PROJECT MANUAL – VOLUME I

Permit Set

Wesley Bradley Park
Phase 2 - Care Center

Puyallup, Washington

December 2, 2024

Owner
Wesley Homes
815 S. 216th Street
Des Moines, WA 98198

Owner's Developer
Senior Housing Partners
2823 N. Hamline Ave. N.
Roseville, MN 55113

Architect
InSite Architects
1000 University Ave. West
Suite 130
St. Paul, MN 5514
Ph 612-252-4822

Structural Engineer
AHBL, Inc.
2251 N. 30th St.
Tacoma, WA 98403
Ph 253-383-2422

ARCHITECT

InSite Architects, Inc
1000 University Ave., West, Suite 130
St. Paul, MN 55104
612.252.4822

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Architect under the Laws of the State of Washington

Name
Dawn Wieczorek Reg. No. 11192

STRUCTURAL ENGINEER

AHBL, Inc.
2251 N. 30th St.
Tacoma, WA 98403
Ph 253-383-2422

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Engineer under the Laws of the State of Washington

Name
Andrew McEachern Reg No. 38722

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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

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INFORMATION AVAILABLE TO BIDDERS

PART 1 GENERAL

EXISTING REPORTS AND SURVEYS

2.01 SUBSURFACE INVESTIGATION REPORT

A. A copy of a geotechnical report with respect to the building site is included with this document:
   1. Title: Geotechnical Report
   2. Date: November 14, 2016, Addenda reports dated December 29, 2022 and May 22, 2023, with Slope Stability Assessment Report dated December 5, 2024.
   3. Prepared by: Terra Associates, Inc.
   4. Project No. T-5915-3

B. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Wesley Homes Bradley Park.

C. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.

D. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Sum accruing to the Owner.

END OF SECTION

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

December 5, 2024
Project No. T-5915-3

Mr. Stephen Nornes
Presbyterian Homes & Services and Senior Housing Partners
2823 Hamline Avenue North
Roseville, Minnesota 55113

Subject: Care Center Building – Revised Design
Wesley Homes Expansion
Puyallup, Washington

References: Letter, Care Center Foundation Support Alternative, Wesley Homes Expansion, Puyallup, Washington, Project No. T-5915-3, prepared by Terra Associates, Inc., dated June 13, 2023

Response to Comments, Geotechnical Report Addendum, Wesley Homes Expansion, Puyallup Washington, Project No. T-5915-3, prepared by Terra Associates, Inc., dated May 22, 2023

Geotechnical Report Addendum, Wesley Homes Expansion, Puyallup, Washington, Project No. T-5915-3, prepared by Terra Associates, Inc., dated December 29, 2022

Geotechnical Report, Wesley Homes Puyallup, 39th Avenue SE, Puyallup, Washington, Project No. T-5915-3, prepared by Terra Associates, Inc., revised date November 14, 2016

Dear Mr. Nornes:

Since issuance of the referenced May 22, 2023 report addendum and June 13, 2023 Foundation Support Alternative letter, the Care Center building has been redesigned. One of the design revisions is reflected in the proposed grading in that new fill material that was to be placed at the crest of the existing west facing slope has been eliminated and the building extension out over this area now constructed over a crawl space area. As requested we have completed additional stability analysis to evaluate the effect of removal of this fill material and determine if pile support of the building would still be required. The following summarizes our findings.

As before our analysis was completed using the SLIDE2 computer program published by RocScience. Foundation loading from building footings that would be used instead of pile support were included in the model. These surcharge loads and footing dimensions were provided by the project structural engineer, AHBL. An exhibit prepared by AHBL, dated September 17, 2024 showing the foundation loading and crawl space area created by the structural framing over this area is attached for reference. We would note that even though no new fill soils would be placed, site preparation for support of the building will still require removal and replacement of the existing fills with new structural fill as recommended in the referenced November 14, 2016 geotechnical report.

Results of the supplemental stability analysis indicates that pile supported foundations would no longer be required with the revised design. SLIDE2 output graphics of the cross section showing the failure surfaces with the minimum safety factor along with soil parameters used in the analysis are attached. Code required minimum safety factors of 1.5 under static conditions and 1.2 under seismic loading (pseudostatic conditions) are met with the revised design.

All other discussion and recommendations outlined in the referenced geotechnical report and subsequent addendums continue to remain valid for project design and construction.

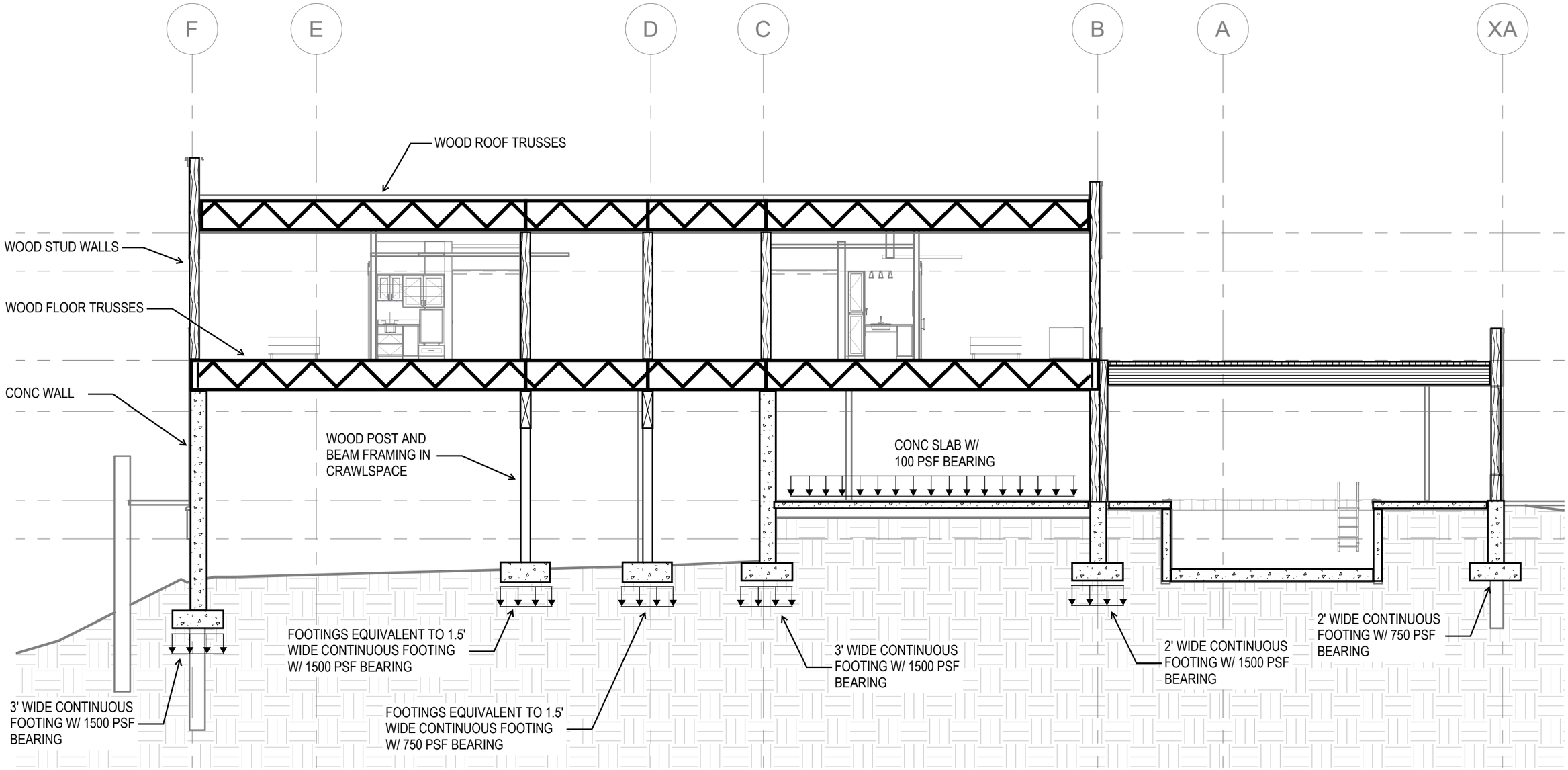
We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Theodore J. Schepper, P.E.
Senior Principal Engineer

Cc: Ms. Jill Krance, In Site Architects

Attachments: Care Center Revision – Structural Concept at Grid 3 prepared by AHBL
SLIDE2 Stability Analysis Results



SCALE: 1/8" = 1'-0"

AHBL
2215 North 30th Street
Suite 300
Tacoma, WA 98403
253.383.2422 TEL
253.383.2572 FAX

