass	PLM 10% Other	PLM None Detected
Layer-1 Analyst: Chris Canilao Date Analyzed : 09/05/2024					

Polarized Light Microscopy Asbestos Analysis Report

To : Atlas - Novi
 46555 Humboldt Dr. Suite 100
 Novi, Michigan 48377

Location : Hartwick Pines
 DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699906 26-CT-A	Ceramic Tile	Beige Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699906 26-CT-A	Grout	Gray Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-2 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699906 26-CT-A	Mortar	White Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-3 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699907 26-CT-B	Ceramic Tile	Beige Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699907 26-CT-B	Grout	Gray Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-2 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699907 26-CT-B	Mortar	White Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-3 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					

Polarized Light Microscopy Asbestos Analysis Report

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 46555 Humboldt Dr. Suite 100
 Novi, Michigan 48377

Location : Hartwick Pines
 DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699908 26-CT-C	Ceramic Tile	Beige Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699908 26-CT-C	Grout	Gray Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-2 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699908 26-CT-C	Mortar	White Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-3 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699909 27-CT-A	Ceramic Tile	White Non-Fibrous Non-Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024 With Grout and Mortar					
1699910 27-CT-B	Ceramic Tile	White Non-Fibrous Non-Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024 With Grout and Mortar					
1699911 27-CT-C	Ceramic Tile	White Non-Fibrous Non-Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024 With Grout and Mortar					

Polarized Light Microscopy Asbestos Analysis Report

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46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

Location : Hartwick Pines
DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699912 28-RI-A	Rolled Insulation	White Fibrous Homogenous	PLM Trace Cellulose PLM 60% Fiberglass	PLM 40% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699913 28-RI-B	Rolled Insulation	White Fibrous Homogenous	PLM Trace Cellulose PLM 60% Fiberglass	PLM 40% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699914 28-RI-C	Rolled Insulation	White Fibrous Homogenous	PLM Trace Cellulose PLM 60% Fiberglass	PLM 40% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699915 29-IC-A	Caulk	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699916 29-IC-B	Caulk	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699917 29-IC-C	Caulk	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					

Polarized Light Microscopy Asbestos Analysis Report

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Location : Hartwick Pines
DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699918 30-IC-A	Caulk	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699919 30-IC-B	Caulk	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699920 30-IC-C	Caulk	Black Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699921 31-TP-A	Textured Plaster	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699922 31-TP-B	Textured Plaster	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699923 31-TP-C	Textured Plaster	White Non-Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					

Polarized Light Microscopy Asbestos Analysis Report

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46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

Location : Hartwick Pines
DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
1699924 32-WP-A	Wallpaper	Cream Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699924 32-WP-A	Adhesive	Yellow Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-2 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699925 32-WP-B	Wallpaper	Cream Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699925 32-WP-B	Adhesive	Yellow Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-2 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699926 32-WP-C	Wallpaper	Cream Fibrous Homogenous	PLM Trace Cellulose	PLM 100% Other	PLM None Detected
Layer-1 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					
1699926 32-WP-C	Adhesive	Yellow Non-Fibrous Homogenous	PLM 1% Cellulose	PLM 99% Other	PLM None Detected
Layer-2 Analyst: Shelby Fogelsong Date Analyzed : 09/05/2024					



Polarized Light Microscopy Asbestos Analysis Report

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46555 Humboldt Dr. Suite 100
Novi, Michigan 48377

Location : Hartwick Pines
DNR

ETL Job : 272101
Client Project : 188BS24516
Date Collected : 08/29/2024
Date Received : 09/04/2024

Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Asbestos
--------	-------------	------------	-----------	---------------	------------

Edm Kili
Lab Supervisor/Other Signatory

Analyst:

Ben Jones
Ben Jones

Chris Canilao
Chris Canilao

Shelby Fogelsong
Shelby Fogelsong

400 Point Count Results by EPA 600/R-93/116 PLM (denoted by "PC")
Item 198.1: PLM Methods for Identifying and Quantitating Asbestos in Bulk Samples
Item 198.6: PLM Methods for Identifying and Quantitating Asbestos in Non-Friable Organically Bound Bulk Samples
EPA 600/R-93/116: Method for Determination of Asbestos in Bulk Building Materials
EPA 600/M4-82-020: Interim Method for Determination of Asbestos in Bulk Insulation Samples
A % Asbestos result of "Trace" indicates that the analyzed material was found to contain less than 1% asbestos and would not be considered an Asbestos Containing Material (ACM).

ETL, Inc. maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced without written approval by ETL, Inc. Test Method EPA 600/R-93-116 & EPA 600/M4-82/020 or NYSDOH-ELAP item 198.1 and/or 198.6 was used to analyze all samples. Matrix interference and/or resolution limits (i.e. detecting asbestos in non-friable organically bound materials) may yield false results in certain circumstances. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing. Interpretation and use of test results are the responsibility of the client. ETL, Inc. is not responsible for the accuracy of the results when requested to physically separate and analyze layered samples. Any PLM results below 10% should be re-analyzed using the EPA recommended Point Count method. Any material that has greater than 1% asbestos content is considered to be an Asbestos Containing Material (ACM). These materials are regulated by both OSHA and the EPA and must be treated accordingly. Results are related to only to samples that were tested. An estimate of uncertainty can be provided at the client's request.

ENVIRONMENTAL TESTING LABORATORIES

Chain of Custody



37575 W Huron River Drive
Romulus, Michigan 48174
(734) 955-6600
Fax: (734) 992-2261
www.2etl.com

Client: Atlas		Contact: Ryan Rae	ETL Project #: 272101
Address: 46555 Humboldt Dr. Suite 100		Phone: 1-248-669-5140	Project Location/Name: DNR Hartwick Pines
		Fax:	
		E-mail: Ryan.rae@oneatlas.com	Client Project #: 188BS24516
Please Provide Results: ☒ Email ☐ Fax ☐ Verbal ☐ Other _____			Date Sampled: 8/29/2024

Turnaround Time (TAT): ☐ RUSH (2 hrs) ☐ Same Day ☐ 24 hrs ☐ 48 hrs ☒ 72 hrs ☐ Standard (5 days)
(If not checked, standard TAT will be assumed) TAT Based on Business Hours Monday-Friday *Rush unavailable for Soot/Char/Ash % analysis. Limited TATs available for large volume.

Sample Type (Check Only One)			
Asbestos: ☒ Bulk (PLM) ☐ Bulk (TEM) ☐ Dust ☐ Air (PCM) ☐ Air (TEM)	Mold: ☐ Tape ☐ Bulk ☐ Air-O-Cell ☐ Air (Other) ☐ Nuisance Dust		

Combustion Tape: ☐ Basic: Total Combustion Particles ☐ Advanced: Soot/Char/Ash %	3M® Scotch™ Magic Tape is required for combustion analysis
--	---

Asbestos Analysis Information (Check all that Apply)	
--	--

Stop at 1st Positive: ☒ Yes / ☐ No (Clearly mark each homogeneous area)	Point Counting: ☐ Yes / ☐ No ☐ *400 Points ☐ *1000 Points
--	---

☐ *Gravimetric Reduction ☐ *Soil or Vermiculite Analysis	Point Counting Criteria:
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* Additional charge and turnaround may be required

1699

Lab ID	Sample ID	Sample Location/Time Sampled	Material or Sample Description	Air Samples Only		
				Start	Stop	Volume
831-833	1-RM-ABC	AM / PM	Roofing - Shingles			
834-836	2-VP-ABC	AM / PM	Roofing - Vapor paper			
837-839	3-M-ABC	AM / PM	Exterior mortar - Gray between natural stone			
840-842	4-WP-ABC	AM / PM	Copper sheeting with waterproofing - Between mortar and poured foundation			
843-845	5-EC-ABC	AM / PM	Penetration Caulk - Exterior pipes			
846-848	6-EC-ABC	AM / PM	Exterior caulk red/brown - On metal and wood siding.			
849-851	7-CC-ABC	AM / PM	Concrete floor			
852-854	8-CC-ABC	AM / PM	Concrete - Foundation walls (poured)			
855-857	9-DW-ABC	AM / PM	Duct Wrap - Fiberglass wrapped in foil			
858-860	10-PI-ABC	AM / PM	Pipe insulation - Yellow fiberglass			
861-863	11-WBS-ABC	AM / PM	Wallboard system			
864-866	12-CA-ABC	AM / PM	Construction Adhesive behind marble window ledge			

Relinquished (Name/Organization):	Matthew Kreuyer <i>Matthew Kreuyer</i>	Date: 9/3/2024	Time: 14:00 AM / PM
Received (Name/ETL):	<i>[Signature]</i>	9/4/24	10:51 AM / PM
Stereoscopical/Sample Analysis (Name/ETL):	<i>[Signature]</i>		
Special Instructions:	Stop at first positive.		
	Remarks:		

**In order to ensure results by specified TAT, the lab must be emailed/called with the quantity of samples to be shipped or dropped off
**Rushes are not accepted after 3:00 PM and Same Days are not accepted after 2:00 PM

ENVIRONMENTAL TESTING LABORATORIES

Chain of Custody



37575 W Huron River Drive
Romulus, Michigan 48174
(734) 955-6600
Fax: (734) 992-2261
www.2etl.com

ETL Project #: 272101

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

Lab ID	Sample ID	Sample Location	Material Description/Volume
<u>867-869</u>	13-IC-ABC		Window Caulk - White
<u>870-872</u>	14-WG-ABC		Window glaze - Gray tacky
<u>873-875</u>	15-CB-ABC		Stairwell cove base 12" beige
<u>870-878</u>	16-CA-ABC		Stair tread beige with black adhesive
<u>879-881</u>	17-CM-ABC		Carpet mastic - Yellow
<u>882-884</u>	18-CB-ABC		Cove base 4" dark tan
<u>885-887</u>	19-VF-ABC		Vinyl flooring - Pebble pattern light brown with some blue and red
<u>888-890</u>	20-CB-ABC		Cove base 4" red/brown
<u>891-893</u>	21-IC-ABC		Clear Caulk - Kitchen backsplash
<u>894-896</u>	22-CA-ABC		Construction adhesive - Yellow on red acoustical wall covering
<u>897-899</u>	23-WP-ABC		Wallpaper (reddish brown) with yellow adhesive
<u>900-902</u>	24-CT-ABC		1'x1' Rough ceiling tile (Gray) with glue pods (brown).
<u>903-905</u>	25-CP-ABC		Ceiling panel 1'x1' - Rough with gouges
<u>906-908</u>	26-CT-ABC		Ceramic tile 6'X6' Beige with grout and mortar
<u>909-911</u>	27-CT-ABC		Ceramic tile white 4"x4" with grout and mortar
<u>912-914</u>	28-RI-ABC		Rolled insulation - White with brown paper.
<u>915-917</u>	29-IC-ABC		Caulk - White - around toilets.
<u>918-920</u>	30-IC-ABC		Caulk - Black - Between window frame and walls.
<u>921-923</u>	31-TP-ABC		Textured plaster on DWS - White
<u>924-926</u>	32-WP-ABC		Wallpaper (cream with red and blue splotches) with yellow adhesive.
<u> </u>			



APPENDIX B

LEAD LABORATORY RESULTS



30105 Beverly Road
Romulus, MI 48174
Ph: 734-629-8161; Fax: 734-629-8431

Certificate of Analysis: Lead In Paint by EPA SW-846 Method 7000B/3050B*

Client : Atlas Technical Consultants
46555 Humboldt Dr.
Novi, MI 48377

Attn : Dawn LeCesne **Email :** dawn.lecesne@oneatlas.com
Phone : 248-669-5140 **Fax :** 248-669-5147

AAT Project : 1064774
Sampling Date : 08/29/2024
Date Received : 09/04/2024
Date Analyzed : 09/04/2024
Date Reported : 09/04/2024

Client Project : 188BS24224

Project Location : SOM HARTWICK PINES

Sample ID	Client Code	Sample Description	PPM	Result Lead (% by weight)	Calculated R L (% by weight)
9706246	PC1	EXT BROWN	8.09	0.000809	0.000546
9706247	PC2	INT WHITE	30.5	0.00305	0.000604
9706248	PC3	INT GREEN	11.0	0.00110	0.000693
9706249	PC4	INT BLACK	9.47	0.000947	0.000842

Analyst Signature

Alexis Pheeneey

ND = Not Detected, N/A = Not Available, RL = Reporting Limit, Analytical Reporting Limit is 5 ug/sample. For true values assume (3) significant figures. The method, batch, and sample Quality Control are acceptable unless otherwise stated. AAT internal SOP S218. The laboratory operates in accord with ISO 17025 guidelines and holds limited scopes of accreditation under AIHA-LAP and NY State DOH ELAP programs. These results are submitted pursuant to AAT, LLC current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. Analytical results relate to the samples as received by the lab. Results in mg/cm2 are calculated based on sample area dimensions supplied by the client. AAT will not assume any liability or responsibility for the manner in which the results are used or interpreted. Reproduction of this document other than in its entirety is not authorized by AAT, LLC. AAT does not blank correct reported values. Sample data apply only to items analyzed. Current EPA/HUD Interim Standard for lead in paint samples is: 5000 PPM (parts per million) or ug/g which is equivalent to 0.5% by weight. EPA definition of lead-based paint: 1.0 mg/cm2. New York City Regulatory Limits: 0.25% by weight or 0.5 mg/cm2 for investigations for a child. MD and Philadelphia definition of lead-based paint: 0.7 mg/cm2. Note: Samples are stored for 15 days following report date. *= Validated modified method.
AIHA LAP- Lab ID #100986, NY State DOH ELAP -Lab ID #11864, State of Ohio- Lab ID # 10042





30105 Beverly Road
Romulus, MI 48174
Ph: 734-629-8161; Fax: 734-629-8431

To : Atlas Technical Consultants
46555 Humboldt Dr.
Novi, MI 48377

Attn : Dawn LeCesne

Email : dawn.lecesne@oneatlas.com

Phone : 248-669-5140

Project Location : SOM HARTWICK PINES

AAT Project : 1064774

Client Project : 188BS24224

Date Reported 09/04/2024

Sample	Client Code	Analysis Requested	Completed	Analyst
9706246	PC1	Lead Paint	09/04/2024	Alexis Pheeney
9706247	PC2	Lead Paint	09/04/2024	Alexis Pheeney
9706248	PC3	Lead Paint	09/04/2024	Alexis Pheeney
9706249	PC4	Lead Paint	09/04/2024	Alexis Pheeney