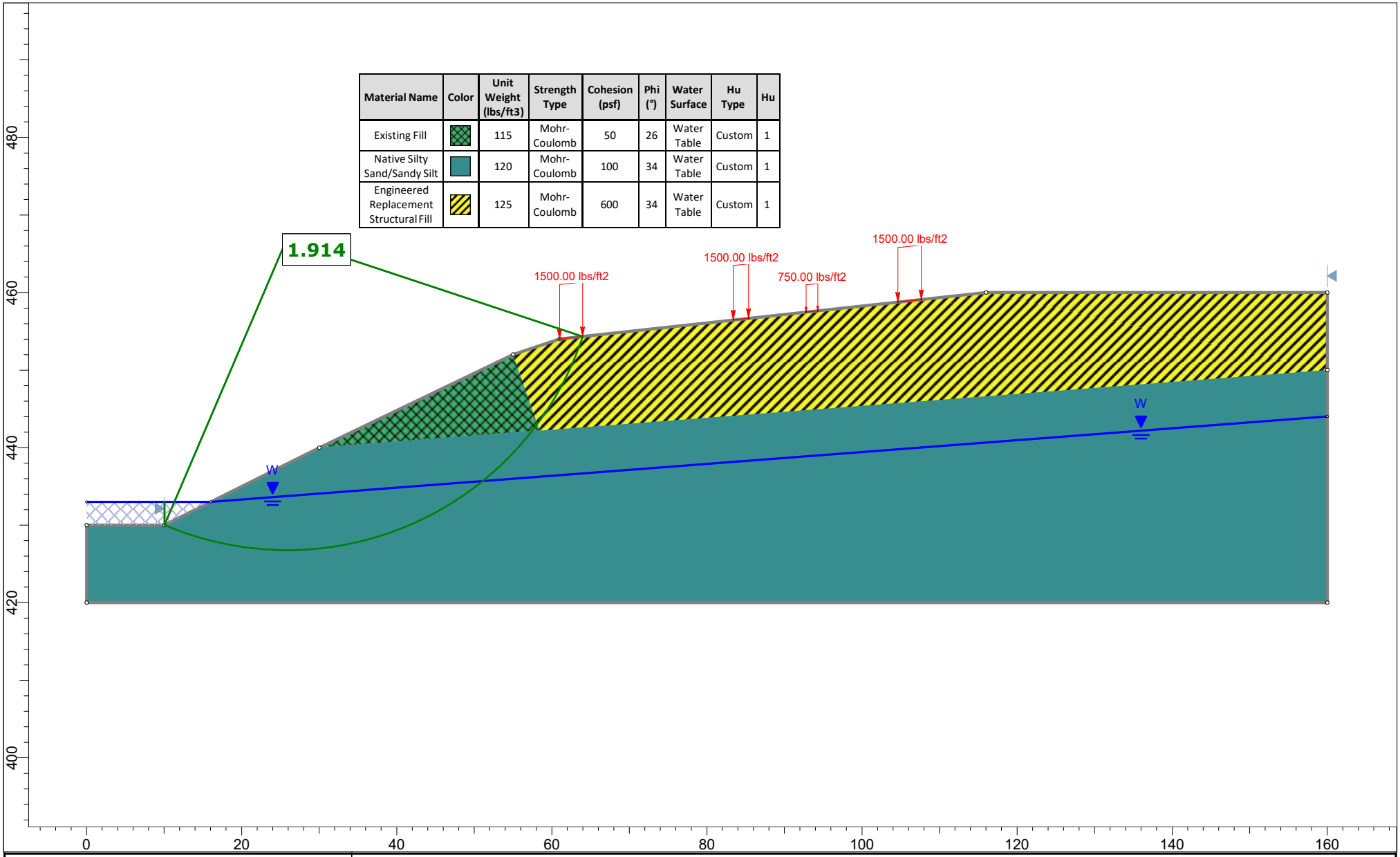
WESLEY BRADLEY PARK - PHASE 2

CARE CENTER REVISION - STRUCTURAL CONCEPT AT GRID 3

DRAWN BY: KBG | DATE: 09/12/2024 | JOB NO.: 2220236.20

EXHIBIT J

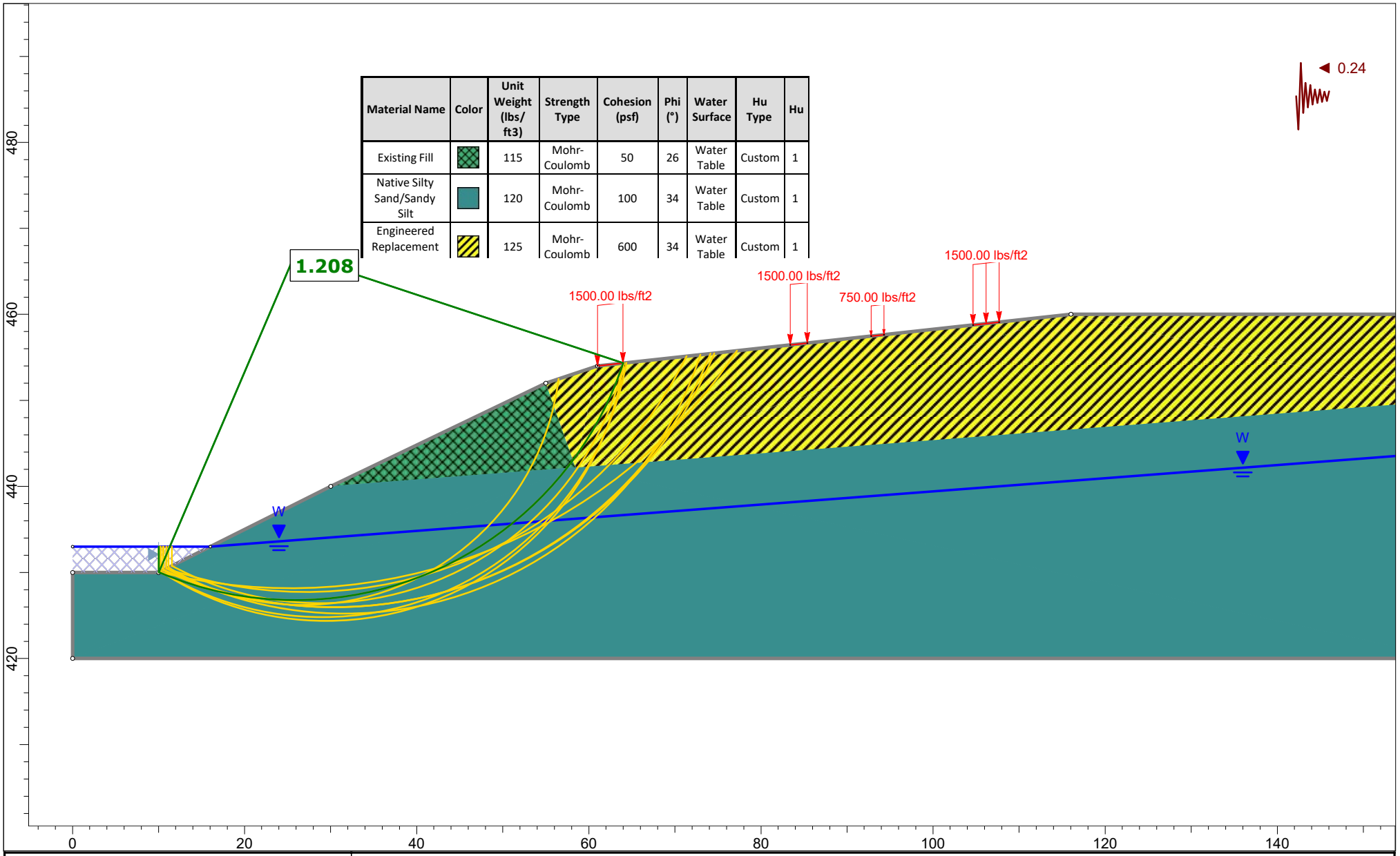
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Hu Type	Hu
Existing Fill		115	Mohr-Coulomb	50	26	Water Table	Custom	1
Native Silty Sand/Sandy Silt		120	Mohr-Coulomb	100	34	Water Table	Custom	1
Engineered Replacement Structural Fill		125	Mohr-Coulomb	600	34	Water Table	Custom	1



rocscience

SLIDEINTERPRET 9.034

Project	SLIDE - An Interactive Slope Stability Program		
Group	Group 1	Scenario	Master Scenario
Drawn By		Company	
Date	Revised Sept 5, 2024	File Name	Figure Center Section A-A' Fill Improved with foundaton loading no new fill Static.slmd



rocscience

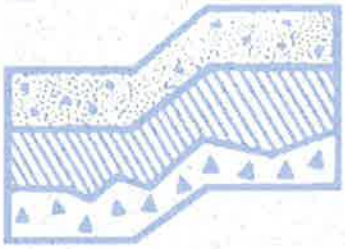
SLIDEINTERPRET 9.034

Project	SLIDE - An Interactive Slope Stability Program		
Group	Group 1	Scenario	Master Scenario
Drawn By		Company	
Date	Revised Sept 5, 2024	File Name	Laro Center Section A-A' Fill Improved with foundaton loading no new fill.slmd

GEOTECHNICAL REPORT

Wesley Homes Puyallup
39th Avenue SE
Puyallup, Washington

Project No. T-5915-3



Terra Associates, Inc.

Prepared for:

Wesley Homes
Des Moines, Washington

October 28, 2015
Revised November 14, 2016

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

October 28, 2015
Revised November 14, 2016
Project No. T-5915-3

Mr. Kevin Anderson
Wesley Homes
815 South 216th Street
Des Moines, Washington 98198

Subject: Geotechnical Report
Wesley Homes Puyallup
39th Avenue SE
Puyallup, Washington

Dear Mr. Anderson:

As requested, we have conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

Our field exploration indicates the soil conditions generally consist of 2 to 18 inches of organic topsoil overlying glacial drift deposits composed of a varying mixture of silty sand, sand, gravel, and silt. In general, the soils were found in a medium dense to dense condition. The exception to this general condition was observed in Test Pit TP-103 where we observed approximately 13.5 feet of organic fill material overlying the native soils. Similar fill material was also observed in Test Pits TP-11 and TP-12 by GeoEngineers (2003) and Test Pit TP-8 by Terra Associates, Inc. (2006).

These fill soils observed are not suitable for building support and should be removed and replaced with new structural fill. Alternatively, the northern buildings may be supported on deep foundations such as pipe piles or on ground improved by installation of Geopiers.

In our opinion, the native soils on the site will be suitable for support of the proposed development provided the recommendations presented in this report are incorporated into project design and construction.

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777 • Fax (425) 821-4334

Mr. Kevin Anderson
October 28, 2015
Revised November 14, 2016

We trust the information presented in this report is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Carolyn S. Decker, P.E.
Project Engineer

11-14-16

Theodore J. Schepper, P.E.
President

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Geotechnical Report
Wesley Homes Puyallup
39th Avenue SE
Puyallup, Washington

1.0 PROJECT DESCRIPTION

The project consists of developing the approximately 14-acre site with a senior housing complex. The complex will include a multi-story building, two brownstone buildings, a stormwater detention pond, and associated access and utility improvements. Based on the grading and storm drainage plan prepared by Barghausen Consulting Engineers dated April 6, 2016, grading to achieve building lot and roadway grades will consist of cuts and fills from 1 to 13 feet. Vertical grade transitions will be supported by retaining walls.

Stormwater will be collected and routed to a detention pond located in the southwest portion of the site. The pond will be formed by a combination of excavation below current site grade, construction of a fill containment berm along the northwest perimeter, and construction of a retaining wall along the east perimeter. The excavation required to achieve the floor elevation of 447.0 will extend 11 to 15 feet below current site grades. The fill depth required to achieve the berm crest elevation of 459.0 will range from 6 to 9 feet.

We expect the multi-story building and brownstone buildings to be wood-framed with slab-on-grade floors producing moderate foundation loads with bearing wall and isolated column loads ranging from about 4 to 6 kips per foot and 200 to 400 kips.

The recommendations in the following sections of this report are based on our understanding of the preceding design features. We should review design drawings as they become available to verify that our recommendations have been properly interpreted and to supplement them, if required.

2.0 SCOPE OF WORK

Our work was completed in accordance with our proposal dated June 1, 2015. Accordingly, on October 13, 2015, we excavated 12 test pits to a maximum depth of 15 feet below existing surface grades. Using the information obtained from our recent subsurface exploration, previous subsurface exploration, and laboratory testing, we performed analyses to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions
- Seismic Criteria per 2015 International Building Code (IBC)
- Geologic Hazards per City of Puyallup Municipal Code
- Site preparation and grading
- Slopes and embankments
- Excavations

- Foundations
- Slab-on-grade floors
- Stormwater detention pond
- Low Impact Development (LID) Methods
- Lateral earth pressure parameters for wall design
- Drainage
- Utilities
- Pavements

It should be noted that recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment are beyond Terra Associates' purview. A building envelope specialist or contractor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The project site is located on the north side of 37th Avenue SE Street approximately 80 feet west of the intersection with 10th Street SE in Puyallup, Washington. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The site is irregular in plan dimension measuring approximately 370 by 1,270 feet. An electrical substation exists east of the property. The majority of the project site slopes gently down towards the west. Overall relief across the site is about 50 feet. The western site margin is bounded by a west-facing slope with approximately 20 feet of local relief with a gradient of about 14 to 30 percent. The site is covered with large to medium-sized Evergreen and deciduous trees and moderate growth of underbrush.

3.2 Soils

In general, the soil conditions observed in the recent test pits consisted of 2 to 18 inches of organic topsoil overlying glacial drift deposits composed of varying mixtures of silty sand, sand, gravel, and silt. In general, the soils were found in a medium dense to dense condition. The exception to this general condition was observed in Test Pit TP-103 where we observed approximately 13.5 feet of organic fill material overlying the native soils. Similar fill material was also observed in Test Pits TP-11 and TP-12 by GeoEngineers (2003) and Test Pit TP-8 by Terra Associates, Inc. (2006).

The *Geologic Map of the South Half of The Tacoma Quadrangle, Washington, by Timothy J. Walsh*, dated 1987 maps the soils as Vashon glacial drift (Vdv). The Vashon glacial drift is described as recessional and interglacial stratified outwash sands and gravels, locally containing silts and clays. Native soil conditions we observed in our test pits are consistent with this mapped geology.

The preceding discussion is intended as a general review of the soil conditions encountered. A more detailed description of the subsurface conditions encountered is presented on the Test Pit Logs in Appendix A. The approximate test pit locations are shown on Figure 2. Figure 2 also shows the location of previous test pits excavated by GeoEngineers and Terra Associates, Inc. Previous test pit logs prepared by GeoEngineers and Terra Associates, Inc. are included in Appendix B.