Reviewed By

Elyse Bidle
Quality Assurance Coordinator

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NY State DOH ELAP -Lab ID #11864, Michigan State Lab # 9996

Date Printed: 09/04/2024 3:49PM

AAT Project: 1064774



30105 BEVERLY RD.
ROMULUS MI 48174
(734) 699-LABS (5227)

FAX: (734) 699-8407

Website: www.accurate-test.com

Email: customersupport@accurate-test.biz



SUBMITTING COMPANY

Atlas Technical Consultants
46555 Humboldt Drive
Suite 100
Novi, MI 48377

CONTACT INFORMATION

Office: 248-669-5140

Fax: —

Cell: 616-308-8243

PO #188BS24224

Email: Matthew.Kreuer@oneatlas.com

PROJECT NUMBER <u>188BS24224</u>		SAMPLING DATE: <u>08/29/24</u>		REQUESTED ANALYSIS LEAD		TURNAROUND TIME (please check one)	
PROJECT ADDRESS <u>50M Hartwick Pines</u>				SINGLE WIPE DUST ()		SAME DAY () 24 Hour (X)	
SAMPLE START TIME <u>—</u>		SAMPLE END TIME <u>—</u>		COMPOSITE SOIL ()		48 Hour () 72 hours ()	
RISK-ASSESSOR <u>Sampled by: Matt Kreuer</u>				PAINT CHIP ☒ % By Wt ☒ mg/cm ² ()		If no TAT is indicated, default is 72 hours	
LAB ID # <u>970821</u>	CLIENT SAMPLE ID	DESCRIPTION	WS, WT, F	WIPE AREA (e.g. 12 in X 12 in)	CLIENT COMMENTS		
	PC-1	Exterior - Brown	—	X	SAMPLES SHIPPED		
	PC-2	Interior - White	—	X			
	PC-3	Interior - Green	—	X	NY STATE SAMPLES ☐		
	PC-4	Interior - Black	—	X	(check here)		
				X	SAMPLE CONDITION		
				X	SEALS INTACT Y N		
				X	CONTAINERS LABELED Y N		
				X	RECVD & ACCEPTED Y N		
				X	LAB REMARKS		
				X	1594		
				X	LAB PROJECT NUMBER <u>10617724</u>		
				X			
SAMPLES RELINQUISHED BY			SAMPLES RECEIVED BY			DATE	
(X) <u>Matthew Kreuer</u>						(X) <u>9-3-2024</u>	
						TIME	
						AM <u>2:00</u> PM	
						AM PM	

By submitting samples to AAT, the client agrees to AAT's terms and conditions.

AAT is not responsible for shipping delays

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit one digital copy 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 Forms: Use CSI Form 13.1A (after the bidding phase)
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions 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. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. 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 date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. 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 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience:
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. 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.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Requested substitution provides sustainable design characteristics that specified product provided.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION

END OF SECTION 012500



SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____
A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____
Telephone: _____

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____



SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Phone: _____
Address: _____
Trade Name: _____ Model No.: _____
Installer: _____ Phone: _____
Address: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product:

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: ☐

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E
☐ Other:

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

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

1.4 INFORMATIONAL SUBMITTALS

- A. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations.

1.5 FIELD CONDITIONS

- A. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Landlord under a separate contract.

1.6 WARRANTY

- A. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.7 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

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/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- C. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs or video.
1. Inventory and record the condition of items to be removed and salvaged.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
1. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PROTECTION

- A. Temporary Protection: 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. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, 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.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting roof and walls.
 5. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- B. 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.
- C. 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 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."
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.
 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

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

END OF SECTION 024119

SECTION 028300 - LEAD REMEDIATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies requirements for working with lead-containing materials (LCM), during any of the following operations:
 - 1. Demolition of Lead-Containing Materials (LCM): Includes razing a building or any portion of a building or piece of equipment with LCM.
 - 2. Incidental Removal or Disturbance of Lead-Based Paint (LBP): This includes activities such as sanding and scraping for paint preparation activities.
 - 3. Removal of Lead-Based Paint (LBP): Complete removal of LBP from substrate, typically prior to torch cutting for demolition activities.
- B. Extent of known LCM is as follows:
 - 1. As indicated in State of Michigan provided survey reports. Assume all paint or other coatings not identified on drawings or reports contain lead.

1.2 RELATED SECTIONS

- A. Demolition and removal of items not containing lead as a component is included in Division 02 Section "Selective Demolition."

1.3 DEFINITIONS

- A. The term "Lead-Based Paint" (LBP) is identified as paint or other surface coating such as varnish, sealer or stain containing lead in any detectable amount.
- B. The term "Incidental Removal or Disturbance of Lead-Based Paint" indicates one or more of the following operations:
 - 1. Scraping, hand sanding, or otherwise removing loose LBP from existing surfaces scheduled to remain in place.
- C. The term "Demolition of LCM" refers to cutting, drilling, abrading, demolishing, or otherwise disturbing building elements coated with LBP or containing lead.
- D. The term "Lead-Containing Materials" (LCM) is identified as construction debris coated with lead-based paint or other materials containing lead, such as x-ray shielding.
- E. The term "Critical Barrier" indicates the perimeter of the enclosure within which lead disruption/removal work takes place. Critical Barriers may include existing floor, wall, and ceiling structures, as well as constructed partitions, closures and seals.
- F. The term "Project Site" indicates the limits of the Project Site as indicated on drawings or by provisions of this specification.
- G. The term "Work Area" indicates the area within the Critical Barrier.
- H. The term "Action Level" means exposure to an airborne concentration of lead of 30 micrograms per cubic meter of air calculated as an 8-hour time-weighted average (TWA).
- I. The term "Exposure Assessment" means a determination of employee exposures for a given task measured by air monitoring. The Assessment must meet the criteria for objective data as outlined in the MIOSHA/OSHA Lead in Construction Standard (MIOSHA Part 603, R325.51992 and 29 CFR 1926.62).
- J. The term "OSHA PEL" stands for the Permissible Exposure Limit established by the Occupational Safety and Health Administration for lead exposure. The OSHA PEL refers to an airborne concentration of lead of 50 micrograms per cubic meter of air calculated as an 8-hour time-weighted average (TWA).
- K. The abbreviation "TCLP" stands for Toxicity Characteristic Leaching Procedure and refers to one of the tests to determine if waste is considered a Hazardous Waste or non-hazardous solid waste.

- L. The term "Hazardous Waste" refers to a listed waste or any solid or liquid waste with one or more of the following characteristics: toxic, corrosive, flammable, explosive, combustible, oxidizer, pyrophoric, unstable (reactive) or water - reactive.
- M. The term "Non-Hazardous Waste" refers to any solid or liquid waste not exhibiting characteristics of Hazardous Waste.

1.4 SUBMITTALS

- A. Exposure Assessment Documentation: Submit to Owner.
- B. All information used to document previous employee exposure assessments, if available. If not available, conduct an initial exposure assessment at the start of the project.
- C. Written Compliance Plan: Submit to Owner a Written Compliance Plan incorporating all requirements in the MIOSHA Lead in Construction Standard. Also indicate type of containment and method of liquid waste capture to be established if water is utilized for removal.
- D. Health and Safety Requirements: Submit to Owner the following information for each employee that will conduct lead disturbance on the job site:
 - 1. Respiratory Protection Program.
 - 2. Proof of current fit test for respirator that will be worn on Project Site.
 - 3. Proof of medical surveillance for respirator usage and lead work.
 - 4. Proof of lead awareness training in accordance with section 1.5. QUALITY ASSURANCE.
- E. Prepare a written schedule for each operation expected to disturb/remove LCM, indicating the following:
 - 1. Type of work to be performed, such as cutting, demolition, paint removal, or other action.
 - 2. Location of work to be performed.
 - 3. Proposed starting date and time.
 - 4. Proposed working hours.
 - 5. Proposed duration.
- F. Waste Container: If necessary, contractor to provide hazardous waste containers (pails, drums, or dumpsters prior to beginning LBP disruption/removal work. Containers are not needed for demolition waste with LBP that has been TCLP tested and found to be non-hazardous:
 - 1. Location
 - 2. Work activities/methods
 - 3. Estimated number of pails, drums or dumpsters needed for both solid and liquid waste.
- G. All submissions must be directed to Owner.

1.5 QUALITY ASSURANCE

- A. [Personnel](#) involved in the disturbance of LCM shall be trained in accordance with the requirements of the MIOSHA Lead in Construction Standard, including:
 - 1. The content of the MIOSHA Lead in Construction Standard and its appendices;
 - 2. The specific nature of the operations which could result in exposure to lead above the action level;
 - 3. The purpose, proper selection, fitting, use, and limitations of respirators;
 - 4. The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females and hazards to the fetus and additional precautions for employees who are pregnant);
 - 5. The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices;
 - 6. The contents of any compliance plan in effect;
 - 7. Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician; and
 - 8. The employee's right of access to records under 29 CFR 1910.20.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 HEALTH AND SAFETY REQUIREMENTS

- A. General: Determine employee exposure to lead in air as required in MIOSHA Lead in Construction Standard.
- B. Exposure Assessment: If the Contractor has made a previous Exposure Assessment that is representative of the task to be performed on-site, the Contractor may rely on this data and determine the need for personal protective equipment and work practice controls based upon this data, if approved by EHS.
- C. Job requirements: When the Contractor does not have an Exposure Assessment or the Assessment is determined to be insufficient, the Contractor must conduct personal air monitoring in accordance with the MIOSHA Lead in Construction Standard and follow the requirements below which are outlined by job task until monitoring determines otherwise:
 - 1. Manual demolition, scraping, sanding, heat gun application, power tool cleaning with HEPA dust collection system, spray painting with LCM:
 - a. Use of 1/2 mask respirator with HEPA filters.
 - b. PPE.
 - c. Medical surveillance.
 - d. Use of changing room.
 - e. Use of handwashing facilities.
 - f. Provision of lead awareness training.
 - 2. Using lead mortar, lead burning, rivet busting, power tool cleaning without HEPA collection, cleaning up with dry expendable abrasives, removing or relocating enclosure:
 - a. Loose fitting PAPR with HEPA or supplied air respirator.
 - b. PPE.
 - c. Medical surveillance.
 - d. Use of changing room.
 - e. Use of handwashing facilities.
 - f. Provision of lead awareness training.
 - 3. Abrasive blasting, welding, using cutting torch, burning (Contact EHS for alternatives before using these methods):
 - a. Supplied air respirator or SCBA.
 - b. PPE
 - c. Medical surveillance.
 - d. Use of changing room.
 - e. Use of handwashing facilities.
 - f. Provision of lead awareness training.

3.2 PREPARATION

- A. General: Prepare Work Areas in a manner that will protect Owner's personnel and property, and the visiting public, from contact with LCM. Prior to beginning work, confirm starting date and time with Owner. Do not begin work that will disturb LCM without Owner's approval.
- B. Preparing Building Exteriors: Ensure adequate measures are in place to limit airborne lead content below the Action Level of 30 ug/m³ (micrograms per cubic meter) adjacent to the Work Area.
 - 1. Erect barricades and install warning tape or signs as necessary to prevent inadvertent exposure of passersby to LCM in all forms, including, but not necessarily limited to dust, particles, and fumes.
 - 2. Completely cover grounds and vegetation with minimum 8-mil thick polyethylene sheets with joints between sheets lapped and taped; with one edge taped to adjacent building surfaces below area of work; and with free ends secured in position with stakes, tie-down lines or weights. Cover sufficient ground area to capture wind-blown chips, dust and particles.
- C. Preparing Building Interiors: Ensure adequate measures are in place to protect building occupants from exposure to airborne lead dust, particles, fumes or other LCM exceeding the Action Level of 30 ug/m³ (micrograms per cubic meter) lead content in air. Adequate measures shall include, but are not necessarily limited to, construction of Critical Barriers and/or establishment of negative pressure within Work Area.

1. Seal off openings and penetrations into the Work Area. Provide temporary dust barriers consisting of at least polyethylene plastic sheet on wood studs. Lap and tape joints of plastic sheeting to prevent dust, particles, fumes, and other forms of lead debris from leaving the enclosed area.
2. Discontinue building ventilation within the Work Area and seal off ventilation supply and return or exhaust diffusers, grilles or openings.
3. Post warning signs at all entrances to the Work Area that state the following, as required in MIOSHA Lead in Construction Standard:

**DANGER
LEAD WORK AREA
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA**

3.3 WORK PRACTICES

- A. General: Perform any removal, demolition or disturbance of LCM in compliance with the following requirements:
 1. Restrict access to Work Area to essential personnel.
 2. Use moist-removal methods and/or HEPA vacuuming where applicable. Do not over-saturate the Work Area.
 3. Any debris generated must be cleaned up immediately before it can be tracked into other areas.
 4. Remove contaminated clothing and personal protective equipment before leaving the Work Area, or Work Area enclosure, as applicable.
 5. If the Action Level is exceeded outside the Work Area, discontinue work and modify Critical Barrier, or perform other modifications of methods or materials as required to reduce the lead contamination below the Action Level.
 6. Prohibit eating, drinking, and smoking in the Work Area.
- B. Incidental Removal of LBP: Remove paint from building surfaces by hand scraping and sanding; or through the use of fluid-applied chemical strippers designed to dry into a solid polymeric sheet and peel off with paint encapsulated. Hand-scraping and sanding must be used in conjunction with moist-removal methods using misted water. Leave moist paint dust and chips in place to air dry before collection. Contact EHS as soon as removal has begun.
 1. Wet methods (including power-washing) that use amounts of water that can drip, spill, or leak onto the ground, or onto or into other adjacent surfaces are prohibited unless approved by EHS.
 2. Dry removal methods (including sand blasting, power sanding, and other methods relying on high velocity mechanical abrasion) that create airborne fine particulate waste materials are prohibited unless specifically reviewed and approved by EHS.
 3. Prior to torch-cutting building elements containing LBP, remove paint within four inches of centerline of cut in accordance with requirements of this Section.
- C. Removal of Solid Lead Sheeting: Remove and stockpile solid lead sheet materials in a manner that will not result in the contamination of Work Area or Project Site. Remove sheet products in the largest sections possible. Do not unnecessarily cut or abrade lead sheet materials. Provide minimum 8-mil thick plastic sheet covering between solid lead stockpiles and walls, floors, paving or ground as applicable.
 1. Do not separate lead sheet materials that are adhesively laminated to gypsum substrates. Remove and dispose as lead hazardous waste all gypsum board with lead laminate attached.