3.3 Groundwater

We observed groundwater seepage in Test Pits TP-107, TP-109, and TP-110 between 7 and 11 feet below current site grades which equates to approximately elevation 443 to 445 feet relative to site elevations. The groundwater was observed flowing from a recessional gravel outwash layer. Previous site exploration test pits excavated by GeoEngineers in March 2003 encountered similar groundwater flows from this gravel layer at depths of five to nine feet below site grades. Based on the location of the test pits and elevation of the groundwater, it appears that the groundwater observed represents a localized shallow groundwater table residing in the gravel outwash.

Although we did not observe groundwater in the other test pits we did observe mottled or iron staining of the upper few feet of many of the soil layers indicating perched shallow groundwater tables likely develop during the normally wet winter months.

4.0 GEOLOGIC HAZARDS

4.1 Seismic Considerations

Section 21.06.210 (113) of the City of Puyallup Municipal Code (PMC) defines Seismic hazard areas as "areas that are subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, or soil liquefaction."

Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in water pressure induced by vibrations. Liquefaction mainly affects geologically recent deposits of fine-grained sand that are below the groundwater table. Soils of this nature derive their strength from intergranular friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction; thus, eliminating the soil's strength.

Based on the soil and groundwater conditions we observed, it is our opinion that there is minimal risk for liquefaction related impacts to occur at this site during an earthquake.

Based on soil conditions observed in the test borings and our knowledge of the area geology, per Chapter 16 of the 2015 International Building Code (IBC), site class "C" should be used in structural design. Based on this site class, in accordance with the 2015 IBC, the following parameters should be used in computing seismic forces:

Seismic Design Parameters (IBC 2015)

Spectral response acceleration (Short Period), S_{Ms}	1.244
Spectral response acceleration (1 – Second Period), S_{M1}	0.632
Five percent damped .2 second period, S_{Ds}	0.829
Five percent damped 1.0 second period, S_{D1}	0.421

These values were determined using the latitude/longitude coordinates 47.156499/-122.283487 and the United States Geological Survey (USGS) Ground Motion Parameter Calculator accessed on November 9, 2016 at the web site http://earthquake.usgs.gov/designmaps/us/application.php.

4.2 Erosion

Section 21.06.210 (40) of the PMC defines Erosion hazard areas as "lands or areas underlain by soils identified by the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) as having "severe" or "very severe" erosion hazards. These include, but are not limited to, the following group of soils when they occur on slopes of 15 percent or greater: Alderwood gravelly sandy loam, Indianola gravelly loam, Kapowsin gravelly loam, Kitsap silt loam (KpD), and Xerochrepts."

The soils observed on-site are classified as Everett gravelly sand loam 0 to 6 percent slopes and Neilton gravelly loamy sand, 8 to 25 percent slopes by the United States Department of Agriculture Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service. With the existing slope gradients, these soils will have a slight to severe potential for erosion when exposed. Therefore, the site is an erosion hazard area as defined by the PMC.

Implementation of temporary and permanent Best Management Practices (BMPs) for preventing and controlling erosion will be required and will mitigate the erosion hazard. As a minimum, we recommend implementing the following erosion and sediment control BMPs prior to, during, and immediately following construction activities at the site.

Prevention

- Limit site clearing and grading activities to the relatively dry months (typically May through September).
- Limit disturbance to areas where construction is imminent.
- Locate temporary stockpiles of excavated soils no closer than ten feet from the crest of slopes.
- Provide temporary cover for cut slopes and soil stockpiles during periods of inactivity. Temporary cover may consist of durable plastic sheeting that is securely anchored to the ground surface or straw mulch.
- Establish permanent cover over exposed areas that will not be disturbed for a period of 30 days or more by seeding, in conjunction with a mulch cover or appropriate hydroseeding.

Containment

- Install a silt fence along site margins and downslope of areas that will be disturbed. The silt fence should be in place before clearing and grading is initiated.
- Intercept surface water flow and route the flow away from the slope to a stabilized discharge point. Surface water must not discharge at the top or onto the face of the steep slope.
- Provide on-site sediment retention for collected runoff.

The contractor should perform daily review and maintenance of all erosion and sedimentation control measures at the site.

4.3 Landslide Hazard

Section 21.06.210 (81) of the PMC defines Landslide Hazard areas as "areas that, due to a combination of site conditions like slope inclination and relative soil permeability are susceptible to landsliding."

With the soil conditions and existing slope gradients observed at the site, in our opinion the site does not contain any landslide hazard areas as defined by the PMC.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

Based on our study, from a geotechnical engineering perspective, the site is suitable for the proposed development. The competent inorganic native soils would provide suitable support for conventional spread footing foundations. Alternatively, if required by desired final building elevations, structural fill placed and compacted above these native soils can be used to support the building foundations. Floor slabs and pavements can be similarly supported.

The existing fill soils observed to depths of 15 feet in the northern area of the site will not be suitable for building support. These existing fills will either need to be removed and replaced with new structural fill or the building foundations and floor supported on piles driven or drilled through the fill into the underlying competent native soils. The lateral extent of the undocumented fill will need to be determined in the field during grading.

Some of the native soils encountered at the site contain a significant amount of fines and will be difficult to compact as structural fill when too wet. The ability to use native silty soils from site excavations as structural fill will depend on its moisture content and the prevailing weather conditions at the time of construction. If grading activities will take place during the winter season, the owner should be prepared to import free-draining granular material for use as structural fill and backfill. The cleaner gravelly sand and sand layers would be suitable for use as structural fill under most weather conditions. The existing organic fill material would not be suitable for reuse as structural fill.

Detailed recommendations regarding the above issues and other geotechnical design considerations are provided in the following sections. These recommendations should be incorporated into the final design drawings and construction specifications.

5.2 Site Preparation and Grading

To prepare the site for construction, existing surface vegetation and other deleterious materials should be stripped and removed. Based on conditions observed at the test pits, we would estimate that surface stripping depths of 2 to 18 inches will be required to remove site vegetation and associated near-surface organic debris. Vegetation debris from clearing operations should be removed from the site. Organic topsoil will not be suitable for use as structural fill, but may be used for limited depths in nonstructural areas.

If the northern building in the vicinity of Terra Test Pits TP-103 and TP-8 and GeoEngineers Test Pits TP-11 and TP-12 are not supported on piles, the existing fill will need to be removed and replaced with structural fill for building support. Excavations to remove the existing fill will, based on the test pits, extend to depths of at least 15 feet below current site grades. The lateral extent of the undocumented fill material will need to be determined in the field during grading.

Once clearing and stripping operations are complete, cut and fill operations can be initiated to establish desired grades. Prior to placing fill, all exposed bearing surfaces should be observed by a representative of Terra Associates to verify soil conditions are as expected and suitable for support of new fill. Our representative may request a proofroll using heavy rubber-tired equipment to determine if any isolated soft and yielding areas are present. If excessively yielding areas are observed, and they cannot be stabilized in place by compaction, the affected soils should be excavated and removed to firm bearing and grade restored with new structural fill. Beneath embankment fills or roadway subgrade if the depth of excavation to remove unstable soils is excessive, the use of geotextile fabrics, such as Mirafi 500X, or an equivalent fabric, can be used in conjunction with clean granular structural fill. Our experience has shown that, in general, a minimum of 18 inches of a clean, granular structural fill placed and compacted over the geotextile fabric should establish a stable bearing surface.

Some of the native soils encountered at the site contain a significant amount of fines and will be difficult to compact as structural fill when too wet. The ability to use native silty soils from site excavations as structural fill will depend on its moisture content and the prevailing weather conditions at the time of construction. If grading activities will take place during the winter season, the owner should be prepared to import free-draining granular material for use as structural fill and backfill. The cleaner sand and gravel layers would be suitable for use as structural fill under most weather conditions.

If imported fill is needed for site grading or subgrade preparation, we recommend that the fill consist of inorganic granular soil meeting the following gradation:

U.S. Sieve Size	Percent Passing
3 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc. should examine and test all materials imported to the site for use as structural fill.

Structural fill should be placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. In nonstructural areas the degree of compaction can be reduced to 90 percent.

5.3 Excavations

All excavations at the site associated with confined spaces, such as utility trenches and lower building levels, must be completed in accordance with local, state, or federal requirements. Based on current Washington State Industrial Safety and Health Administration (WISHA) regulations, the upper loose uncontrolled fill and medium dense to dense native soils at the site would be classified as Type C soils. The deeper very dense native soils would be classified as Type A soils.

Accordingly, temporary excavations in Type C soils should have their slopes laid back at an inclination of 1.5:1 (Horizontal:Vertical) or flatter, from the toe to the crest of the slope. Side slopes in Type A soils can be laid back at a slope inclination of 0.75:1 or flatter. For temporary excavation slopes less than 8 feet in height in Type A soils, the lower 3.5 feet can be cut to a vertical condition, with a 0.75:1 slope graded above. For temporary excavation slopes greater than 8 feet in height up to a maximum height of 12 feet, the slope above the 3.5-foot vertical portion will need to be laid back at a minimum slope inclination of 1:1. No vertical cut with a backslope immediately above is allowed for excavation depths that exceed 12 feet. In this case, a four-foot vertical cut with an equivalent horizontal bench to the cut slope toe is required. All exposed temporary slope faces that will remain open for an extended period of time should be covered with a durable reinforced plastic membrane during construction to prevent slope raveling and rutting during periods of precipitation.

Site exploration indicates the presence of a localized shallow groundwater table contained in the gravel outwash layer at depths of 5 to 11 feet below current site grades. Also perched groundwater development can be expected at the site during the winter season. The contactor should be prepared to dewater site excavations as needed to maintain stability and relatively dry working conditions. Dewatering using conventional sump pumps along with collector trenches at the excavation base or perimeter cut off drains to capture and control seepage before it enters the excavation will need to be considered.

The above information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. Job site safety is the sole responsibility of the project contractor.

5.4 Slopes and Embankments

All permanent cut and fill slopes should be graded with a finished inclination of no greater than 2:1 (Horizontal:Vertical). Upon completion of grading, the slope face should be appropriately vegetated or provided with other physical means to guard against erosion. Final grades at the top of the slope must promote surface drainage away from the slope crest. Water must not be allowed to flow uncontrolled over the slope face. If surface runoff must be directed towards the slope, the runoff should be controlled at the top of the slope, piped in a closed conduit installed on the slope face, and taken to an appropriate point of discharge beyond the toe.

All fill placed for embankment construction should meet the structural fill requirements in Section 5.2 of this report. In addition, if the new fills will be placed over existing slopes of 20 percent or greater, the structural fill should be keyed and benched into competent native slope soils. Figure 3 presents a typical slope key and bench configuration. At minimum, a toe drain should be installed in the key cut as shown on Figure 3. Depending on seepage conditions, drains may also be required along individual benches excavated on the slope face especially along the pond slopes. The need for drains along the upper benches will be best determined in the field at the time of construction.

5.5 Foundations

Spread Footings

The buildings may be supported on conventional, isolated, or continuous spread footing foundations bearing on the competent undisturbed native soils or structural fill placed on undisturbed competent native soils. Spread footing foundations bearing on undisturbed subgrade composed of the native soils and compacted structural fill can be designed for a net allowable bearing capacity 3,000 pounds per square foot (psf). For short-term loads, such as wind and seismic, a one-third increase in the allowable bearing capacity may be used. For the structural loading expected, we estimate total settlement of isolated spread footings will be one-inch or less, with differential settlement of one-half inch and less.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressures acting on the side of the footing can also be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 350 pcf. We recommend not including the upper 12 inches of soil in this computation because they can be affected by weather or disturbed by future grading activity. This value assumes the foundation will be constructed neat against competent fill soil or backfilled with structural fill. The recommended lateral resistance value includes a safety factor of 1.5.

The soils exposed at foundation levels for the large multi-unit buildings should be observed by Terra Associates, Inc. If loose or medium stiff silts are present at planned footing grades, these silts should be overexcavated and be replaced with structural fill or as an alternative, the foundations may be stepped down to bear on the underlying dense glacially consolidated soils.

The following sections address foundation options for the northern buildings underlain by loose fills.

Steel Pipe Piles

If excavation and replacement of existing fills for the northern buildings is determined to be uneconomical or unfeasible, a suitable alternative for foundation support is to transfer building loads through the uncontrolled fill to the underlying very dense or hard bearing strata using four-inch diameter steel pipe piles. The pipe piles should be driven to refusal using a minimum 850 foot-pound impact hammer. Refusal is defined as less than one-inch of pile penetration during 15 seconds of continuous driving.

Based on data from the test pits, we anticipate pile tip elevations will range from 15 to 20 feet below existing grades. Pipe pile installation may encounter some obstructions, such as wood debris and roots. If an obstruction is encountered during driving, the pile location should be excavated, the obstruction removed, and the area then refilled to grade before re-driving. Alternatively, flexibility in pile location can be included in the design to allow for relocating the pile a short distance in an attempt to avoid the obstruction.

Four-inch diameter steel pipe piles driven to refusal will develop an allowable axial capacity of ten tons per pile. For resistance to lateral loading, a lateral pile capacity of one-fourth of a ton can be used for vertically-placed piles. Pipe piles may be battered to increase their ability to resist lateral loads. We expect pile settlements would not exceed one-fourth of an inch.

Ground Improvement

As an alternative to piles, consideration can be given to using ground other improvement techniques to establish suitable support for conventional spread footing designs. Methods that could be considered include vibrated stone columns or Geopiers (aggregate rammed piers). Both of these methods create highly densified columns of graded aggregate that would extend through the upper softer soils a short depth into the underlying dense sands. Because of the methods used to construct the columns some improvement of the adjacent soils is also realized. Once constructed, conventional spread footing foundations can be designed to bear immediately above the stone column/Geopier locations.

These ground improvement techniques are typically completed on a design/build approach with both design and construction completed by a specialty contractor. We can assist in contracting and selecting the specialty contractor, if desired.

5.6 Slab-on-Grade Construction

Slab-on-grade may be supported on competent undisturbed bearing surfaces consisting of the native dense drift soils or structural fill placed above competent native soils. If the existing fill is not removed from below the northern buildings the floors should also be structurally supported on piles.

Immediately below the floor slab, we recommend placing a four-inch thick capillary break layer composed of clean, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab, and can actually serve as a water supply for moisture seeping through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained. We recommend floor designers and contractors refer to the 2003 American Concrete Institute (ACI) Manual of Concrete Practice, Part 2, 302.1R-96, for further information regarding vapor barrier installation below slab-on-grade floors.

5.7 Lateral Earth Pressure on Below-Grade Building Walls

The magnitude of earth pressure development on below-grade walls will partly depend on the quality of the wall backfill. We recommend placing and compacting wall backfill as structural fill as described in Section 5.2 of this report. To guard against hydrostatic pressure development, wall drainage must also be installed. A typical recommended wall drainage detail is shown on Figure 4.

With wall backfill placed and compacted as recommended, and drainage properly installed, we recommend designing unrestrained walls for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). For restrained walls, an additional uniform load of 100 psf should be added to the 35 pcf. To account for typical traffic surcharge loading, the walls can be designed for an additional imaginary height of two feet (two-foot soil surcharge). For evaluation of wall performance under seismic loading, a uniform pressure equivalent to 8H psf, where H is the height of the below-grade portion of the wall should be applied in addition to the static lateral earth pressure. These values assume a horizontal backfill condition and that no other surcharge loading, sloping embankments, or adjacent buildings will act on the wall. If such conditions exist, then the imposed loading must be included in the wall design. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 5.5 of this report.

5.8 Stormwater Detention Pond

As mentioned above, a stormwater pond is planned for the site. The proposed pond floor is between 11 and 15 feet below existing site grades and is formed by a combination of excavation, fill containment berm construction, and wall construction. The fill depths for the berm construction are between six and nine feet. Fill used to form containment berms for the detention ponds should consist of native silty sand with gravel placed and compacted as structural fill. Interior pond slopes below the stored water level should be graded at 3:1 with exterior pond slopes at 2:1.

Our field exploration indicates that the soils in the area of the pond consist of dense gravel with silt and sand. Heavy groundwater flow was observed near elevations 443 to 445 feet in the test pits located in the larger pond area which is currently below the proposed bottom of pond elevation of 447 feet. This groundwater elevation would be expected to rise during the normally wet winter season. While the soils encountered at this pond site exhibit permeability characteristics that would be suitable for infiltration considerations the elevated groundwater table would preclude designing the pond as a retention facility. However, if there is a dead storage water quality component in the pond design, lining the pond to prevent infiltration losses of the dead storage component will need to be considered.

5.9 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the site at all times. Water must not be allowed to pond or collect adjacent to foundations or within the immediate building area. We recommend providing a positive drainage gradient away from the building perimeter. If this gradient cannot be provided, surface water should be collected adjacent to the structures and disposed to appropriate storm facilities.

Surface water must not be allowed to flow uncontrolled over the crest of the site slopes and embankments. Surface water should be directed away from the slope crests to a point of collection and controlled discharge. If site grades do not allow for directing surface water away from the slopes, then water should be collected and tightlined down the slope face in a controlled manner.

Subsurface

We recommend installing perimeter foundation drains adjacent to shallow foundations. The drains can be laid to grade at an invert elevation equivalent to the bottom of footing grade. The drains can consist of four-inch diameter perforated PVC pipe that is enveloped in washed pea gravel-sized drainage aggregate. The aggregate should extend six inches above and to the sides of the pipe. Roof and foundation drains should be tightlined separately to the storm drains. All drains should be provided with cleanouts at easily accessible locations.

Infiltration

The drift soils composed of silty sand with gravel, silt, and sandy silt characteristically exhibits low permeability and would not be a suitable receptor soil for discharge of development stormwater using infiltration/retention facilities. While there are deposits of cleaner outwash soils also present within the drift deposits their random distribution and limited thickness would preclude designing and using infiltration systems, in our opinion. Conventional stormwater detention with controlled release to the drainage basin should be used to manage development stormwater.

5.10 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA) specifications. For site utilities within city rights of way, bedding and backfill should be completed in accordance with City of Puyallup specifications. At minimum, trench backfill should be placed and compacted as structural fill, as described in the Section 5.2 of this report. As noted, soils excavated on-site should be suitable for use as backfill material during dry weather conditions. However, the contractor should be prepared to moisture condition the soils to facilitate proper compaction, as necessary and import suitable material during the wet winter months.

5.11 Pavements

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. All subgrade should be prepared in accordance with the recommendations in Section 5.2 of this report. For traffic consisting mainly of light passenger and commercial vehicles with only occasional heavy traffic, and with a stable subgrade prepared as recommended, we recommend the following pavement sections:

- Two inches of Hot Mix Asphalt (HMA) over four inches of crushed rock base (CRB)
- Four inches full depth HMA

The paving materials used should conform to the current Washington State Department of Transportation (WSDOT) specifications for HMA and CRB surfacing.

Long-term pavement performance will depend on surface drainage. A poorly-drained pavement section will be subject to premature failure as a result of surface water infiltrating into the subgrade soils and reducing their supporting capability. For optimum pavement performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks when they occur.

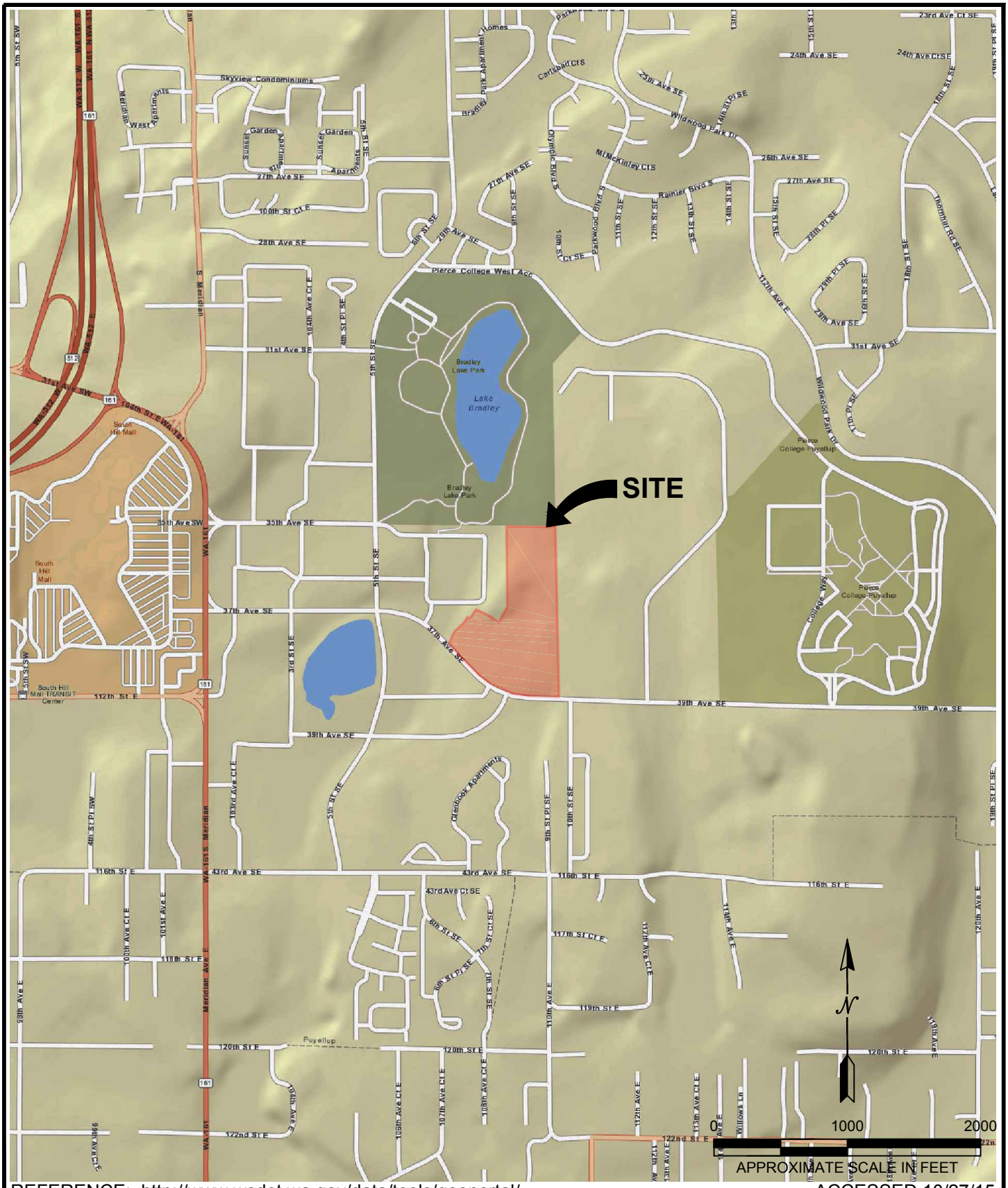
6.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final design and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction in order to observe compliance with the design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

7.0 LIMITATIONS

This report is the property of Terra Associates, Inc. and was prepared in accordance with generally accepted geotechnical engineering practices. This report is intended for specific application to the Wesley Homes Puyallup project and for the exclusive use of Wesley Homes and their authorized representatives. No other warranty, expressed or implied, is made.

The analyses and recommendations presented in this report are based upon data obtained from the test pits excavated on-site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report prior to proceeding with construction.