3.4 DISPOSAL

- A. Lead Painted Demolition Debris and Lead Paint Chips: Prior to removal of waste from the site, coordinate Toxicity Characteristic Leaching Procedure (TCLP) testing of LCM waste with EHS-HMM. Allow two weeks for testing results. If TCLP testing shows the waste to be nonhazardous, the waste can be disposed of as normal construction demolition debris. If waste is classified as Hazardous or has not been TCLP tested, comply with the following requirements:
 1. Collect and place solid and liquid waste in Owner-provided containers.
 2. Store waste containers in a secure area (preferably a locked room at the project site. Set containers securely on a hard surface which is accessible to EHS drum carts. Do not stage containers on lawns, dirt piles, gravel drives, areas with mud or basement areas with no elevator access.

3. Ensure that soil, ground water, and drains or sewers within the storage area are protected from possible contamination. Keep containers secure and tightly closed at all times, except when adding waste.
 4. Keep lead waste segregated from other waste. Do not co-mingle waste. **DO NOT MIX LIQUID AND SOLID WASTE.**
 5. Place appropriate labels on all containers. Provide all information required on the label; mark labels using indelible ink. The name of the "Waste Generator" is as follows:
 - a. "Campus Area" 1655 Dean Road, Ann Arbor, Michigan 48109.
 - b. Contact EHS at the start of the project (734-763-4568) for proper generator name and site address.
 6. Mark the side of each container with the name and phone number of Owner's Representative knowledgeable about the type of waste contained.
 7. Do not remove waste from Project Site.
- B. Disposal of hazardous lead waste shall be done in coordination with EHS-HMM.
1. Contact EHS-HMM at least one week in advance to request pick-up of the containers.
 2. EHS will pickup and dispose of properly packaged and staged hazardous lead waste at no cost to the contractor. Call the EHS-HMM Program at 734-763-4568 to schedule a pickup immediately after lead waste has been staged.
- C. Disposal of Non-Hazardous LCM from Demolition/Renovation Activities: Collect non-hazardous LCM waste in a covered dumpster and dispose of the waste at a Type II or III landfill. For projects where large amounts of hazardous waste are generated, EHS may allow for transportation and disposal of waste by a qualified contractor. If applicable, contact EHS for additional transportation and disposal requirements.

3.5 CLEAN UP

- A. Upon completion of LCM or LBP removal and disposal operations, clean all surfaces within the Work Area before it can be tracked into other areas, including, but not necessarily limited to the following:
1. Siding.
 2. Steel support structures.
 3. Floors and ground.
 4. Walls.
 5. Window sills.
 6. Trim.
 7. Ledges and projections.
- B. For projects within building interior spaces, use a HEPA filtered vacuum for removal/elimination of dust, particulates, and debris.
1. Brushing, brooming and other dry methods that generate airborne dust are prohibited.
- C. Remove and dispose of wash water and HEPA filters as Hazardous Waste.
- D. Remove and dispose of all solid waste used for protection and clean-up as Non-Hazardous Waste as indicated in Section 3.4, "Disposal of Non-Hazardous LCM from Demolition/Renovation Activities".
- E. Field Testing: Upon completion of removal, disposal, and clean-up operations, the Owner may visually inspect and/or test the Project Site for evidence of remaining lead contamination. Return to Project Site and, at no additional cost to Owner, re-clean areas found to be contaminated.

END OF SECTION 028300

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. If differing requirements are identified elsewhere (in these specifications or on drawings or separate instructions), the more stringent requirement shall be met.

1.2 SUMMARY

- A. Section Includes:
 - 1. Wood products.
 - 2. Wood-preservative-treated lumber.
 - 3. Fire-retardant-treated lumber.
 - 4. Dimension lumber framing.
 - 5. Miscellaneous lumber.
 - 6. Plywood backing panels.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
 - 2. Section 064023 "Interior Architectural Woodwork" for interior wood stairs and railings.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. Lumber grading agencies, and abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. SPIB: The Southern Pine Inspection Bureau.
 - 4. WCLIB: West Coast Lumber Inspection Bureau.
 - 5. WWPB: Western Wood Products Association.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates:
 - 1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
 - 2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

- A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 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 and provide certificates of grade compliance issued by grading agency.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
 - 4. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content:
 - 1. Boards: 15 percent.
 - 2. Dimension Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC 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 items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED LUMBER

- A. General: Where fire-retardant-treated materials are indicated, materials are to comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment is not to promote corrosion of metal fasteners.
 2. Exterior Type: Treated materials are to comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering in accordance with ASTM D2898. Use for exterior locations and where indicated.
 3. Interior Type A: Treated materials are to have a moisture content of 28 percent or less when tested in accordance with ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 4. Design Value Adjustment Factors: Treated lumber is to be tested according to ASTM D5664 and design value adjustment factors are to be calculated according to ASTM D6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency and other information required by authorities having jurisdiction.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each and provide certificates of treatment compliance issued by testing agency.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations are not to bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
1. Framing for raised platforms.
 2. Framing for stages.
 3. Concealed blocking.
 4. Framing for non-load-bearing partitions.
 5. Framing for non-load-bearing exterior walls.
 6. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
 7. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions by Grade: Construction or No. 2 grade.
1. Application: Interior partitions not indicated as load bearing.
 2. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine or mixed southern pine; SPIB.
 - c. Spruce-pine-fir; NLGA.
 - d. Hem-fir; WCLIB, or WWPA.
 - e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 - f. Northern species; NLGA.
 - g. Eastern softwoods; NeLMA.
 - h. Western woods; WCLIB or WWPA.
- B. Load-Bearing Partitions by Grade: as indicated on drawings.
1. Application: Exterior walls and interior load-bearing partitions.
 2. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine; SPIB.
 - c. Douglas fir-larch; WCLIB or WWPA.
 - d. Southern pine or mixed southern pine; SPIB.
 - e. Spruce-pine-fir; NLGA.
 - f. Douglas fir-south; WWPA.
 - g. Hem-fir; WCLIB or WWPA.
 - h. Douglas fir-larch (north); NLGA.
 - i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

- C. Machine Stress-Rated (MSR) Lumber Partitions: Any species of MSR dimension lumber with a grade of not less than what is indicated on drawings.
 - 1. Application: Exterior walls and interior load-bearing partitions.
- D. Load-Bearing Partitions by Performance: Any species and grade with a modulus of elasticity and an extreme fiber stress in bending of that indicated on drawings or greater.
 - 1. Application: Exterior walls and interior load-bearing partitions.
- E. Ceiling Joists: Construction or No. 2 grade unless otherwise indicated on drawings.
 - 1. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine; SPIB.
 - c. Douglas fir-larch; WCLIB or WWP.
 - d. Douglas fir-larch (north); NLGA.
 - e. Southern pine or mixed southern pine; SPIB.
 - f. Spruce-pine-fir; NLGA.
 - g. Hem-fir; WCLIB or WWP.
 - h. Douglas fir-south; WWP.
 - i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWP.
 - j. Northern species; NLGA.
 - k. Eastern softwoods; NeLMA.
 - l. Western woods; WCLIB or WWP.
- F. Joists, Rafters, and Other Framing by Grade: as indicated on drawings.
 - 1. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine; SPIB.
 - c. Douglas fir-larch; WCLIB or WWP.
 - d. Southern pine or mixed southern pine; SPIB.
 - e. Spruce-pine-fir; NLGA.
 - f. Douglas fir-south; WWP.
 - g. Hem-fir; WCLIB or WWP.
 - h. Douglas fir-larch (north); NLGA.
 - i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWP.
- G. Joists, Rafters, and Other Framing by Performance: Any species and grade with a modulus of elasticity and an extreme fiber stress in bending of that indicated on drawings or greater for 2-inch nominal thickness and 12-inch nominal width for single-member use.

2.5 ENGINEERED WOOD PRODUCTS

- A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
- B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
 - 1. Extreme Fiber Stress in Bending, Edgewise: as indicated.
 - 2. Modulus of Elasticity, Edgewise: as indicated.
- C. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
 - 1. Extreme Fiber Stress in Bending, Edgewise: as indicated.
 - 2. Modulus of Elasticity, Edgewise: as indicated.
- D. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Comply with material requirements of and with structural capacities established and monitored according to ASTM D5055.
 - 1. Web Material: Either OSB or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.

2. Structural Properties: Depths and design values not less than those indicated.
 3. Comply with APA PRI-400. Factory mark I-joists with APA-EWS trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA-EWS standard.
- E. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research or evaluation report for I-joists.
1. Manufacturer: Provide products by same manufacturer as I-joists.
 2. Material: All-veneer product, glued-laminated wood, or product made from any combination solid lumber, wood strands, and veneers.
 3. Thickness: 1-1/8 inches.
 4. Comply with APA PRR-401, rim board grade. Factory mark rim boards with APA-EWS trademark indicating thickness, grade, and compliance with APA-EWS standard.

2.6 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
 6. Grounds.
 7. Utility shelving.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of the following species:
1. Hem-fir (north); NLGA.
 2. Mixed southern pine or southern pine; SPIB.
 3. Spruce-pine-fir; NLGA.
 4. Hem-fir; WCLIB or WWPA.
 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 6. Western woods; WCLIB or WWPA.
 7. Northern species; NLGA.
 8. Eastern softwoods; NeLMA.
- C. Concealed Boards: 15 percent maximum moisture content and the following species and grades:
1. Mixed southern pine or southern pine; No. 2; SPIB.
 2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
 3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 4. Eastern softwoods; No. 2 Common grade; NeLMA.
 5. Northern species; No. 2 Common grade; NLGA.
 6. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.
- D. Roofing Nailers: Structural- or No. 2-grade lumber or better; kiln-dried Douglas fir, southern pine, or wood having similar decay-resistant properties.
- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.7 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.8 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or ASTM F2329.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Post-Installed Anchors: as indicated on drawings.

2.9 METAL FRAMING ANCHORS

- A. All metal framing anchors are the responsibility of the contractor. Provide sizes based on drawing notes or loads shown. If no loads are shown determine member reaction based on loads published in the engineering data.
- B. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch-minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.
- C. Provide metal framing anchors that have allowable design loads, as published by manufacturer, that meet or exceed loads indicated on drawings, or for reactions determined by engineering data and/or plan loading. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by qualified independent testing agency. Framing anchors are to be punched for fasteners adequate to withstand same loads as framing anchors.
- D. Face Mount Hangers: U-shaped joist hangers with seat and nailing flanges, full depth of joist, as indicated on Drawings. Nailing flanges provide lateral support at joist top chord.
 - 1. Thickness: as required by hanger design.
 - 2. Finish: Galvanized.
- 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.
 - 1. Strap Width: as required by hanger design.
- F. Thickness: as required by hanger design
- G. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: as required by design.
 - 2. Thickness: as required by design.
 - 3. Length: as required by hanger design.
- H. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fastens to side of rafter or truss, face of top plates, and side of stud below.
- I. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
- J. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.

- K. 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.
 - 1. Bolt Diameter: as indicated.
 - 2. Width: as required by product specified.
 - 3. Body Thickness: as required by product specified.
 - 4. Base Reinforcement Thickness: as required by product specified.
- L. Wall Bracing:
 - 1. T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.
 - 2. Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.
- M. Materials: Unless otherwise indicated, fabricate from the following materials:
 - 1. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.
 - a. Use for interior locations unless otherwise indicated.
 - 2. Heavy-Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - a. Use for wood-preserved-treated lumber and where indicated.

2.10 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets:
 - 1. 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.
 - 2. Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
 - 3. Self-adhering sheet consisting of 64 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.
- C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.
- D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- F. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.
- G. Do not splice structural members between supports unless otherwise indicated.
- H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- I. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- K. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- L. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. 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.
 - 3. ICC-ES evaluation report for fastener.
- N. Securely attach roofing nailers to substrates by anchoring and fastening to withstand bending, shear, or other stresses imparted by Project wind loads and fastener-resistance loads as designed in accordance with ASCE/SEI 7.
- O. Use steel common 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. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- 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 wood blocking to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Attach wood roofing nailers securely to substrate to resist the designed outward and upward wind loads indicated on Drawings and in accordance with ANSI/SPRI ED-1, Tables A6 and A7.
- D. 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 INSTALLATION OF WOOD FURRING

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally and vertically at 24 inches o.c.
- C. Furring to Receive Gypsum Board or Plaster Lath: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

3.4 INSTALLATION OF WALL AND PARTITION FRAMING

- A. General: 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. Fasten plates to supporting construction unless otherwise indicated.
- A. General: Provide plates as indicated on drawings using members as indicated on drawings, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.
 - 1. For exterior walls, provide framing as indicated on drawings.
 - 2. For interior load-bearing walls and partitions framing as indicated on drawings
 - 3. For interior non-load-bearing partitions and walls, provide 2-by-6-inch nominal- 2-by-4-inch nominal- size wood studs spaced 16 inches o.c. unless otherwise indicated.
 - 4. 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 unless noted otherwise.
- B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
 - 1. For non-load-bearing partitions, provide double-jamb studs and 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, unless noted otherwise on plans provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated or, if not indicated, according to Table R502.5(1) or Table R502.5(2), as applicable, in ICC's International Residential Code for One- and Two-Family Dwellings.
- D. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.

- E. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
 - 1. For non-load-bearing partitions, provide double-jamb studs and 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 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.
- F. Provide diagonal bracing in exterior walls, at both walls of each external corner walls, at locations indicated, at 45-degree angle, full-story height unless otherwise indicated. Use 1-by-4-inch nominal-size boards, let-in flush with faces of studs.