REFERENCE: http://www.wsdot.wa.gov/data/tools/geoportal/ ACCESSED 10/27/15

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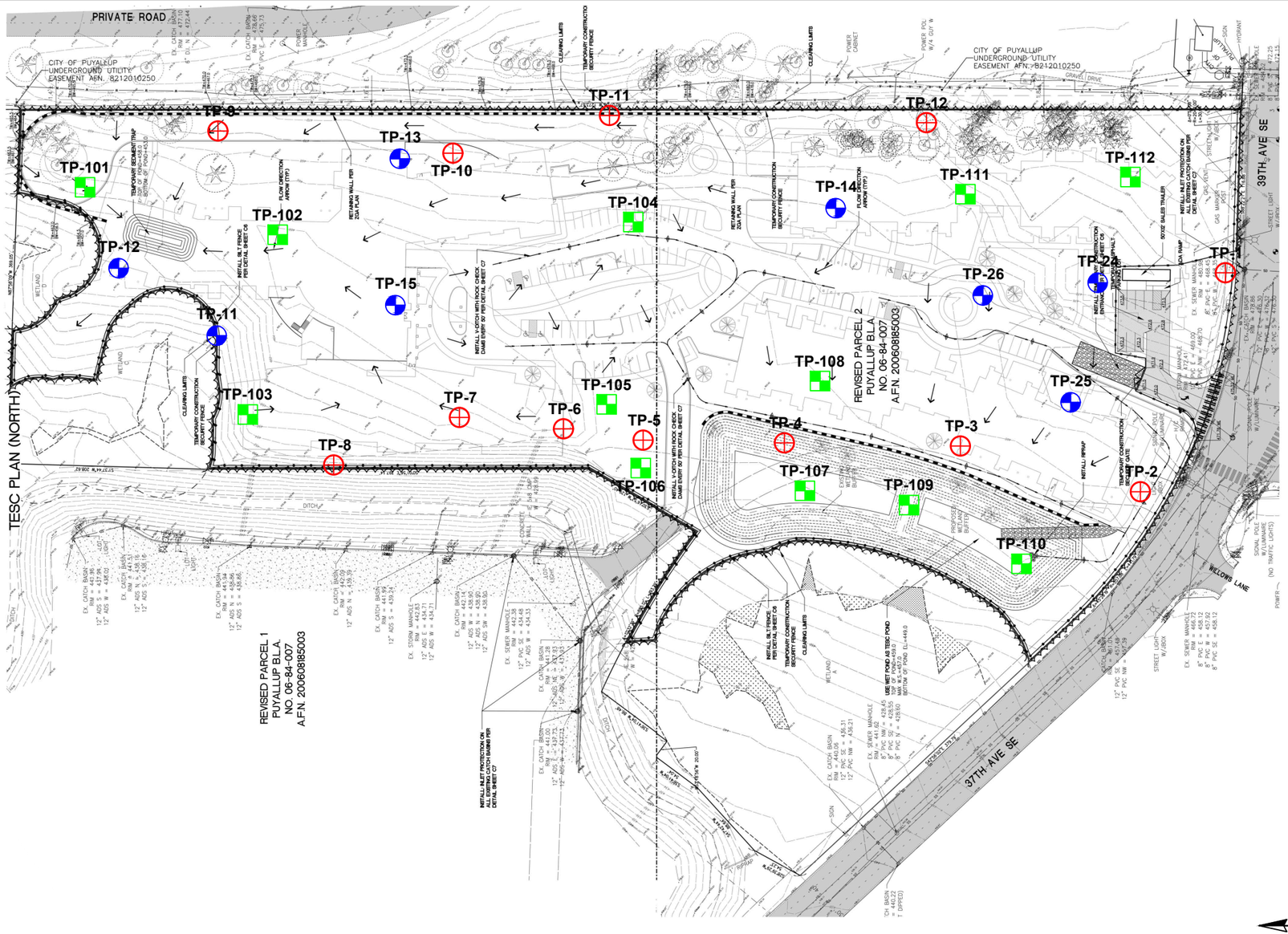
VICINITY MAP
WESLEY HOMES PUYALLUP
PUYALLUP, WASHINGTON

Proj. No.T-5915-3	Date NOV 2016	Figure 1



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE: SITE PLAN PROVIDED BY BARGHAUSEN.

LEGEND:

- APPROXIMATE TEST PIT LOCATION (TERRA 2015)
- APPROXIMATE TEST PIT LOCATION (GEO-ENGINEERS 2003)
- APPROXIMATE TEST PIT LOCATION (TERRA ASSOCIATES 2006)

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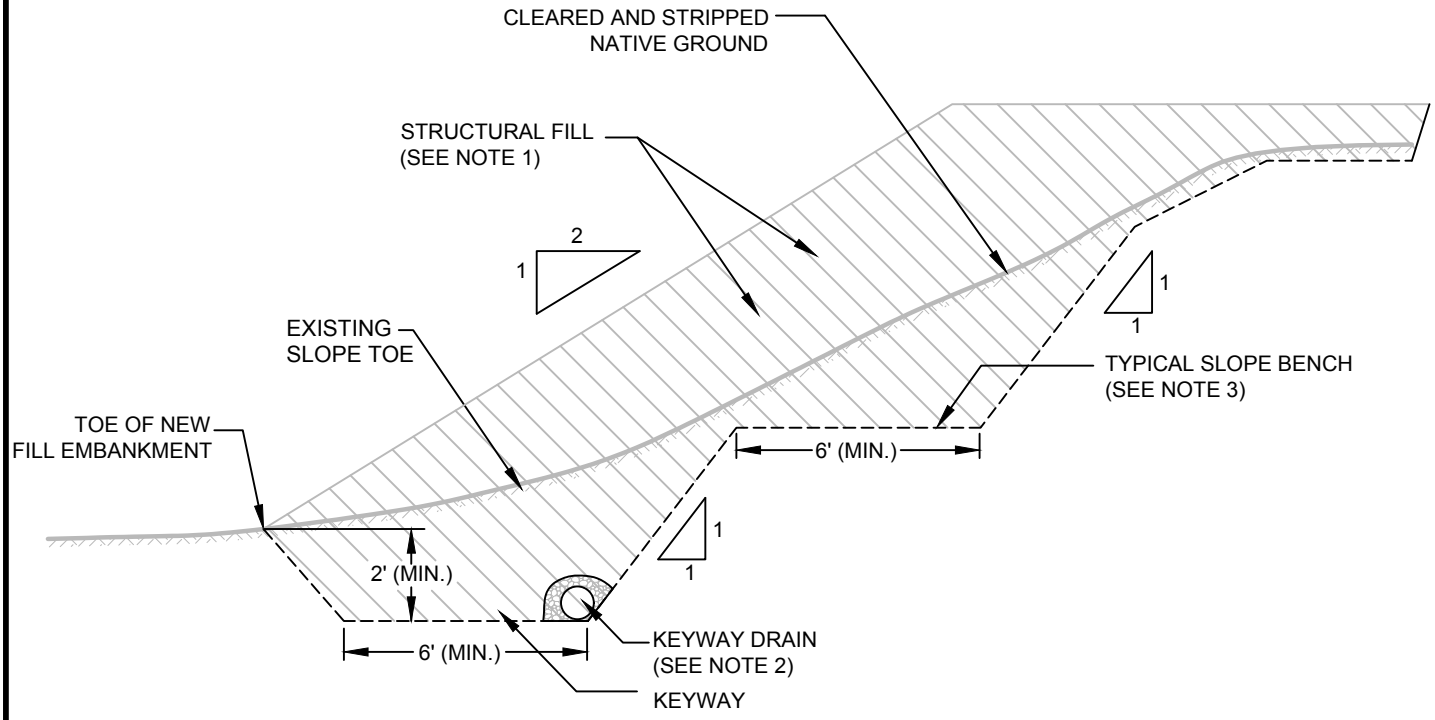
EXPLORATION LOCATION PLAN
WESLEY HOMES PUYALLUP
PUYALLUP, WASHINGTON

Proj. No.T-5915-3	Date NOV 2016	Figure 2



NOT TO SCALE

NOTES:

1) STRUCTURAL FILL SHALL BE COMPACTED TO A MINIMUM OF 95% OF ASTM D 698 MAXIMUM DRY DENSITY VALUE.
2) DRAINS SHALL CONSIST OF 6" DIA. PERFORATED PVC PIPE ENVELOPED IN 1 cu ft OF 3/4" WASHED GRAVEL. DRAIN PIPE SHALL BE DIRECTED TO THE STORM DRAIN SYSTEM OR APPROVED POINT OF DISCHARGE.
3) ADDITIONAL BENCHES AND BENCH DRAINS MAY BE REQUIRED BASED ON FIELD EVALUATION BY THE GEOTECHNICAL ENGINEER.

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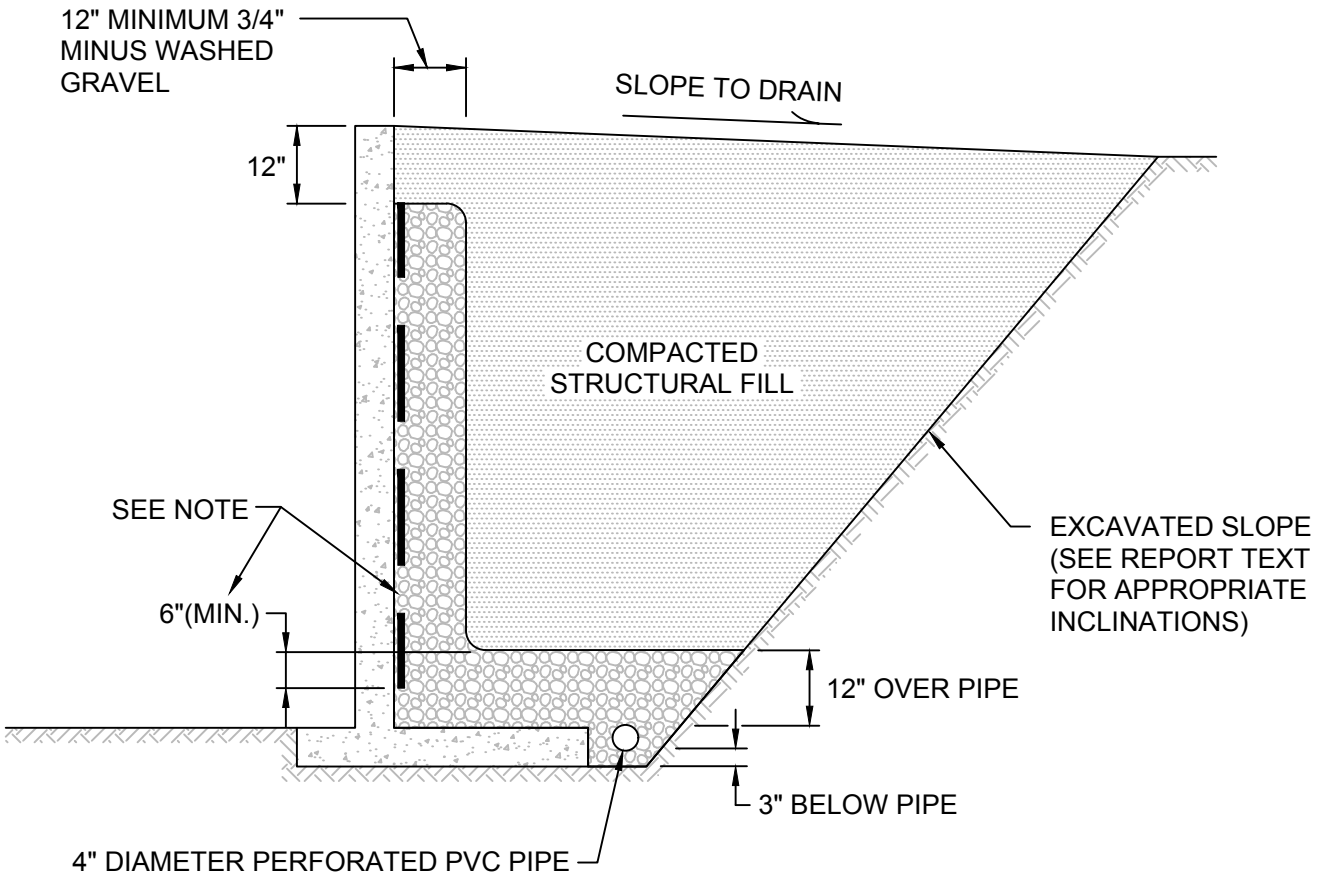
TYPICAL SLOPE KEY AND BENCH DETAIL
WESLEY HOMES PUYALLUP
PUYALLUP, WASHINGTON

Proj. No.T-5915-3	Date NOV 2016	Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF SIX INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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TYPICAL WALL DRAINAGE DETAIL
WESLEY HOMES PUYALLUP
PUYALLUP, WASHINGTON

Proj. No.T-5915-3	Date OCT 2015	Figure 4

APPENDIX A
FIELD EXPLORATION AND LABORATORY TESTING

Wesley Homes Puyallup
Puyallup, Washington

On October 13, 2015, we completed our site exploration by observing soil and groundwater conditions at 12 test pits. The test pits were excavated using a track-mounted excavator to a maximum depth of 15 feet below existing site grades. Test pit locations were determined in the field by using GPS coordinates from Google Earth. The approximate location of the test pits is shown on the attached Exploration Location Plan, Figure 2. Test Pit Logs are attached as Figures A-2 through A-13.