3.5 INSTALLATION OF FLOOR JOIST FRAMING

- A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:
 - 1. Where supported on wood members, by toe nailing and by using metal framing anchors.
 - 2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.
- B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches and do not embed more than 4 inches.
- C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.
- D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than one-third depth of joist; do not locate closer than 2 inches from top or bottom.
- E. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.
- F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.
- G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch metal strap anchors spaced not more than 96 inches o.c., extending over and fastening to three joists. Embed anchors at least 4 inches into grouted masonry with ends bent at right angles and extending 4 inches beyond bend.
- H. Provide solid blocking between joists under jamb studs for openings.
- I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.
 - 1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.
- J. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.
 - 1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal-size lumber, double-crossed and nailed at both ends to joists.
 - 2. Steel bridging installed to comply with bridging manufacturer's written instructions.

3.6 INSTALLATION OF CEILING JOIST AND RAFTER FRAMING

- A. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
 - 1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal-size or 2-by-4-inch nominal-size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

- B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
 - 1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
 - 2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal-size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

3.7 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. If differing requirements are identified elsewhere (in these specifications or on drawings or separate instructions), the more stringent requirement shall be met.

1.2 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Subflooring and underlayment.
 - 3. Sheathing joint-and-penetration treatment materials.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for plywood backing panels.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review air-barrier and water-resistant glass-mat gypsum sheathing requirements and installation, special details, transitions, mockups, air-leakage testing, protection, and work scheduling that covers air-barrier and water-resistant glass-mat gypsum sheathing.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. Wall sheathing.
 - 2. Subflooring and underlayment.
 - 3. Sheathing joint-and-penetration treatment materials.
- B. Product Data Submittals: 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 plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
 - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5516.
 - 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 5. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.
- C. Shop Drawings: For air-barrier and water-resistant glass-mat gypsum sheathing assemblies.
 - 1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
 - 2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, including list of ABAA-certified installers and supervisors employed by Installer, who work on Project and testing and inspecting agency.
- B. Product Certificates: From air-barrier and water-resistant glass-mat gypsum sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.
- C. Product Test Reports: For each air-barrier and water-resistant glass-mat gypsum sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.
 - 3. Foam-plastic sheathing.
 - 4. Air-barrier and water-resistant glass-mat gypsum sheathing.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.
 - 1. Installer is to be licensed by ABAA in accordance with ABAA's Quality Assurance Program and is to employ ABAA-certified installers and supervisors on Project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested in accordance with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- B. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing Performance: Air-barrier and water-resistant glass-mat gypsum sheathing assembly, and seals with adjacent construction, are to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies are to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, tie-ins to other installed air barriers, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products are to meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials are to comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering in accordance with ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials are to have a moisture content of 28 percent or less when tested in accordance with ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber plywood is to be tested in accordance with ASTM D5516 and design value adjustment factors are to be calculated in accordance with ASTM D6305. Span ratings after treatment are to be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F are to be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
 - 1. Roof and wall sheathing within 48 inches of fire walls.
 - 2. Roof sheathing.
 - 3. Subflooring and underlayment for raised platforms.

2.5 WALL SHEATHING

- A. Plywood Sheathing, Walls: DOC PS 1, Exposure 1, Structural I sheathing.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: Not less than what is indicated on drawings.
- B. Oriented-Strand-Board Sheathing, Walls: DOC PS 2, Exposure 1, Structural I sheathing.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: Not less than what is indicated on drawings.
- C. Paper-Surfaced Gypsum Sheathing: ASTM C1396/C1396M, gypsum sheathing; with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges.

1. Type and Thickness: Not less than indicated on drawings.
 2. Edge and End Configuration: As indicated on drawings.
 3. Size: As indicated on drawings.
- D. Extruded-Polystyrene-Foam Sheathing: ASTM C578, Type IV, in manufacturer's standard lengths and widths with tongue-and-groove or shiplap long edges as standard with manufacturer.
1. Thickness: As indicated.
 2. Flame Propagation Test: Materials and construction are to be tested in accordance with NFPA 285.

2.6 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exterior, Structural I, C-C Plugged single-floor panels.
- B. Oriented-Strand-Board Combination Subfloor-Underlayment: Exposure 1 single-floor panels.
- C. Plywood Subflooring: Exposure 1 single-floor panels or sheathing.
- D. Oriented-Strand-Board Subflooring: Exposure 1.
- E. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior B-C with fully sanded face.
- F. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, not less than 5/8-inch nominal thickness, for ceramic tile set in epoxy adhesive.
- G. Plywood Underlayment for Carpet: DOC PS 1, Exterior, C-C Plugged.

2.7 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, parapet, and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C1002.
 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C954.
- G. Screws for Fastening Composite Nail Base Insulated Roof Sheathing to Metal Roof Deck: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours in accordance with ASTM B117. Provide washers or plates if recommended by sheathing manufacturer.

2.8 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Paper-Surfaced and Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."
- B. Sheathing Tape for Foam-Plastic Sheathing: Pressure-sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

2.9 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

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. Arrange joints so that pieces do not span between fewer than three support members.
- 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 on drawings, complying with the following minimum code requirements:
 - 1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- 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 wall parapet and 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. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 INSTALLATION OF WOOD STRUCTURAL PANEL

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Combination Subfloor-Underlayment:
 - a. Glue and nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch apart at edges and ends.
 - 2. Subflooring:
 - a. Glue and nail to wood framing.
 - b. Screw to cold-formed metal framing.

- c. Space panels 1/8 inch apart at edges and ends.
- 3. Wall and Roof Sheathing:
 - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch apart at edges and ends.
- 4. Underlayment:
 - a. Nail to subflooring.
 - b. Space panels 1/32 inch apart at edges and ends.
 - c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

3.3 INSTALLATION OF GYPSUM SHEATHING

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to wood framing with nails or screws.
 - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 - 4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners at minimum 8 inches o.c. unless noted otherwise on drawings and set back a minimum of 3/8 inch from edges and ends of panels.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners at minimum 8 inches o.c. unless noted otherwise on drawings and set back a minimum of 3/8 inch from edges and ends of panels.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints in accordance with sheathing manufacturer's written instructions.
 - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
 - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.
- F. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing:
 - 1. Install accessory materials in accordance with sheathing manufacturer's written instructions and details to form a seal with adjacent construction, to seal fasteners, and ensure continuity of air and water barrier.
 - a. Coordinate the installation of sheathing with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - b. Install transition strip on roofing membrane or base flashing, so that a minimum of 3 inches of coverage is achieved over each substrate.
 - 2. Connect and seal sheathing material continuously to air barriers specified under other Sections as well as to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

3. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
4. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip, so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
 - a. Transition Strip: Roll firmly to enhance adhesion.
 - b. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
5. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of sheathing material with foam sealant.
6. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
7. Seal top of through-wall flashings to sheathing with an additional 6-inch-wide, transition strip.
8. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
9. Repair punctures, voids, and deficient lapped seams in strips and transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 INSTALLATION OF CEMENTITIOUS BACKER UNITS

- A. Install panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing and Inspecting Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier and water-resistant glass-mat gypsum sheathing, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 2. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 3. Termination mastic has been applied on cut edges.
 4. Strips and transition strips have been firmly adhered to substrate.
 5. Compatible materials have been used.
 6. Transitions at changes in direction and structural support at gaps have been provided.
 7. Connections between assemblies (sheathing and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 8. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
 1. Air-Leakage-Location Testing: Air-barrier sheathing assemblies will be tested for evidence of air leakage in accordance with ASTM E1186, chamber depressurization using detection liquids.
 2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate in accordance with ASTM E783.
- E. Air barriers will be considered defective if they do not pass tests and inspections.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.

END OF SECTION 061600

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior trim.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.

1.3 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium density overlay on the face.
- C. PVC: Polyvinyl chloride.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors 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 and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
- B. Samples: For each exposed product and for each color and texture specified.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
 - 1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
 - 2. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: ANSI A135.4.
- D. MDF: ANSI A208.2, Grade 130-
- E. Particleboard: ANSI A208.1, Grade M-2-
- F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
 1. Color: As selected by Architect from manufacturer's full range.

2.2 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 1. Species and Grade: As indicated on Finish Drawings.
 2. Maximum Moisture Content: 10 percent.
 3. Finger Jointing: Not allowed.
 4. Gluing for Width: Not allowed-
 5. Veneered Material: Use for lumber trim wider than 6 inches (150 mm).
 6. Face Surface: Surfaced (smooth)-
 7. Matching: Selected for compatible grain and color.
- B. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA WM 4, N-grade wood moldings made to patterns included in MMPA's "HWM/Series Hardwood Moulding Patterns."
 1. Species: As indicated on Finish Drawings.
 2. Maximum Moisture Content: 9 percent.
 3. Finger Jointing: Not allowed.
 4. Matching: Selected for compatible grain and color.
 5. Optional Material: Kiln-dried softwood or MDF, with exposed surfaces veneered with species indicated, may be used in lieu of solid wood.
 6. Base Pattern: As indicated on Finish Drawings.
 7. Shoe-Mold Pattern: As indicated on Finish Drawings.
 8. Casing Pattern: As indicated on Finish Drawings.
 9. Mull-Casing Pattern: As indicated on Finish Drawings.
 10. Stop Pattern: As indicated on Finish Drawings.
 11. Chair-Rail Pattern: HWM 297, 11/16-by-3-inch (17-by-76-mm) chair rail.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

- B. Low-Emitting Materials: Adhesives shall comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- D. Installation Adhesive for Foam-Plastic Moldings: Product recommended for indicated use by foam-plastic molding manufacturer.
- E. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.
- F. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

2.4 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work:
 - 1. Interior standing and running trim, except shoe and crown molds.
 - 2. Wood-board paneling.
- B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius or as indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.

5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 1. Do not use pieces less than 24 inches (610 mm) long, except where necessary.
 2. Stagger joints in adjacent and related standing and running trim.
 3. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 4. Use scarf joints for end-to-end joints.
 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
 7. Install trim after gypsum-board joint finishing operations are completed.
 8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
 9. Fasten to prevent movement or warping.
 10. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements.
 1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Cabinet hardware and accessories.
 - 3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Apply AWI Quality Certification Program label to Shop Drawings.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Research reports.
- C. Field quality control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Manufacturer of products Licensed participant in AWI's Quality Certification Program.

1.7 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements:
 - 1. Advantage Millwork.
 - 2. Eyewood.
 - 3. Grand Valley Wood Products.
 - 4. Handorn.
 - 5. Superior Wood Products.
 - 6. Wooden Hammer.
 - 7. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.

2.2 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
- B. Architectural Woodwork Standards Grade: Premium.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: ISO 4586-3, grades as indicated or if not indicated, as required by quality standard.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ABET Inc.
 - b. Formica Corporation.
 - c. Laminart LLC.
 - d. Pionite; a Panolam Industries International, Inc. brand.
 - e. Wilsonart LLC.
 - f. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- F. Exposed Surfaces:
 - 1. Plastic-Laminate Grade: HGS.
 - 2. Edges: Grade HGS.
 - 3. Pattern Direction: As indicated.
- G. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, ISO 4586-3, grade to match exposed surface.
- H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by laminate manufacturer's designations.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 2. Particleboard (Medium Density): ANSI A208.1, Grade M-2.
 3. Softwood Plywood: DOC PS 1, medium-density overlay.

2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction as determined by testing performed on identical products by a qualified testing agency.
 1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. Cabinet Hardware: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087100 "Door Hardware." Section 087111 "Door Hardware (Descriptive Specification)."
- B. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 100 degrees of opening, self-closing.
- C. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.
- D. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- E. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.
- F. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
- G. Drawer Slides: ANSI/BHMA A156.9.
 1. Standard Duty (Grade 1 and Grade 2): Side mount and extending under bottom edge of drawer.
 2. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount.
 - a. Type: Full extension.
 - b. Material: Epoxy-coated polymer slides.
 - c. Motion Feature: Soft close dampener Self-closing mechanism.
- H. Door Locks: ANSI/BHMA A156.11, E07121.
- I. Drawer Locks: ANSI/BHMA A156.11, E07041.
- J. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- K. Grommets for Cable Passage: 1-1/4-inch (32-mm) OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 1. Color: Black.
- L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
 1. Dark, Oxidized, Satin Bronze, Oil Rubbed: ANSI/BHMA 613 for bronze base; ANSI/BHMA 640 for steel base; match Architect's sample.
 2. Bright Brass, Clear Coated: ANSI/BHMA 605 for brass base; ANSI/BHMA 632 for steel base.

3. Bright Brass, Vacuum Coated: ANSI/BHMA 723 for brass base; ANSI/BHMA 729 for zinc-coated-steel base.
 4. Satin Brass, Blackened, Bright Relieved, Clear Coated: ANSI/BHMA 610 for brass base; ANSI/BHMA 636 for steel base.
 5. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base.
 6. Bright Chromium Plated: ANSI/BHMA 625 for brass or bronze base; ANSI/BHMA 651 for steel base.
 7. Satin Stainless Steel: ANSI/BHMA 630.
- M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.
- N. Flip Down Counter Brackets and Lever
1. Basis-of-Design: Sagatsune Folding Bracket with Soft Close EB-317 and Lever Release EB-2000-B.
 2. Bracket: Provide bracket in quantity as required for flip down counter length and weight. Bracket automatically locks when flap is in open position and releases upon lever actuation. Bracket includes damper unit with soft-close feature and is durability tested to 50,000 cycles.
 3. Lever: Provide lever compatible with bracket assembly. Lever release to unlock multiple brackets with one-hand operation, provide side lever assembly at both sides of counter, lever to maintain bracket locking feature.
- O. Metal Edge Guard:
1. 5/8" inch anodized aluminum J-Shaped molding where indicated on drawings. Basis-of-Design: Richelieu J-Shaped Top Finishing Molding, satin finish.
- P. Metal J-Channel at Millwork Panel Extension
1. Basis-of-Design: Fry Reglet Artisan J-Channel T25, depth 1 3/8", height 1 1/4" with 3/8" J-return, extruded aluminum 6063T5, clear anodized.

2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Type II water-resistant type as selected by fabricator to comply with requirements.
1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.7 FABRICATION

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual."
1. For glass in frames, secure glass with removable stops.
 2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)** using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than **16 inches (400 mm)** o.c. with No. 10 wafer-head screws sized for not less than **1-1/2-inch (38-mm)** penetration into wood framing, blocking, or hanging strips.

3.2 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
 - 1. Inspection entity is to prepare and submit report of inspection.

END OF SECTION 064116

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Sound attenuation 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 globosum* 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. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.
- C. Evaluation Reports: For foam-plastic insulation from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

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. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include but are not limited to, manufacturers specified.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 ACOUSTICAL INSULATION FOR INTERIOR PARTITIONS

- A. Acoustical Insulation:
1. Product: Thermafiber Sound Attenuation Fire Blanket (SAFB); unfaced.
 - a. Density – 1 inch thick: 4 pcf, nominal.
 - b. Density – Greater than 1 inch thick: 2.5 pcf nominal.
 2. Surface Burning Characteristics: tested in accordance with ASTM E84.
 - a. Unfaced: Flame spread 0 and Smoke Developed 0.
 - b. Foil Faced: Flame Spread 25 and Smoke Developed 0.
 3. Corrosivity: Non-corrosive, when tested in accordance with ASTM C665.
 4. Fiber Type: EPA Choice fiber; minimum 75 percent pre-consumer recycled content; complies with EPA Preference Program.
 5. Post-Consumer Recycled Content: 0 percent.
 6. UL Certified Environmental Product Declaration in accordance with ISO 14025.

2.3 ACCESSORIES

- A. Clips for Securing Insulation to Encountered Surfaces: Spindle anchor and washer type consisting of perforated metal plates with spindle welded to center and snap-on washers. Spindle and washers shall receive a corrosion-resistant electro-zinc plating. Adhesives for securing clips in place shall be recommended by the approved clip manufacturer.
1. Acceptable Manufacturers:
 - a. Miracle Adhesives Corp.
 - b. Stic-Klip Mfg. Co., Inc.
 - c. Midwest Fasteners.
 - d. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- B. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer and complying with fire-resistance requirements.
1. For bonding rigid polystyrene insulation to masonry or concrete, provide adhesive equal to "Foamgrab PS" made by Dacor Products Co. or equal made by ChemRex Inc. or Miracle Adhesives.
- C. Protection Board: Premolded, semi-rigid asphalt/fiber composition board, 1/4" thick, formed under heat and pressure, standard sizes.

2.4 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Available Products:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
 - c. Gemco; Spindle Type.
 2. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Available Products:
 - a. Gemco; 90-Degree Insulation Hangers.
 2. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Available Products:
 - a. AGM Industries, Inc.; RC150.
 - b. AGM Industries, Inc.; SC150.
 - c. Gemco; Dome-Cap.
 - d. Gemco; R-150.
 - e. Gemco; S-150.
 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawlspace.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
1. Available Products:
 - a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Eckel Industries of Canada; Stic-Klip Type S Adhesive.
 - c. Gemco; Tuff Bond Hanger Adhesive.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

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.
- F. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 5. For wood-framed construction, install blankets according to ASTM C 1320.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
 - 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.
- C. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.

2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- D. Install board insulation in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.
1. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.
 2. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.
- E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.6 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 protected by permanent construction immediately after installation.

END OF SECTION 072100



IA Project No. 20251010

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
 - 1. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions.
 - e. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - g. Vertical joints between two separate glass panels.
 - h. Other joints as indicated.
- B. Related Sections include the following:
 - 1. Division 07 Section 079200.10 "Joint Sealant Submittal Summary".
 - 2. Division 07 Section 079219 "Acoustical Joint Sealants" for sealing joint in sound-rated construction.
 - 3. Division 08 Section 088000 "Glass & Glazing" for glazing sealants.
 - 4. Division 09 Section 092900 "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
 - 5. Division 09 Section 093013 "Ceramic Tiling" for sealing tile joints.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
 - 1. Each submittal to include a complete Section 079201 "Joint Sealant Submittal Summary". Contractor to complete all requested information on summary sheet.
 - 2. Architect to select color for mockup and final approval.
- 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. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Field-Adhesion Test Report Log: For each sealant application tested.
- J. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- K. Warranties: Special warranties specified in this Section.
- L. Mockups: Include initial color selections in a field mockup or in place for final review and selection before proceeding. Allow 5 business days for final review.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the commencement of the Work.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
 - 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
 - 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- E. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.

2. Conduct field tests for each kind of sealant and joint substrate.
 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- F. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:
1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.6 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.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 Articles.

- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 Articles.

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 sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 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. Low-Emitting Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers".
- D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids: Where elastomeric 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 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Multicomponent Nonsag Polysulfide Sealant:
1. Available Products:
 - a. Pacific Polymers, Inc.; Elasto-Seal 227 Type II (Gun Grade).
 - b. Pecora Corporation; Synthacalk GC-2+.
 - c. Polymeric Systems Inc.; PSI-350.
 - d. PolySpec Corp.; T-2235-M.
 - e. PolySpec Corp.; T-2282.
 - f. PolySpec Corp.; Thiokol 2P.
 - g. Sonneborn, Division of ChemRex Inc.; Sonolastic Polysulfide Sealant.
 2. Type and Grade: M (multicomponent) and NS (nonsag).
 3. Class: 25.
 4. Use[s] Related to Exposure: T (traffic) NT (nontraffic).
 5. Uses Related to Joint Substrates: M, 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 galvanized steel and stone.
- F. Multicomponent Nonsag Immersible Polysulfide Sealant:
1. Available Products:
 - a. Pecora Corporation; GC-2+.

- b. PolySpec Corp.; T-2235-M.
 - 2. Type and Grade: M (multicomponent) and NS (nonsag).
 - 3. Class: 25.
 - 4. Uses Related to Exposure: T (traffic), NT (nontraffic), and I (immersible), Class 1.
 - 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Coated glass galvanized steel brick and stone.
- G. Multicomponent Pourable Polysulfide Sealant:
 - 1. Available Products:
 - a. Meadows, W. R., Inc.; Deck-O-Seal.
 - b. Pacific Polymers, Inc.; Elastoseal 227 Type I (Pourable).
 - 2. Type and Grade: M (multicomponent) and P (pourable).
 - 3. Class: 25.
 - 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Brick.
- H. Single-Component Nonsag Polysulfide Sealant:
 - 1. Available Products:
 - a. Pacific Polymers, Inc.; Elastoseal 230 Type I (Gun Grade).
 - b. Polymeric Systems Inc.; PSI-7000.
 - 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: M, 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 galvanized steel brick ceramic tile.
- I. Multicomponent Nonsag Neutral-Curing Silicone Sealant:
 - 1. Available Products:
 - a. Dow Corning Corporation; 756 H.P.
 - 2. Type and Grade: M (multicomponent) and P (pourable).
 - 3. Class: 50.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, 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 galvanized steel brick, ceramic tile, and stone.
- J. Multicomponent Pourable Neutral-Curing Silicone Sealant:
 - 1. Available Products:
 - a. Dow Corning Corporation; FC Parking Structure Sealant.
 - 2. Type and Grade: M (multicomponent) and P (pourable).
 - 3. Class: 25.
 - 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Galvanized steel brick ceramic tile.
- K. Single-Component Neutral-Curing Silicone Sealant:
 - 1. Available Products:
 - a. Dow Corning Corporation; 790.
 - b. GE Silicones; SilPruf LM SCS2700.
 - c. Tremco; Spectrem 1 (Basic).
 - d. GE Silicones; SilPruf SCS2000.
 - e. Pecora Corporation; 864.
 - f. Pecora Corporation; 890.
 - g. Polymeric Systems Inc.; PSI-641.
 - h. Sonneborn, Division of ChemRex Inc.; Omniseal.
 - i. Tremco; Spectrem 3.
 - j. Dow Corning Corporation; 791.
 - k. Dow Corning Corporation; 795
 - l. GE Silicones; SilPruf NB SCS9000.

- m. GE Silicones; UltraPruf II SCS2900.
 - n. Pecora Corporation; 865.
 - o. Pecora Corporation; 895.
 - p. Pecora Corporation; 898.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 100/50.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, 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 galvanized steel brick ceramic tile.
 - 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- L. Single-Component Neutral-Curing Silicone Sealant:
- 1. Available Products:
 - a. Dow Corning Corporation; 799.
 - b. GE Silicones; UltraGlaze SSG4000.
 - c. GE Silicones; UltraGlaze SSG4000AC.
 - d. Polymeric Systems Inc.; PSI-631.
 - e. Schnee-Morehead, Inc.; SM5731 Poly-Glaze Plus.
 - f. Tremco; Proglaze SG.
 - g. Tremco; Spectrem 2.
 - h. Tremco; Tremsil 600.
 - 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: Coated glass color anodic aluminum aluminum coated with a high-performance coating galvanized steel ceramic tile.
- M. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:
- 1. Available Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
 - 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: Coated glass color anodic aluminum aluminum coated with a high-performance coating galvanized steel ceramic tile.
- N. Single-Component Nonsag Urethane Sealant:
- 1. Available Products:
 - a. Pecora Corporation; Dynatrol I-XL.
 - b. Sika Corporation, Inc.; Sikaflex - 15LM.
 - c. Tremco; DyMonic.
 - d. Tremco; Vulkem 921.
 - e. Tremco; Vulkem 931.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 100/50.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Color anodic aluminum aluminum coated with a high-performance coating galvanized steel brick ceramic tile.
- O. Multicomponent Nonsag Immersible Urethane Sealant:
- 1. Available Products:
 - a. Tremco; Vulkem 116.
 - b. Tremco; Vulkem 921.
 - 2. Type and Grade: M (multicomponent) and P (pourable).
 - 3. Class: 50.
 - 4. Uses Related to Exposure: T (traffic) and NT (nontraffic) and I (immersible), Class 1.

5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Color anodic aluminum aluminum coated with a high-performance coating galvanized steel brick ceramic tile.
- P. Single-Component Pourable Urethane Sealant:
 1. Available Products:
 - a. Sika Corporation, Inc.; Sikaflex - 1CSL.
 - b. Sonneborn, Division of ChemRex Inc.; SL 1.
 - c. Tremco; Vulkem Nova 300 SSL.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 50.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Galvanized steel brick ceramic tile.
- Q. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - d. Pecora Corporation.
 - e. Sika Corporation; Joint Sealants.
 - f. Tremco Incorporated.
 - g. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- R. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation-Construction Systems.
 - b. Bostik, Inc.
 - c. ER Systems; an ITW Company.
 - d. Pecora Corporation.
 - e. Polymeric Systems, Inc.
 - f. Schnee-Morehead, Inc., an ITW company.
 - g. Sherwin-Williams Company (The).
 - h. Sika Corporation.
 - i. Tremco Incorporated.
 - j. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- S. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation-Construction Systems.
 - b. Pecora Corporation.
 - c. Polymeric Systems, Inc.
 - d. Schnee-Morehead, Inc., an ITW company.
 - e. Sherwin-Williams Company (The).
 - f. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- T. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. LymTal International Inc.

- b. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- U. Urethane, Immersible, S, P, 25, T, NT, I: Immersible, single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T, NT, and I.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Sika Corporation.
 - b. Tremco Incorporated.
 - c. W. R. Meadows, Inc.
 - d. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.

2.4 PREFORMED JOINT SEALANTS

- A. Preformed Silicone-Sealant System: Manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
 - 1. Available Products:
 - a. Dow Corning Corporation; 123 Silicone Seal.
 - b. GE Silicones; UltraSpan US1100.
 - c. Pecora Corporation; Sil-Span.
 - d. Tremco; Spectrem Ez Seal.
- B. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from 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:
 - 1. Available Products:
 - a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
 - b. Illbruck Sealant Systems, Inc.; Wilseal 600.
 - c. Polytite Manufacturing Corporation; Polytite B.
 - d. Polytite Manufacturing Corporation; Polytite Standard.
 - e. Sandell Manufacturing Co., Inc.; Polyseal.
 - 2. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.
 - a. Density: Manufacturer's standard.

2.5 PREFORMED TAPE SEALANTS

- A. Back-Bedding Mastic Tape Sealant: Preformed, butyl-based elastomeric tape sealant with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 - 1. AAMA 804.3 tape, where indicated.
 - 2. AAMA 806.3 tape, for applications in which tape is subject to continuous pressure.
 - 3. AAMA 807.3 tape, for applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Tape Sealant: Closed-cell, PVC foam tape sealant; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
 - 1. Type 1, for applications in which tape acts as the primary sealant.
 - 2. Type 2, for applications in which tape is used in combination with a full bead of liquid sealant.

2.6 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) O (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 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, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - d. Exterior insulation and finish system.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.

- c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 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. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. 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.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
- 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 configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Installation of Preformed Tapes: Install according to manufacturer's written instructions.
- H. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
- 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 - 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch (6 mm) inside masking tape.
 - 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.

4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each type of elastomeric sealant and joint substrate.
 2. Test Method: Test joint sealants according to in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free of voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
 5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.

- c. Vertical joints on exposed surfaces of walls and partitions.
 - d. Perimeter joints of exterior openings where indicated.
 - e. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, NS, 25, NT (See 2.3/P).
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT See 2.3/M).
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Acoustical joints where required and to seal full perimeter joints between rooms, corridors, and open areas.
 - b. Other joints as indicated.
 - 2. Joint Sealant: Acoustical (See Article 2.4).
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Samples: Manufacturer's color charts consisting of strips of cured sealants, showing full range of available colors for each product exposed to view.
- C. Acoustical joint-sealant schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Test and Evaluation Reports:
 - 1. Product test reports.
- B. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty Documentation:
 - 1. Manufacturers' special warranties.
 - 2. Installer's special warranties.

1.5 WARRANTY

- A. Installer's Special Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Manufacturer's Special Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACOUSTICAL JOINT SEALANTS

- A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.
- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DAP Products Inc.
 - b. Grabber Construction Products, Inc.
 - c. Hilti, Inc.
 - d. Specified Technologies Inc.
 - e. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.

2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.2 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- 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 acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- 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 acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. 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 ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written instructions for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

END OF SECTION 079219

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 8. State Building Codes, Local Amendments.
- D. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

- e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
- 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
- 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.

- c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 - 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 - 5. Manufacturers:
 - a. McKinney Products (MK)
 - b. Ives (IV).
 - c. Hager (HA).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
 - 1. Manufacturers:
 - a. Pemko Products (PE).
 - b. Hager (HA).
 - c. Stanley (ST).
- C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
 - 1. Manufacturers:
 - a. McKinney (MK) - QC-C Series.
 - b. Hager (HA)
 - c. Schlage (SC)

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 - 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 - 2. Furnish dust proof strikes for bottom bolts.
 - 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 - 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 - 5. Manufacturers:
 - a. Rockwood Products (RO).
 - b. Ives (IV).
 - c. Trimco (TR).

- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 5. Manufacturers:
 - a. Rockwood Products (RO).
 - b. Trimco (TR).
 - c. Ives (IV).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
1. Manufacturers:
 - a. Standard Cylinders included with Locks.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
1. Manufacturers:
 - a. ASSA ABLOY ACCENTRA, formerly known as Yale (AC) - 8800FL Series
 - b. Stanley Best (BE). 40H Series.
 - c. Sargent (SA). 8200 Series.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 7. Vertical Rod Exit Devices: Where surface vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor. Concealed vertical rods not permitted.
 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. ASSA ABLOY ACCENTRA, formerly known as Yale (AC) - 8800FL Series
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Dormakaba (DO) – 9000 Series.
- C. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- D. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable

according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

- E. Product Notes and Applications.
 - 1. Thru Bolts not permitted. Provide blocking as required.
 - 2. Self-Reaming and Tapping Screws (SRT) not permitted.
- F. Manufacturers:
 - 1. Norton (NO) – 7500 Series
 - 2. ASSA ABLOY ACCENTRA, formerly known as Yale (AC) – 4400 Series.
 - 3. Sargent (SA). – 351 Series.

2.8 ARCHITECTURAL TRIM

- A. Door Protective Trim
 - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
 - 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
 - 4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
 - 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
 - 6. Manufacturers:
 - a. Rockwood Products (RO).
 - b. Trimco (TR).
 - c. Ives (IV).

2.9 DOORSTOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 - 1. Manufacturers:
 - a. Rockwood Products (RO).
 - b. Trimco (TR).
 - c. Ives (IV).

2.10 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko Products (PE).
 - 2. National Guard (NG).
 - 3. Reese (RE).

2.11 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.12 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Section "Closeout Procedures" for project punch and reporting requirements including compliance with approved submittals and verification door hardware is properly installed, operating and adjusted.

3.5 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.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate selection for the material and application.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

- B. Manufacturer's Abbreviations:

- 1. MK - McKinney
- 2. PE - Pemko
- 3. RO - Rockwood
- 4. OT - Other
- 5. AC - ASSA ABLOY ACCENTRA
- 6. SU - Securitron
- 7. HS - HES
- 8. NO - Norton

Hardware Sets

See following (2) pages for Hardware Sets and Hardware Legend.

Hardware Sets

Hartwick Pines State Park Visitor Center Reno
Job #: 22437

April 15, 2026

1.0

Item	Qty	Description	Part Number	UOM	Leaf	Size	Mfr
HI-2	3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US10	EA	B		MK
LO-5	1	Privacy Lock	ND40 .RHO .613 .OS-OCC	EA	B		SC

2.0

Item	Qty	Description	Part Number	UOM	Leaf	Size	Mfr
HI-2	3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US10	EA	B		MK
LO-6	1	Storeroom Lock	ND80 .P6 .RHO .613	EA	B		SC

Hardware Legend

Hartwick Pines State Park Visitor Center Reno
Job #: 22437

April 15, 2026

Item	UOM	Manufacturer	Description	Part Number	Finish	
HI-2	EA	McKinney	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US10	US10	Dull Bronze
LO-5	EA	Schlage	Privacy Lock	ND40 .RHO .613 .OS-OCC	.612	Satin Bronze
LO-6	EA	Schlage	Storeroom Lock	ND80 .P6 .RHO .613	.612	Satin Bronze

END OF SECTION 087100

SECTION 088000 – GLASS AND GLAZING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

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

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the glass and glazing as shown on the drawings and/or specified herein, including but not limited to glazing of the following:
 - 1. Laminated safety glass.
 - 2. Window film.

1.3 RELATED SECTIONS

- A. Related Sections include the following:
 - 1. Division 01 Section "Submittals"

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: 30 psf or greater if required by Code.
 - 2. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - a. Load Duration: 60 seconds or less.
 - 3. Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 3/4", whichever is less.
 - 4. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - a. Temperature Change (Range): 120 deg. F ambient; 180 deg F, material surfaces.
- C. Glass units shall be annealed, heat strengthened, fully tempered or laminated where required to meet wind load and safety glazing requirements, as shown, specified or recommended by the glass fabricator and as required by the prevailing Building Code.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.

- B. Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.
 - 1. Submit complete range of samples of standard colors and patterns for ceramic frits at insulating glass.
 - 2. Submit complete range of samples of sandblasted glass showing variations of grits and opacity achieved.
- C. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.
- D. Calculations: Provide wind load charts, calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied.
- E. Drawing for each section of glass in the segmented curtainwall show extent of the different sizes of inner and outer lites required to maintain uniform joint width along the segmented curtainwall system.
- F. Test Reports: Provide certified reports for specified tests.
- G. Warranties: Provide written warranties as specified herein.

1.6 QUALITY ASSURANCE

- A. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.
- B. Installer: A firm having no more than five (5) years of documented successful experience in type of work required by this Section, and which is acceptable to manufacturers of primary materials; and with a successful record of in-service installations similar in size and scope to this Project.
- C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section. Provide units with proper thickness, edge clearance and tolerance to comply with recommendations of glass manufacturer.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
 - 1. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide".
 - 2. SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines for Sealed Insulating Glass Units".
- E. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
- F. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI 97.1.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council.
 - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.
- B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.
 - 1. Protect materials from moisture, sunlight, excess heat, sparks and flame.
 - 2. Sequence deliveries to avoid delays but minimize on-site storage.

1.9 WARRANTIES

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
- B. Manufacturer's Special Project Warranty on Coated Glass Products: Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.
 - 1. Warranty Period: Manufacturer's standard but not less than five (5) years after date of Project Completion.
- C. Manufacturer's Special Project Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure or hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period.
 - 1. Warranty Period: Manufacturer's standard but not less than ten (10) years after date of Project Completion.
- D. Manufacturer's Special Project Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated glass manufacturer agreeing to replace laminated glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty period five (5) years from date of Project Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/FABRICATORS

- A. All glass and glazing used at the exterior of the Project shall be manufactured by the same manufacturer. The same manufacturer and the same furnace shall be used for all tempered and heat strengthened glass used throughout the project.
- B. All interior glazing to match glass type of exterior insulated glass.

2.2 GLASS MATERIALS AND PRODUCTS

- A. Laminated Safety Glass: Provide two tempered glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conform to ASTM C1172, and as follows:

1. Interlayer Color: Clear, unless otherwise noted.
 - a. Office doors: Provide laminated translucent glass; interlayer color/translucence as selected by the Architect. Translucent finish shall not be see-through.
2. Interlayer Material: Provide Monsanto "Saflex" or DuPont "Butacite", 0.030 in. thick at vertical applications, and 0.060 in. thick at sloped or horizontal applications.
3. Minimum thickness of 1/4" total.

2.3 GLAZING MATERIALS AND PRODUCTS

- A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulated glass sealants, with laminated glass interlayers, and with any other surfaces in contact.
- B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:
 1. Dow Corning 795.
 2. General Electric Silglaze N 2500 or Contractors SCS-1000.
 3. Rhodorsil 3B, 5C, or 6B.
 4. Tremco Spectrem 2.
- C. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75±5 for hollow profile, and 60±5 for solid profiles, ASTM C 864.
- D. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40±5, and 20% to 35% compression, ASTM C-509; Type II.
- E. Preformed Glazing Tape: Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form. Provide Tremco "Polyshim II" or approved equal.
- F. Setting Blocks: Provide neoprene or silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be 1/16" more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds 3/4" the glass manufacturer must be consulted for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.
 1. Shims: For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.
 2. Structural Silicone Glazing: Provide silicone setting blocks where structural silicone occurs at sills and at insulated units with silicone edge seals.
- G. Edge Blocks: Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of 55±5.
- H. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.
- I. Miscellaneous Glazing Materials: Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.

2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

- C. Grind smooth and polish exposed glass edges.

2.5 WINDOW FILM

- A. Basis-of-Design: CollidEscape Guaranteed – Imaged, <https://www.collidescape.org/images>
- B. Description: Exterior applied adhesive window film, perforated to reduce bird strikes, printed imagery on film, reduces reflections at exterior, slightly darkens view to outside from interior.
- C. Imagery: To be provided by DNR. Contractor to coordinate with DNR and manufactured to have image printed on film.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

- 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.9 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.
- B. Related Requirements:
 - 1. Division 06 Section 061000 "Thermal Rough Carpentry" for wood framing and furring that supports gypsum board.
 - 2. Division 07 Section 072100 "Building Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD 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 paper-faced gypsum panels 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 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent.
- B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 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. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. G-P Gypsum.
 - b. Lafarge North America Inc.
 - c. National Gypsum Company.
 - d. USG Corporation.
 - e. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
 - 1. Thickness: 1/4 inch (6.4 mm).
 - 2. Long Edges: Tapered.
- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered.
- E. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 3. In corridors and in other areas as noted, use abuse resistant gypsum panels. Acceptable products are:

1. National Gypsum 5/8" Hi-Abuse Wallboard. Type X available where required for fire rating.
 2. Georgia Pacific 5/8" ToughRock abuse resistant gypsum board. Type X available where required for fire rating.
 - a. Core: 5/8 inch (15.9 mm), Type X.
 - b. Long Edges: Tapered.
 - c. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- F. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- G. Acoustically enhanced gypsum board ASTM D3273.
- H. National Gypsum Gold Bond brand 5/8" sound break XP. See detail 3/A3.7 for location.

2.4 TILE BACKING PANELS

- A. See Specification Section 093000 – Tile for TCA installation methods and backer panels.
- B. Glass-Mat, Water-Resistant Backing Board:
1. Complying with ASTM C 1178/C 1178M.
 - a. Product: Subject to compliance with requirements, provide "DensShield Tile Guard" by G-P Gypsum.
 2. Complying with ASTM C1177/C 1177M.
 - a. Product: Subject to compliance with requirements, provide "DensArmor Plus Interior Guard" by G-P Gypsum.
 3. Core: 5/8 inch (15.9 mm), Type X.
- C. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Custom Building Products; Wonderboard.
 - b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - c. USG Corporation; DUROCK Cement Board.
 - d. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 2. Thickness: 1/2 inch (12.7 mm).
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- D. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C 1396/C 1396M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. G-P Gypsum.
 - b. Lafarge North America Inc.
 - c. National Gypsum Company.
 - d. USG Corporation.
 - e. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 2. Core: 5/8 inch (15.9 mm), Type X.

2.5 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. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.

- d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
- e. Expansion (control) joint.
- f. Curved-Edge Cornerbead: With notched or flexible flanges.

- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - d. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
 - 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Exterior Gypsum Soffit Board: Paper.
 - 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - 4. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: 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 setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 - 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
 - 3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. 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.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent.
- E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AC-20 FTR.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.
 - f. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- F. Thermal Insulation: As specified in Division 07 Section 072100 "Thermal Insulation."
- G. Vapor Retarder: As specified in Division 07 Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, 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. Form control and expansion joints with space between edges of adjoining gypsum panels.

- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: As indicated on Drawings.
 - 2. Flexible Type: Apply in double layer at curved assemblies.
 - 3. Ceiling Type: Ceiling surfaces.
 - 4. Abuse-Resistant Type: As indicated on Drawings.
 - 5. Moisture- and Mold-Resistant Type: As indicated on Drawings.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. 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.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Curved Surfaces:
 - 1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
 - 2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING EXTERIOR GYPSUM PANELS FOR WALLS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
 - 1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 - 2. Fasten with corrosion-resistant screws.
 - 3. Comply with manufacturer's written installation instructions.

3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- B. Water-Resistant Backing Board: Install where indicated with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 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. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use where indicated.
 - 3. L-Bead: Use where indicated.
 - 4. U-Bead: Use where indicated.
 - 5. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.7 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 for trim products specifically indicated as not intended to receive tape.

- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Where indicated on Drawings and when scheduled to receive heavy or medium textured finishes.
 - 4. Level 4: Use in offices and other areas that receive lower public traffic and visibility.
 - a. Primer and its application to surfaces are specified in other Division 09 sections.
 - 5. Level 5: for all walls and ceilings to receive painted finish, lightly textured finish, and/or wall coverings in corridors and other high public traffic areas.
 - a. Primer and its application to surfaces are specified in other Section 099000 "Interior Painting."
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. 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 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Ceramic mosaic tile.
 - 3. Tile backing panels.
 - 4. Waterproof membranes.
 - 5. Crack isolation membranes.
 - 6. Setting material.
 - 7. Grout materials.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealing of movement joints in tile surfaces.
 - 2. Section 092900 "Gypsum Board" for tile backing panels.

1.2 DEFINITIONS

- A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. Face Size: Actual tile size, excluding spacer lugs.
- C. Large Format Tile: Tile with at least one edge **15 inches (381 mm)** or longer.
- D. Module Size: Actual tile size plus joint width indicated.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. If product materials provided match specifications exactly, submit digital product data only; tagged and labeled per finish specifications, including image of product sample. If product or materials do not match specifications exactly, submit physical sample and product data for review. Architect reserves the right to request physical samples in any instance.
- B. Shop Drawings: Show locations, plans, and elevations, of each type of tile and tile pattern. Show widths, details, and locations of movement joints in tile substrates and finished tile surfaces.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product, including product use classification.
- D. Product Test Reports:
 - 1. Tile-setting and -grouting products.
 - 2. Certified porcelain tile.

3. Slip-resistance test reports from qualified independent testing agency.

- E. Field Quality-Control Reports: Water test reports of membrane in wet areas.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Installer is a Trowel of Excellence member of the Tile Contractors' Association of America.
 2. Installer's supervisor for Project holds the International Masonry Institute's Supervisor Certification.
 3. Installer employs only installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.
 4. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of mud floors mud walls membranes shower receptors and large format tile.