A geotechnical engineer from our office conducted the field exploration. Our representative classified the soil conditions encountered, maintained a log of each test pit, obtained representative soil samples, and recorded water levels observed during excavation. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on Figure A-1.

Representative soil samples obtained from the test pits and test borings were placed in closed containers and taken to our laboratory for further examination and testing. The moisture content of each sample was measured and is reported on the individual Test Boring Logs. Grain size analyses were performed on selected samples. The results of the grain size analyses are shown on Figures A-14 and A-15.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
‖	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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UNIFIED SOIL CLASSIFICATION SYSTEM
WESLEY HOMES PUYALLUP
PUYALLUP, WASHINGTON

Proj. No.T-5915-3	Date NOV 2016	Figure A-1

LOG OF TEST PIT NO. TP-101

FIGURE A-2

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Understory **APPROX. ELEV:** 456 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Black silty SAND, fine grained, moist, heavy organic inclusions. (SM) (TOPSOIL)	Loose			
2	1	Brown SAND with silty and gravel, fine to medium grained, dry, roots. (SP-SM)	Medium Dense	8.1		
5	2	Gray silty SAND with gravel, fine to medium grained, moist, cemented. (SM)	Dense	6.7		
9	3	Brown SAND with gravel, medium to coarse grained, moist. (SP)	Dense	5.5		
10		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-102

FIGURE A-3

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Low Grass/Weeds **APPROX. ELEV:** 458 +- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(2 inches ORGANICS) Red-brown SAND with silt and gravel, fine to medium grained, moist. (SP-SM)	Medium Dense	3.1		
3		Gray SAND with gravel to GRAVEL with sand, medium to coarse grained, dry. (SP/GP)	Medium Dense			
6	2			36.9		
8	3	Gray SILT, fine grained, moist, very small sand interbeds, upper two feet mottled. LL=35 PL=26 PI=9	Medium Stiff	36.8		
11		Brown SAND with silt and gravel to GRAVEL with silt and sand, medium to coarse grained, wet to saturated. (SP-SM/GP-GM)	Dense			
13	4			12.1		
		Test pit terminated at approximately 13 feet. No groundwater seepage observed.				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-103

FIGURE A-4

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Blackberries **APPROX. ELEV:** 451 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(6 inches ORGANICS)		10.4		
5	2	FILL: black with some brown and gray silty sand with gravel and sand with silt and gravel, fine to medium grained, moist, heavy organic inclusions including large logs and cut wood.	Medium Dense	18.5		
14	3	Gray silty SAND, fine to medium grained, wet. (SM)	Medium Dense	21.2		
15		Test pit terminated at approximately 15 feet. No groundwater seepage observed.				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-104

FIGURE A-5

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Brush **APPROX. ELEV:** 458 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(8 inches ORGANICS) Brown SAND with silt and gravel to silty SAND with gravel, fine to medium grained, dry.	Medium Dense	10.4		
2						
3			Medium Dense			
4	2			6.5		
5		Gray silty GRAVEL with sand to silty SAND with gravel, fine to medium grained, moist, some cobbles. (GM/SM)	Dense			
6						
7						
8						
9		Gray SAND with silt and gravel, fine to coarse grained, wet. (SP-SM)	Dense			
10	3			11.0		
11		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-105

FIGURE A-6

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Blackberries **APPROX. ELEV:** 454 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		(8 inches ORGANICS)				
1	1	Brown SAND with silt and gravel, fine to coarse grained, dry to moist, roots. (SP-SM)	Medium Dense	8.4		
2						
3						
4						
4	2			3.7		
5						
6						
7	3	Gray SILT, fine grained, moist, upper two feet mottled. (ML)	Medium Stiff to Stiff	19.8		
8						
9						
10	4			19.4		
11		Test pit terminated at approximately 10.5 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-106

FIGURE A-7

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Grass **APPROX. ELEV:** 452 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
0		(8 inches ORGANICS)				
1	1	Gray SAND, fine grained, moist, some silt and gravel. (SP)	Medium Dense	6.6		
5	2	Gray SILT, fine grained, moist, upper two feet mottled. (ML)	Medium Stiff to Very Stiff	18.8		
7	3			30.1		
10	4	Brown silty SAND with gravel, fine to medium grained, moist to wet. (SM)	Dense	13.1		
11		Test pit terminated at approximately 10.5 feet. No groundwater seepage observed.				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-107

FIGURE A-8

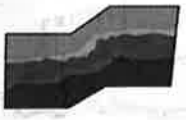
PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Forest Duff **APPROX. ELEV:** 452 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** 7 Feet **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Dark brown silty SAND, fine to medium grained, moist. (SM) (TOPSOIL)	Loose			
3	1	Gray silty SAND, fine grained, moist, roots. (SM)	Medium Dense	12.1		
6		Brown SAND with silt, medium to coarse grained, wet to saturated. (SP-SM)	Medium Dense			
7 ▼	2			21.7		
9		Brown GRAVEL with silt and sand, medium to coarse grained, saturated. (GP-GM)	Dense			
10	3			8.3		
		Test pit terminated at approximately 10 feet. Heavy groundwater seepage observed at 7 feet.				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. TP-108

FIGURE A-9

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Understory **APPROX. ELEV:** 456 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
0		(8 inches ORGANICS)				
1	1			7.2		
2			Medium Dense			
3		Brown to gray silty SAND to silty SAND with gravel, fine grained, moist, some cementation. (SM)				
4						
5			Dense			
6	2			9.3		
7						
8	3			8.4		
9		Gray SAND with silt and gravel, medium to coarse grained, moist to wet. (SP-SM)	Dense			
10	4			13.9		
11		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-109

FIGURE A-10

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Brush **APPROX. ELEV:** 454 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** 11.5 Feet **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(8 inches ORGANICS)		15.1		
2		Gray sandy SILT to silty SAND, fine grained, moist. (ML/SM)	Medium Dense			
3						
4	2			5.8		
5						
6		Brown GRAVEL with sand, fine to medium grained, moist. (GP)	Medium Dense			
7						
8				8.0		
9	3					
10		Brown GRAVEL with silt and sand, medium to coarse grained, moist to saturated. (GP-GM)	Dense			
11						
▼ 12	4			13.4		
13		Test pit terminated at approximately 12 feet. Heavy groundwater seepage observed at 11.5 feet.				
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-110

FIGURE A-11

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Understory **APPROX. ELEV:** 454 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** 11 Feet **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(8 inches ORGANICS)				
1	1	Gray SILT with sand, fine grained, moist, upper two feet mottled, trace gravel. (ML)	Medium Dense	14.8		
2						
3	2			4.9		
4		Brown GRAVEL with silt and sand, fine to coarse grained, moist. (GP-GM)				
5						
6		*At 6 feet soil becomes wet.				
7	3		Medium Dense	12.1		
8						
9						
10						
▼ 11		Test pit terminated at approximately 11 feet. Heavy groundwater seepage observed at 11 feet.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-111

FIGURE A-12

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Tall Understory **APPROX. ELEV:** 466 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Dark brown silty SAND, fine grained, moist, heavy organic inclusions. (SM) (TOPSOIL)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, moist. (SM)	Medium Dense	12.6		
5	2	Gray silty SAND with gravel, fine to medium grained, moist, upper two feet mottled, occasional cobble/boulder. (SM)	Medium Dense Dense	11.4		
10	3			7.8		
11		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-112

FIGURE A-13

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** CSD

LOCATION: Puyallup, Washington **SURFACE CONDS:** Forest Duff **APPROX. ELEV:** 474 +/- Ft.

DATE LOGGED: October 13, 2015 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Dark brown silty SAND, fine grained, moist, heavy organic inclusions. (SM) (TOPSOIL)	Loose			
2	1	Red-brown to brown SAND with silt and gravel to silty SAND with gravel, fine to medium grained, dry. (SP-SM/SM)	Medium Dense	7.6		
4	2	Brown GRAVEL with sand, medium to coarse grained, dry. (GP)	Medium Dense	1.9		
8	3	Gray silty SAND with gravel, fine to medium grained, moist. (SM)	Dense	5.8		
10		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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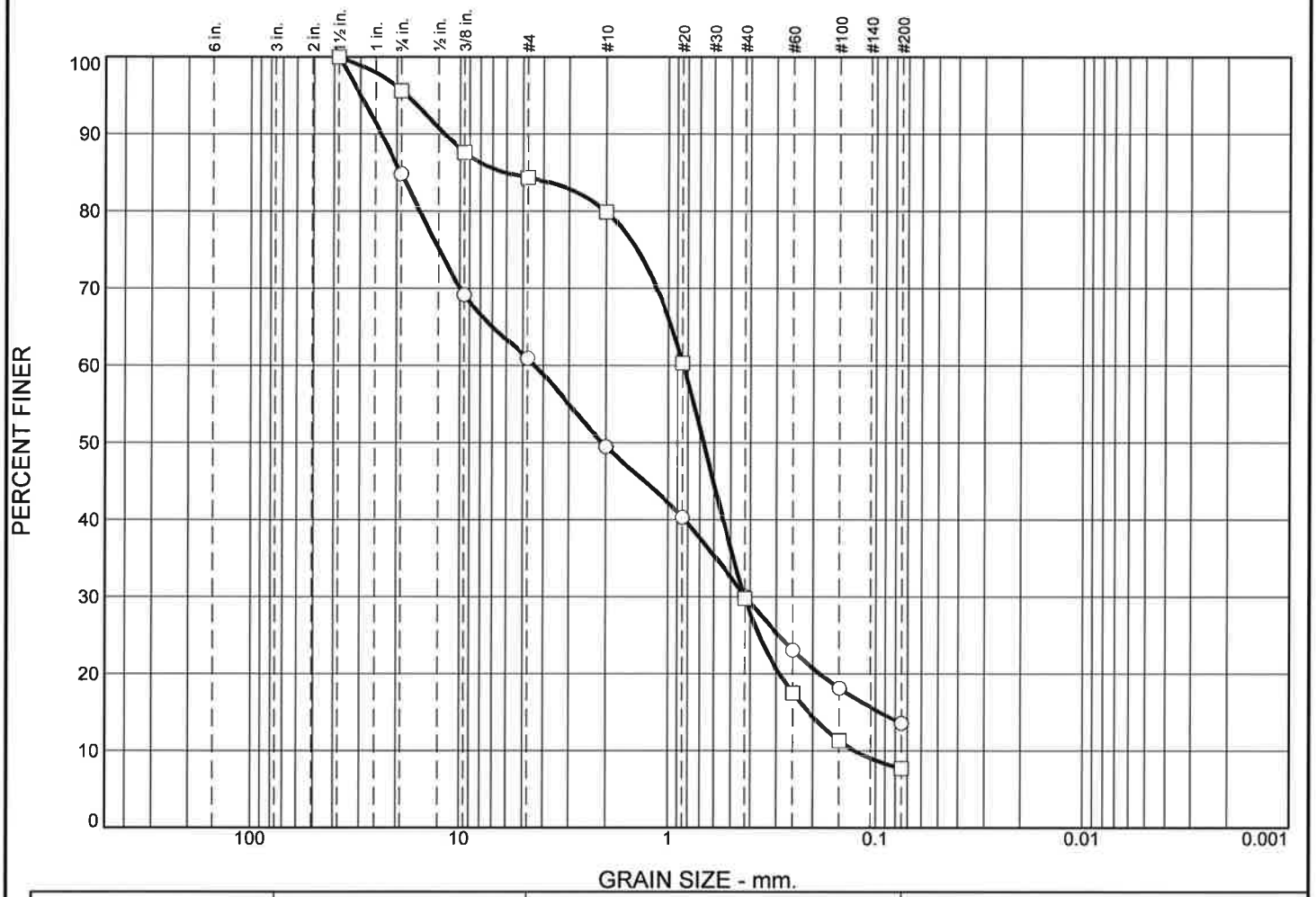
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	15.2	23.9	11.4	19.4	16.5	13.6	
□	0.0	4.4	11.3	4.4	50.1	22.1	7.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			19.2109	4.4000	2.0841	0.4221	0.0955			
□			6.0908	0.8436	0.6729	0.4274	0.2101	0.1259	1.72	6.70