1.8 MOCKUPS

- A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockup of each type of floor tile installation.
 2. Build mockup of each type of wall tile installation.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in "Referenced Standards" Article in the Evaluations and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Tile: Obtain tile of each type and color or finish from single source or producer.
1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

- B. Tiling System: Obtain system products from single manufacturer and each aggregate from single source or producer.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
 - e. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 2. Obtain setting and grouting
 3. Materials, except for unmodified portland cement and aggregate, from single manufacturer.
 4. Obtain underlayment from manufacturer of setting and grouting materials.
 5. Obtain waterproof membrane, crack isolation, and other required membranes from manufacturer of setting and grouting materials.
 6. Obtain joint sealants from manufacturer of setting and grouting materials.
- C. Accessory Products: Obtain each of the following products specified in this Section from a single manufacturer:
1. Stone thresholds.
 2. Backer units.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
1. Provide tile complying with Standard Grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
1. Where tile is indicated for installation in swimming pools on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 PORCELAIN TILE

- A. Porcelain Tile Type: Unglazed.
1. Certification: Tile certified by the Porcelain Tile Certification Agency.
 2. Face Size: As indicated on Drawings.
 3. Face Size Variation: Rectified.
 4. Thickness: As indicated on Drawings.
 5. Product Use Classification: Interior, Dry (ID) Interior, Wet (IW).
 6. Tile Color, Glaze, and Pattern: As indicated on Drawings.
 7. Grout Color: As indicated on Drawings.
 8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

2.4 CERAMIC MOSAIC TILE

- A. Ceramic Mosaic Tile Type: Unglazed.
 - 1. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
 - 2. Module Size: As indicated on Drawings.
 - 3. Thickness: **1/4 inch (6.4 mm)**.
 - 4. Face: Plain with cushion edges.
 - 5. Surface: Smooth, without abrasive admixture.
 - 6. Product Use Classification: Interior, Dry (ID) Interior, Wet (IW).
 - 7. Tile Color and Pattern: As indicated on Drawings.
 - 8. Grout Color: As indicated on Drawings.
 - 9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges in maximum lengths available to minimize end-to-end butt joints.
 - 1. Thickness: As indicated on Drawings.
 - 2. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
- B. Glass-Mat, Water-Resistant Gypsum Panel: ASTM C1658/C1658M, with fiberglass mat partially or completely embedded into the core.
 - 1. Core: As indicated on Drawings.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
- C. Coated Glass-Mat, Water-Resistant Gypsum Backing Panel: ASTM C1178/C1178M, with a water-resistant coating on one surface, and manufacturer's standard edges.
 - 1. Core: As indicated on Drawings.
 - 2. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.6 WATERPROOF MEMBRANES

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and ANSI A118.12 and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Waterproof Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer with continuous fabric reinforcement.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [ARDEX Americas.](#)
 - b. [Boiardi Products Corporation; a QEP company.](#)
 - c. [Bostik; Arkema.](#)
 - d. [C-Cure.](#)
 - e. [Custom Building Products.](#)
 - f. [H.B. Fuller Construction Products Inc. / TEC.](#)
 - g. [Laticrete International, Inc.](#)
 - h. [MAPEI Corporation.](#)
 - i. [National Applied Construction Products, Inc.](#)
 - j. Noble Company (The).
 - k. [Parex USA, Inc.](#)
 - l. Schonox HPS North America, Inc.
 - m. [Sika Corporation.](#)
 - n. [Southern Grouts & Mortars, Inc.](#)
 - o. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.

2.7 CRACK ISOLATION MEMBRANES

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Crack Isolation Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer.

2.8 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
 - 1. Cleavage Membrane: Installer's option of material that complies with ANSI A108.02, paragraph 3.8.
 - 2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, **2 by 2 inches (50.8 by 50.8 mm)** by **0.062-inch (1.57-mm)** diameter; comply with ASTM A1064/A1064M except for minimum wire size.
 - 3. Latex Additive: acrylic resin or styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
- B. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Boiardi Products Corporation; a QEP company.
 - c. Bostik; Arkema.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. H.B. Fuller Construction Products Inc. / TEC.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.
 - i. Parex USA, Inc.
 - j. Schluter Systems L.P.
 - k. Siena Tile & Stone Installation Products; Omega Products International.
 - l. Southern Grouts & Mortars, Inc.
 - m. Summitville Tiles, Inc.
 - n. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
 - 4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.4.
- C. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Custom Building Products.
 - c. H.B. Fuller Construction Products Inc. / TEC.
 - d. Laticrete International, Inc.
 - e. MAPEI Corporation.
 - f. Parex USA, Inc.
 - g. Siena Tile & Stone Installation Products; Omega Products International.
 - h. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
 - 4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.15.

2.9 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High-Performance Tile Grout: ANSI A118.7.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Bostik; Arkema.
 - c. Custom Building Products.
 - d. H.B. Fuller Construction Products Inc. / TEC.
 - e. Laticrete International, Inc.
 - f. MAPEI Corporation.
 - g. Parex USA, Inc.
 - h. Southern Grouts & Mortars, Inc.
 - i. Summitville Tiles, Inc.
 - j. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Polymer Type:
 - a. Dry, redispersible form, prepackaged with other dry ingredients.
 - b. Liquid-latex form for addition to prepackaged dry-grout mix.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, **4.0 mils (0.1 mm)** thick.
- C. Metal Flooring Transitions: Profile designed specifically for flooring applications; height to match tile and setting-bed thickness.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Custom Building Products.
 - c. Dural USA, Inc.
 - d. Profilitec Corp.
 - e. Progress Profiles America Inc.
 - f. Schluter Systems L.P.
 - g. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Description: As indicated on Drawings.
 - 3. Material and Finish: As indicated on Drawings.
 - a. Color: As indicated on Drawings.
- D. Metal Edge Trim: Profile designed for wall terminations and edge protection.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Custom Building Products.
 - c. Dural USA, Inc.
 - d. Profilitec Corp.
 - e. Progress Profiles America Inc.
 - f. Schluter Systems L.P.
 - g. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Description: As indicated on Drawings.
 - 3. Terminations: As indicated on Drawings.
 - 4. Material and Finish: As indicated on Drawings.
 - a. Color: As indicated on Drawings.

- E. Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after grouting is completed without damaging grout or tile.
- F. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- G. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with adhesives bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped **1/4 inch per foot (1:50)** toward drains.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- E. Substrate Flatness:
 - 1. For tile shorter than **15 inches (381 mm)**, confirm that structure or substrate is limited to variation of **1/4 inch in 10 ft. (6.4 mm in 3 m)** from the required plane, and no more than **1/16 inch in 12 inches (1.5 mm in 300 mm)** when measured from tile surface high points.
 - 2. For large format tile, tile with at least one edge **15 inches (381 mm)** or longer, confirm that structure or substrate is limited to **1/8 inch in 10 ft. (3 mm in 3 m)** from the required plane, and no more than **1/16 inch in 24 inches (1.5 mm in 609 mm)** when measured from tile surface high points.
- F. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

- A. Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- B. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- C. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow crack isolation membrane to cure before installing tile or setting materials over it.
- D. Mix mortars and grouts to comply with "Referenced Standards" Article in the Evaluations and mortar and grout manufacturers' written instructions.
 - 1. Add materials, water, and additives in accurate proportions.
 - 2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.
- E. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile swimming pool decks.
 - c. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - d. Tile floors consisting of rib-backed tiles.
 - 2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - 3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
 - 4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
 - 5. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
 - 6. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 7. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- F. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- G. Metal Flooring Transitions: Install at locations indicated.
- H. Metal Wall Trim: Install at locations indicated on Drawings.
- I. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 FIELD QUALITY CONTROL

- A. Water Test:
 - 1. Test of waterproofing membrane in showers and similar areas to be performed by Installation Contractor before setting tile.
 - a. Perform test after 24 hours of waterproof membrane installation.
 - b. Insert test plug in drain or waste line.
 - c. Fill shower base with water, high enough that the membrane-to-drain connection and floor-to-wall transition can be evaluated, and mark wall.
 - d. Check for leaks after 24 hours.
 - 2. Test to be witnessed by Architect and Owner.
- B. Nonconforming Work:
 - 1. Waterproof membrane will be considered defective if water level has dropped.
 - 2. Remove and replace defective components and retest.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Wood Subfloor:
 - 1. TCNA F121 and ANSI A108.1A. Cement mortar bed (thickset) installed on waterproof membrane.
 - a. Ceramic Tile Type: Porcelain.
 - b. Bond Coat for Cured-Bed Method: Latex-Portland Cement Mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Joint Width: 1/8 inch (3.2 mm).
 - e. Movement Joints: Types located on Drawings.
- B. Interior Wall Installations, Wood or Metal Studs or Furring:
 - 1. TCNA W245: Thinset mortar on glass-mat, water-resistant gypsum backer board over waterproof membrane.
 - a. Ceramic Tile Type: Cermaic.
 - b. Thinset Mortar: Latex-portland cement mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Waterproof Membrane: Fluid-applied membrane.
 - e. Joint Width: 1/8 inch (3.2 mm).
 - f. Movement Joints: Types located on Drawings.

END OF SECTION 093013

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Modular carpet tile.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Transition details to other flooring materials.
- B. Digital Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
- C. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- D. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than **10 sq. yd. (8.3 sq. m).**

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Master II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Build mockups at locations and in sizes shown on Drawings.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.10 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AtlasMasland.
 2. Bentley Mills, Inc.
 3. Interface, Inc.
 4. J&J Flooring Group LLC.
 5. Mannington Mills, Inc.
 6. Milliken & Company.
 7. Mohawk Carpet, LLC; The Mohawk Group.
 8. Patcraft; a division of Shaw Industries, Inc.
 9. Philadelphia Commercial; a division of Shaw Industries, Inc.
 10. Shaw Industries Group, Inc.; Berkshire Hathaway Company.
 11. StaticSmart; Julie Industries.
 12. Tandus; a Tarkett company.
 13. van Gelder, Inc.
- B. Color: As indicated on Drawings.
- C. Pattern: As indicated on Drawings.
- D. Fiber Content: As indicated on Drawings.
- E. Fiber Type: As indicated on Drawings.
- F. Pile Characteristic: As indicated on Drawings.
- G. Pile Thickness: for finished carpet tile according to ASTM D6859. As indicated on Drawings.
- H. Surface Pile Weight: As indicated on Drawings.
- I. Total Weight: As indicated on Drawings.
- J. Backing System: As indicated on Drawings.
- K. Size: As indicated on Drawings.
- L. Applied Treatments:
1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- M. Performance Characteristics:
1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D7330.
 2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
 3. Dry Breaking Strength: Not less than 100 lbf (445 N) according to ASTM D2646.
 4. Delamination: Not less than 3.5 lbf/in. (0.6 N/mm) according to ASTM D3936.
 5. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
 6. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
 7. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
 8. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
 9. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft. (18.6 sq. m)**, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)** in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions **1/8 inch (3 mm)** wide or wider, and protrusions more than **1/32 inch (0.8 mm)** unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl wall covering.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement seams and termination points.
- B. Digital Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36 inches (914 mm) long in size.
- C. Product Schedule: For wall coverings.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

1.8 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.
 - 1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F1141 for appearance shading characteristics.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system

is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

1. Wood-Veneer Wall Coverings: Condition spaces for not less than 48 hours before installation.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 2. Fire-Growth Contribution: No flashover and heat and smoke release when tested in accordance with NFPA 265 NFPA 286.

2.2 VINYL WALL COVERING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Arc-Com Fabrics, Inc.
 2. Designtex; Design Tex Group Inc. (The).
 3. Designtex Momentum
 4. Innovations USA.
 5. Knoll, Inc.
 6. MDC Interior Solutions.
 7. Maharam Fabric Corporation; Herman Miller, Inc.
 8. Versa Wallcovering.
 9. Wolf-Gordon Inc.
- B. Description: Provide vinyl products in rolls from same production run and complying with the following:
 1. Type II, Medium Duty.
 2. ASTM F793/F793M for strippable wall coverings.
- C. Total Weight: As indicated on Drawings.
- D. Width: 54 inches (1372 mm).
- E. Backing: Nonwoven fabric.
- F. Repeat: Random.
- G. Mildew Resistance: Rating of zero or 1 when tested in accordance with ASTM G21.
- H. Colors, Textures, and Patterns: As indicated on Drawings.

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 099123 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.
- C. Metal Primer: Interior ferrous metal primer complying with requirements in Section 099123 "Interior Painting" and recommended in writing by primer and wall-covering manufacturers for intended substrate.
- D. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended in writing by wall-covering manufacturer.
- E. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation surfaces being true in plane and vertical and horizontal alignment, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow plaster to cure for at least 90 days. Neutralize areas of high alkalinity. Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply metal primer as recommended in writing by metal-primer manufacturer and wall-covering manufacturer.
 - 4. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 5. Painted Surfaces:
 - a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
 - b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.
- D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL LINER

- A. Install wall liner, without gaps or overlaps. Form smooth wrinkle-free surface for finished installation. Do not begin wall-covering installation until wall liner has dried.

3.4 INSTALLATION OF WALL COVERING

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
 - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern **72 inches (1828 mm)** above the finish floor.
- F. Install seams vertical and plumb at least **6 inches (152 mm)** from outside corners and **3 inches (76 mm)** from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.5 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 099124 - INTERIOR PAINTING (MPI STANDARDS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Aluminum (not anodized or otherwise coated).
 - 2. Gypsum board.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 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.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Behr Paint Company; Behr Process Corporation.
 2. Benjamin Moore & Co.
 3. Sherwin-Williams Company (The).
 4. Zinsser/Rust-Oleum Corporation.
 5. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
- B. Products: Subject to compliance with requirements, provide product listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

- C. Colors: As indicated in a color schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
 2. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and CMUs): 12 percent.
 4. Wood: 15 percent.
 5. Gypsum Board: 12 percent.
 6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- G. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
1. SSPC-SP 2.
 2. SSPC-SP 3.
 3. SSPC-SP 7/NACE No. 4.
 4. SSPC-SP 11.

- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 - 1. Scrape and clean knots and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 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.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed, or factory finished if acceptable to topcoat manufacturers.
- 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.
- E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.

- f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
- 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Wood Substrates: Wood trim.
 - 1. Institutional Low-Odor/VOC Latex System, MPI INT 6.3V:
 - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semigloss (MPI Gloss Level 5), MPI #147.
- B. Gypsum Board Substrates:
 - 1. Latex over Latex Sealer System, MPI INT 9.2A:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Prime Coat: Latex, interior, matching topcoat.
 - c. Intermediate Coat: Latex, interior, matching topcoat.
 - d. Topcoat: Latex, interior, flat (MPI Gloss Level 1), MPI #53. Gypsum board ceilings only.
 - e. Topcoat: Latex, interior (MPI Gloss Level 4), MPI #43.
 - f. Topcoat: Latex, interior, semigloss (MPI Gloss Level 5), MPI #54.

END OF SECTION 099124

SECTION 099301 - STAINING AND TRANSPARENT FINISHING (MPI STANDARDS)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Staining and transparent finishing of interior wood surfaces.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. For each type of product.
 - 2. Include preparation requirements and application instructions.
 - 3. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 4. Indicate VOC content.
- B. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of product.
- C. Samples for Verification: For each type of finish system and in each color and gloss of finish required.
 - 1. Submit Samples on representative samples of actual wood substrates, 8 inches (200 mm) long.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.
- E. Sustainable Design Submittals:
 - 1. Third-Party Certifications: For each product.
 - 2. Third-Party Certified Life Cycle Assessment: For each product.

1.3 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures of less than 5 deg F (3 deg C) above the dew point, or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 STAINING AND TRANSPARENT FINISHING (MPI STANDARDS)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Behr Paint Company (Behr Process LLC)
 - 2. Benjamin Moore & Co.
 - 3. Sherwin-Williams Company (The)
- B. Products: Subject to compliance with requirements, provide one of the products listed in wood finish systems schedules for the product category indicated.

2.2 MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- C. Stain Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for finish and substrate indicated.
 - 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
 - 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.2 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

- A. Wood Substrates, Glued-Laminated Construction, provide one of the following systems, to match existing glulam stain and finishing:
 - 1. Polyurethane Varnish over Stain System MPI INT 6.1J:
 - a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The)
 - b. First Intermediate Coat: Polyurethane varnish matching topcoat.
 - c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
 - d. Topcoat, Satin: Varnish, interior, polyurethane, oil modified (MPI Gloss Level 4), MPI #57.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
 - e. Topcoat, Gloss: Varnish, interior, polyurethane, oil modified (MPI Gloss Level 6), MPI #56.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
 - 2. Polyurethane Varnish System MPI INT 6.1D:
 - a. Prime Coat: Polyurethane varnish matching topcoat.
 - b. Intermediate Coat: Polyurethane varnish matching topcoat.
 - c. Topcoat, Satin: Varnish, interior, polyurethane, oil modified (MPI Gloss Level 4), MPI #57.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
 - d. Topcoat, Gloss: Varnish, interior, polyurethane, oil modified (MPI Gloss Level 6), MPI #56.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
 - 3. Moisture-Cured Clear Polyurethane over Stain System MPI INT 6.1S:
 - a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).

- b. First Intermediate Coat: Moisture-cured polyurethane matching topcoat.
- c. Second Intermediate Coat: Moisture-cured polyurethane matching topcoat.
- d. Topcoat, Gloss: Varnish, polyurethane, moisture cured (MPI Gloss Level 6), MPI #31.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
- 4. Clear, Two-Component Polyurethane System MPI INT 6.1W:
 - a. Prime Coat: Two-component polyurethane matching topcoat.
 - b. Intermediate Coat: Two-component polyurethane matching topcoat.
 - c. Topcoat, Gloss or High Gloss: Varnish, aliphatic polyurethane, two component (MPI Gloss Level 6 or MPI Gloss Level 7), MPI #78.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
- B. Wood Substrates, Wood Trim, Architectural Woodwork, & Doors:
 - 1. Polyurethane Varnish over Stain System MPI INT 6.3E:
 - a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).
 - b. First Intermediate Coat: Polyurethane varnish matching topcoat.
 - c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
 - d. Topcoat, Satin: Varnish, interior, polyurethane, oil modified (MPI Gloss Level 4), MPI #57.
 - 1) Behr Paint Company (Behr Process LLC)
 - 2) Benjamin Moore & Co.
 - 3) Sherwin-Williams Company (The).

END OF SECTION 099301

SECTION 101423.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes room-identification signs that are directly attached to the building.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For room-identification signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols & colors.
- D. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Contractor with minimum 5 years' experience in the field.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image.
 - c. Separation or delamination of sheet materials and components.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 ROOM-IDENTIFICATION SIGNS

- A. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACE Sign Systems, Inc.
 - b. Advance Corporation
 - c. Allen Industries
 - d. APCO Graphics, Inc
 - e. ASE, Inc
 - f. ASI Sign Systems, Inc
 - g. Best Sign Systems, Inc.
 - h. Clarke Systems
 - i. Cosco
 - j. Diskey Sign Company
 - k. Foresight Supersign
 - l. inpro Corporation
 - m. Mohawk Sign Systems
 - n. Nelson-Harkins Industries
 - o. Poblocki Sign Company, LLC
 - p. Seton Identification Products; a Brady Corporation company
 - q. Signature Signs, Inc.
 - r. Signs & Decal Corp
 - s. Vista System, LLC
 - t. Vomar Products, Inc
 2. Sheet Sign: Photopolymer face sheet with raised graphics.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
 - b. Color(s): As selected by Architect from manufacturer's full range.
 3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition at Vertical Edges at Horizontal Edges to match existing building signage.
 - b. Corner Condition in Elevation: to match existing building signage.
 4. Mounting: Surface mounted to wall.
 5. Text and Typeface: Accessible raised characters and Braille.

2.3 SIGN MATERIALS

- A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 - 4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- C. Subsurface-Etched Graphics: Reverse etch back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
 - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

END OF SECTION 101423.16

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Stainless steel corner guards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
 - 2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details.
- A. Digital Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type of exposed plastic material.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wall-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, ~~96-inch-~~ (2400-mm-) long units.
 - 2. Bed-Locator Covers: Full-size plastic covers equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two units.
 - 3. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, ~~48-inch-~~ (1200-mm-) long units.
 - 4. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).
 - a. Store corner-guard covers in a vertical position.
 - b. Store wall-guard covers in a horizontal position.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

2.3 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guard: Fabricated as one piece from formed or extruded metal with formed edges; with 90 or 135 degree turn to match wall condition.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [American Floor Products Company, Inc.](#)
 - b. [Babcock-Davis.](#)
 - c. [Boston Group USA.](#)
 - d. [Construction Specialties, Inc.](#)
 - e. [J. L. Industries, Inc.; Activar Construction Products Group, Inc.](#)
 - f. [Koroseal Interior Products, LLC.](#)
 - g. [Nystrom, Inc.](#)
 - h. [Pawling Corporation.](#)
 - i. [Tepromark Architectural Products, LLC.](#)
 - j. [The R.C. Musson Rubber Co.](#)
 - k. [WallGuard.com.](#)
 - l. [Wallprotex.](#)
 - m. [inpro Corporation.](#)
 - n. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 - 2. Material: Stainless steel sheet, Type 304.
 - 3. Wing Size: Nominal, as indicated on Drawings.
 - 4. Mounting: Adhesive.
 - 5. Color and Texture: As indicated on Drawings.

2.4 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Polycarbonate Plastic Sheet: ASTM D6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. (800 J/m) of notch when tested according to ASTM D256, Test Method A.
- C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- D. Adhesive: As recommended by protection product manufacturer.

2.5 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than **20 feet (6.1 m)**, splice aluminum retainers and plastic covers at different locations along the run, but no closer than **12 inches (305 mm)** apart.
 - 3. Adjust end and top caps as required to ensure tight seams.
- D. Fire Doors: Install protection according to the listing of each item.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
 - 2. Private-use bathroom accessories.
 - 3. Under lavatory guards.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: If **product or** materials provided match specifications exactly, submit digital product data only; tagged and labeled per finish specifications, including image of product sample. If product or **materials** do not match specifications exactly, submit physical sample and product data for review. Architect reserves the right to request physical samples **in any instance**.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Samples: Digital Samples for approval.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 10 years from date of Substantial Completion.

- B. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Structural Performance: Design accessories and fasteners to comply with the following requirements:
 - 1. Grab Bars: Installed units are able to resist **250 lbf (1112 N)** concentrated load applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Basis of Design: Refer to Accessory Schedule on Drawings.

2.3 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, **0.031-inch- (0.8-mm-)** minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B19, flat products; ASTM B16/B16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B30, castings.
- C. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), **0.036-inch- (0.9-mm-)** minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A653/A653M, with **G60 (Z180)** hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- G. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.4 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.
- C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 102814 – ADULT CHANGING STATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

Adult Changing Stations, Adjustable Height: Adjustable-Height Adult-Changing Station

1.2 RELATED REQUIREMENTS

- A. Section 061000 – “Rough Carpentry”, blocking in walls.
- B. Section 092900 – “Gypsum Board” Plaster and gypsum board assemblies, blocking in walls.
- C. Section 093013 – “Ceramic Tiling”, coordination with tile layout and installation.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's data sheets for each product specified, including the following.
 - 1. Installation instructions and recommendations, including templates and rough-in measurements.
 - 2. Storage and handling requirements and recommendations.
 - 3. Cleaning and maintenance instructions.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Provide products manufactured by a company with a minimum of 5 years successful experience manufacturing similar products.
- B. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
- C. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA, ICC A117.1 International Building Code (IBC), and state building code requirements as applicable.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.6 WARRANTY

- A. Manufacturer's Warranties: Submit manufacturer's standard 3 year warranty for materials and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Products: Koala Kare Products, a Division of Bobrick, www.koalabear.com.
- B. Substitutions: Refer to Section 012500 “Substitution Procedures”.

2.2 ADULT CHANGING STATIONS, HEIGHT-ADJUSTABLE

- A. Surface-Mounted Adjustable Height Changing Station :
 - 1. Basis of Design: Model KB3000-AHL as manufactured by Koala Kare Products, a Division of Bobrick.

2. Powered-Height Adjustability: Changing surface shall electronically adjust from 12" (300mm) to 41" (1,041mm) from floor.
3. Unit shall have two sets of built-in electronic controls for height adjustment. One located on face of wall cover and one on the front of changing surface.
4. Weight Capacity: Tested to support up to 500 lbs. (227 kg.) static load.
5. Changing Surface shall be polyethylene and meet IK10 standard for resistance to high impact and sharp objects.
6. UL certified for US and Canada.
7. Back-Up Battery: Unit shall have a built-in backup battery system that allows for continuous operation in the event of a power interruption.
8. Class 1 electrical system to protect against electrical shock.
9. Emergency Stop: Unit shall include a wall-mounted emergency stop to break power to actuator.
10. Changing Surface shall be a minimum 75 1/4" (1,911mm) long, and 31 1/2" (800mm) wide, and can be opened and closed with one-hand.
11. Unit shall have a safety rail with a curved dip in the center for easier patient changing by caregiver. Safety rail rotates and locks under changing bed when in closed position.
12. Unit shall withstand significant exposure to water without damage to electrical components. It shall include a grounded power cord and have a splash-proof control system. Electrical components and wiring shall not come in contact with station users or caregivers.
13. Changing surface shall not have covered areas to help ensure cleanliness.
14. Unit shall have ISO 60601-1 and -2 whole product certification.
15. Durability: Cycle tested through range of motion 28,000 times at 500lbs. Stress tested to 100,000 cycles with 500lbs. bounce load test.
16. Frame shall be constructed of 2" powder coated steel tubing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 1. Verify wall blocking has been installed properly.
 2. Verify required electrical services have been installed properly.
 3. Verify wall location does not interfere with door swings or use of fixtures.
 4. Use fasteners and anchors suitable for wall substrate and project conditions.
 5. Install units at location and height indicated on the drawings.
 6. Install units level, plumb, and in proper relationship with adjacent construction.
 7. Adjust for proper operation.

3.2 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before substantial completion.

END OF SECTION 102814

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid surface material countertops.
 - 2. Solid surface material backsplashes.

1.3 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches (150 mm) square.
 - 2. Wood trim, 8 inches (200 mm) long.
 - 3. One full-size solid surface material countertop, with front edge and backsplash, 8 by 10 inches (200 by 250 mm) of construction and in configuration specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.
- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 - 1. Build mockup of typical countertop as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Affinity Surfaces; a brand of Domain Industries, Inc.
 - b. Avonite Surfaces.
 - c. Durasein Solid Surface; a brand of Relang International, LLC.
 - d. E. I. du Pont de Nemours and Company.
 - e. Formica Corporation.
 - f. LG Chemical, Ltd.
 - g. Meganite Inc.
 - h. Samsung Chemical USA, Inc.
 - i. Swan Corporation (The).
 - j. Transolid Div of Trumbull Industries.
 - k. Wilsonart LLC.
 - l. Requests for substitutions will be considered in accordance with provisions of Section 012500 Substitution Procedures.
 2. Type: Provide Standard type unless Special Purpose type is indicated.
 3. Colors and Patterns: As indicated on Drawings.
- B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
1. Grade: Premium.
- B. Configuration:
- 4- Front: Straight, slightly eased at top.
 - 2- Backsplash: Straight, slightly eased at corner.
- C. Countertops: ~~3/4-inch-~~ (19-mm-) thick, solid surface material with front edge built up with same material.
- D. Backsplashes: ~~1/2-inch-~~ (12.7-mm-) thick, solid surface material with wood-trimmed edges.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Fabricate with loose backsplashes for field assembly.
 2. Install integral sink bowls in countertops in the shop.
- F. Joints: Fabricate countertops without joints.
- G. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated.
1. Joint Locations: Not within ~~18 inches~~ (450 mm) of a sink or cooktop and not where a countertop section less than ~~36 inches~~ (900 mm) long would result, unless unavoidable.

2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints where indicated. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.

H. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting **3/16 inch (5 mm)** into fixture opening.
 - b. Provide vertical edges, rounded to **3/8-inch (10-mm)** radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting **3/16 inch (5 mm)** into fixture opening.
 - c. Provide **3/4-inch (20-mm)** full bullnose edges projecting **3/8 inch (10 mm)** into fixture opening.
2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.3 INSTALLATION MATERIALS

- A. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of **1/8 inch in 8 feet (3 mm in 2.4 m)**, **1/4 inch (6 mm)** maximum. Do not exceed **1/64-inch (0.4-mm)** difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 1. Install metal splines in kerfs in countertop edges at joints where indicated. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.

2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- I. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16