Material Description	USCS	AASHTO
○ Silty SAND with gravel	SM	
□ Well graded SAND with silt and gravel	SW-SM	

Project No. T-5915-3 **Client:** Wesley Homes

Project: Wesley Homes Puyallup

Puyallup, Washington

○ **Location:** Test Pit TP-101 **Depth:** -5.5 feet **Sample Number:** 2

□ **Location:** Test Pit TP-105 **Depth:** -1.5 feet **Sample Number:** 1

Remarks:

○ Tested on 10/15/2015

□ Tested on 10/15/2015

Terra Associates, Inc.

Kirkland, WA

Figure A-14

Tested By: FQ

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.8	5.0	17.4	23.9	50.9	
□	0.0	32.1	25.3	6.9	22.1	9.1	4.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.9912	0.1722						
□			28.3351	14.6713	8.7037	1.1078	0.4626	0.3242	0.26	45.25

Material Description	USCS	AASHTO
○ Sandy SILT	ML	
□ Poorly graded GRAVEL with sand	GP	

Project No. T-5915-3 **Client:** Wesley Homes

Project: Wesley Homes Puyallup

Puyallup, Washington

○ **Location:** Test Pit TP-109 **Depth:** -1 foot **Sample Number:** 1

□ **Location:** Test Pit TP-109 **Depth:** -8.5 feet **Sample Number:** 3

Remarks:

○ Tested on 10/15/2015

□ Tested on 10/15/2015

Terra Associates, Inc.

Kirkland, WA

Figure A-15

Tested By: FQ

APPENDIX B

PREVIOUS TEST PIT LOGS

LOG OF TEST PIT NO. 1

FIGURE A-2

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 474

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(9 inches TOPSOIL)		2.5		
		Brown sandy GRAVEL, dry. (GP)	Dense			
5		Moist below 5 feet.				
		Brown sandy GRAVEL, dry. (GP)	Dense	5.3		
10		Test pit terminated at 11 feet. No groundwater seepage was observed. No caving was observed.				
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 2

FIGURE A-3

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 458

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(6 inches TOPSOIL)				
		Brown silty SAND, moist to dry. (SM)		8.3		
			Medium Dense			
5		Very dense below 5 feet.		11.4		
		Brown gravelly SAND, dry. (SP)	Very Dense			
10				4.5		
		Test pit terminated at 10 feet. No groundwater seepage was observed. No caving was observed.				
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 3

FIGURE A-4

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 458

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(12 inches TOPSOIL) Brown sandy SILT with gravels, oxidation staining, moist. (ML)	Medium Dense	11.7		
5		Gray sandy SILT, cemented, moist. (ML)	Dense	13.8		LL=21 PL=18 PI=3
		Test pit terminated at 8 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 4

FIGURE A-5

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: _____ ELEV: 456

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(6 inches TOPSOIL) Brown gray silty SAND with oxidation staining, moist. (SM)		18.6		
		Very dense below 3 feet.	Dense			
5						
		Test pit terminated at 8 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 5

FIGURE A-6

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 453

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(9 inches TOPSOIL)		11.6		
		Brown gray silty SAND with gravel, cemented, moist. (SM)	Very Dense	8.3		
5						
		Test pit terminated at 7 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 6

FIGURE A-7

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 458

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(9 inches TOPSOIL) Brown SAND, dry to moist. (SP)	Medium Dense	8.3		
5		Brown sandy GRAVEL to gravelly SAND, moist. (GP-SP)	Dense to Very Dense	3.0 3.2		
10		Test pit terminated at 8 feet. No groundwater seepage was observed. No caving was observed.				
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 7

FIGURE A-8

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 455

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(12 inches TOPSOIL)		5.9		
		Brown gravelly SAND, dry. (SP)	Dense			
5						
		Brown SAND, dry. (SP)	Dense	5.2		
10		Brown gray sandy SILT to SILT with oxidation staining, moist. (ML)	Hard	23.4		
		Test pit terminated at 12 feet. No groundwater seepage was observed. No caving was observed.				
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 8

FIGURE A-9

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 448

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(6 inches TOPSOIL)		6.0		
				18.8		
		UNCONTROLLED FILL: dark brown black silty sand with decayed wood, trace branches, roots, moist. (SM)	Loose			
5						
10						
		Gray sandy SILT to SILT, moist. (ML)	Medium Stiff	29.5		
15		Test pit terminated at 15 feet. No groundwater seepage was observed. No caving was observed.				
20						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 9

FIGURE A-10

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 462

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(9 inches TOPSOIL) Brown silty SAND with gravel, dry. (SM)	Medium Dense	5.9		
5		Brown gravelly SAND, dry. (SP)	Very Dense	3.6		
		Test pit terminated at 8 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 10

FIGURE A-11

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 462

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(9 inches TOPSOIL)		3.6		
		Brown silty SAND with gravel, dry to moist. (SM)	Medium Dense			
5						
		Test pit terminated at 6 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 11

FIGURE A-12

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 469

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(12 inches TOPSOIL)		3.9		
		Yellow brown gravelly SAND, dry. (SP)	Very Dense			
5						
		Test pit terminated at 6 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 12

FIGURE A-13

PROJECT NAME: Puyallup Senior Housing Project PROJ. NO: T-5915-1 LOGGED BY: TA

LOCATION: Puyallup, Washington SURFACE CONDS: ELEV: 472

DATE LOGGED: August 3, 2006 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
		(9 inches TOPSOIL) Reddish-brown silty SAND with gravel, dry. (SM)	Medium Dense	8.4		
5		Brown sandy GRAVEL, dry. (GP)	Very Dense	5.8		
		Test pit terminated at 7 feet. No groundwater seepage was observed. No caving was observed.				
10						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Date Excavated: 03/27/03 Logged by: EWH

Equipment: Case 580L Backhoe Surface Elevation (ft): 450

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
450	0					SOD	2- to 6-inch grass and sod			
						SM	Black silty fine to coarse sand, trace organic material (loose, moist)			
						SM	Dark brown-black silty sand, trace gravel, occasional wood fragments (loose, moist) (fill)			
		X	1					31		
						SP-SM	Dark brown-black fine to coarse sand with silt and gravel, occasional organic material and cobbles (medium dense, moist) (fill)			
445	5			▼						
440	10	X	2					31		
435	15	X	3			SM	Green/gray silty fine sand with occasional coarse sand, fine gravel, roots (loose, moist) (native)			
430	20						Test pit completed at at depth of 15 feet on 03/27/03 Slow groundwater seepage observed at a depth of 5 feet Minor caving observed at depths between 0 and 2 feet			

Note: See Figure A-1 for explanation of symbols

The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

3443-002-00 GEI GT LOG (PIT 2.1.0 P:\3\3443002\00\FINALS\3443002TESTPITS.GPJ GEIV2_2.GDT 4/23/03

LOG OF TEST PIT 11

Geo Engineers

Project: Puyallup Retail Center

Project Location: Puyallup, Washington

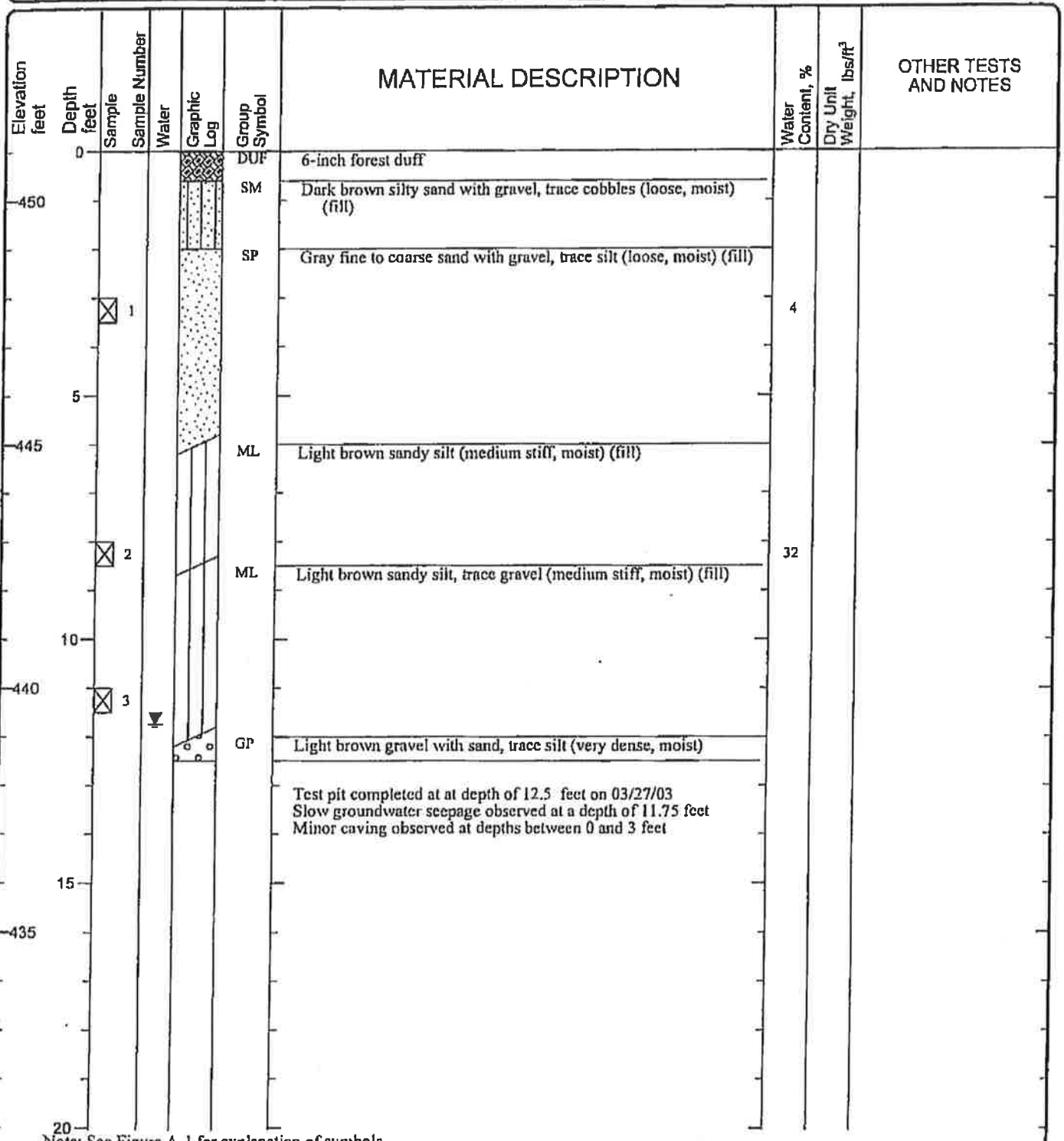
Project Number: 3443-002-00

Figure: A-12

Sheet 1 of 1

Date Excavated: 03/27/03 Logged by: EWH

Equipment: Case 580L Backhoe Surface Elevation (ft): 451



Note: See Figure A-1 for explanation of symbols

The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT 12

Geo Engineers

Project: Puyallup Retail Center

Project Location: Puyallup, Washington

Project Number: 3443-002-00

Figure: A-13

Sheet 1 of 1

Date Excavated: 03/27/03 Logged by: EWH

Equipment: Case 580L Backhoe Surface Elevation (ft): 464

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
464	0					DUF	6-inch forest duff			
						SM	Brown-reddish brown silty sand with roots (loose, moist)			
						GP-GM	Gray fine to coarse gravel with sand and silt, occasional sand and cobbles (dense, moist)			
460		☒	1							
	5			▼						
455										
	10						Test pit completed at at depth of 10.5 feet on 03/27/03 Moderate groundwater seepage observed at a depth of 5.5 feet Moderate caving observed at depths between 1 and 2 feet			
450										
	15									
445										
	20									

Note: See Figure A-1 for explanation of symbols
The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT 13

Geo Engineers

Project: Puyallup Retail Center
Project Location: Puyallup, Washington
Project Number: 3443-002-00

Figure: A-14
Sheet 1 of 1

Date Excavated: 03/27/03 Logged by: EWH

Equipment: Case 580L Backhoe Surface Elevation (ft): 460

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
460	0					DUF	3- to 6-inch forest duff			
						SM	Brown silty sand with gravel (loose, moist)			
		X	1			GP	Gray fine to coarse gravel with sand, trace silt (dense, wet)			
455	5			▼						
450	10						Test pit completed at at depth of 10 feet on 03/27/03 Rapid groundwater seepage observed at a depth of 5 feet Slight caving observed at depths between 1 and 3 feet			
445	15									
440	20									

Note: See Figure A-1 for explanation of symbols
The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

3443-002-00 GEI GTTestTPIT 2.1.0 P:\3\3443002\00\FINALS\3443002TESTPITS.GPJ GEIV2_2.GDT 4/23/03

LOG OF TEST PIT 14

Geo Engineers

Project: Puyallup Retail Center
Project Location: Puyallup, Washington
Project Number: 3443-002-00

Figure: A-15
Sheet 1 of 1

Date Excavated: 03/27/03 Logged by: EWH

Equipment: Case 580L Backhoe Surface Elevation (ft): 467

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0					SOD	6-inch grass and sod			
						SM	Brown silty sand with gravel, trace roots (loose, moist)			
465						GP	Gray fine to coarse gravel with sand, trace silt (medium dense, moist)			
		☒	1							
	5			▼						
460										
	10						Test pit completed at at depth of 10 feet on 03/27/03 Minor groundwater seepage observed at a depth of 6 feet Severe caving observed at depths between 2 and 10 feet			
455										
	15									
450										
	20									

Note: See Figure A-1 for explanation of symbols

The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

3443-002-00 GEI GT ... PIT 2.1.0 P:\3\3443002\00\FINALS\3443002\00TESTPITS.GPJ GEIV2_2.GDT 4/23/03

LOG OF TEST PIT 15

Geo Engineers

Project: Puyallup Retail Center

Project Location: Puyallup, Washington

Project Number: 3443-002-00

Figure: A-16

Sheet 1 of 1

Date Excavated: 03/31/03 Logged by: KWG

Equipment: Case 580L Backhoe Surface Elevation (ft): 468

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0					DUF	2- to 4-inch forest duff			
		X	1			SP-SM	Reddish brown fine sand with silt, occasional gravel (medium dense, moist)			
						GP	Gray fine to coarse gravel with sand, trace silt (dense, moist)			
465		X	2							
						SP	Gray fine to medium sand, trace silt and granite cobbles (dense, moist)			
	5	X	3							
		X	4			SM	Gray silty fine sand (very dense, moist)			
460							Test pit completed at at depth of 8 feet on 03/31/03 No groundwater seepage observed No caving observed			
	10									
455										
	15									
450										
	20									

Note: See Figure A-1 for explanation of symbols

The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

TPIT 2.1.0 P:\3\3443002\00\FINALS\3443002000TESTPITS.GPJ GEIV2_2.GDT 4/23/03

3443-002-00 GEI

LOG OF TEST PIT 24

GeoEngineers

Project: Puyallup Retail Center

Project Location: Puyallup, Washington

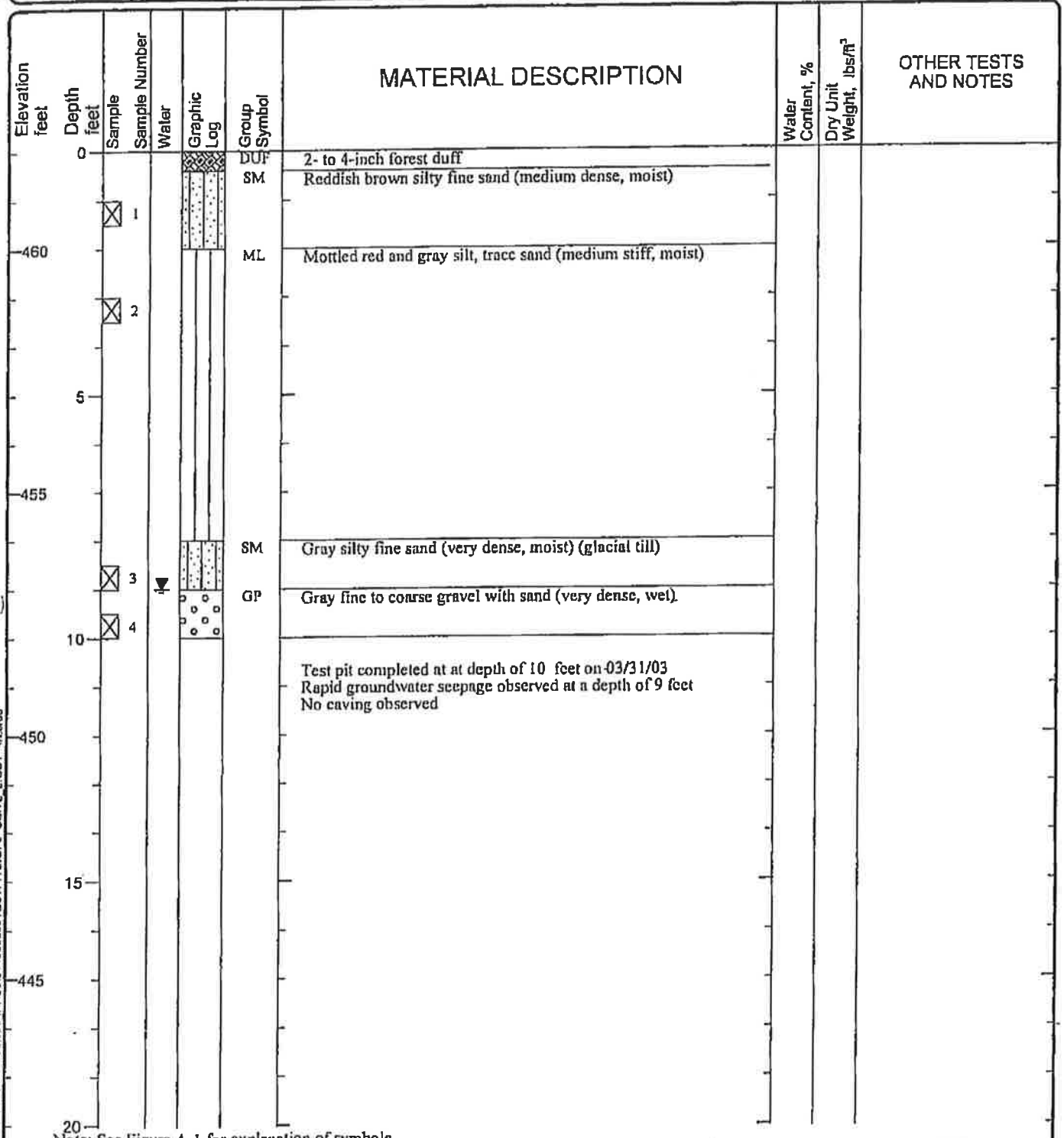
Project Number: 3443-002-00

Figure: A-25

Sheet 1 of 1

Date Excavated: 03/31/03 Logged by: KWG

Equipment: Case 580L Backhoe Surface Elevation (ft): 462



Note: See Figure A-1 for explanation of symbols
The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT 25

Geo Engineers

Project: Puyallup Retail Center
Project Location: Puyallup, Washington
Project Number: 3443-002-00

Figure: A-26
Sheet 1 of 1

Date Excavated: 03/31/03 Logged by: KWG

Equipment: Case 580L Backhoe Surface Elevation (ft): 462

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0					DUF	2- to 4-inch forest duff			
						SM	Reddish brown silty fine to medium sand, trace gravel (medium dense, moist)			
460				▼		SM	Reddish gray silty fine sand (dense, wet)			
		☒	1					22		%F = 45.7 Sieve Analysis
						GP	Gray fine to coarse gravel with sand, trace silt (dense, wet)			
	5	☒	2							
455										
							Test pit completed at at depth of 8 feet on 03/31/03 Rapid groundwater seepage observed at a depth of 2 feet Minor caving observed at depths between 2 and 4 feet			
	10									
450										
	15									
445										
	20									

Note: See Figure A-1 for explanation of symbols

The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

.TPIT 2.1.0 P:\3443002\00\FINALS\3443002\00TESTPITS.GPJ GEIV2_2.GDT 4/23/03

3443-002-00 GEI

LOG OF TEST PIT 26

Geo Engineers

Project: Puyallup Retail Center

Project Location: Puyallup, Washington

Project Number: 3443-002-00

Figure: A-27

Sheet 1 of 1

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

May 22, 2023
Project No. T-5915-3

Mr. Stephen Nornes
Presbyterian Homes & Services and Senior Housing Partners
2823 Hamline Avenue North
Roseville, Minnesota 55113

Subject: Response to Comments
Geotechnical Report Addendum
Wesley Homes Expansion
Puyallup, Washington

Reference: Geotechnical Report Addendum, Wesley Homes Expansion, Puyallup, Washington, Project No. T-5915-3, prepared by Terra Associates, Inc., dated December 29, 2022

Dear Mr. Nornes:

Subsequent submittal of the referenced addendum, the City of Puyallup has requested additional information regarding the Landslide Hazard Area. Specifically, the city has requested Puyallup Municipal Code (PMC) 21.06.1230 (2) (A-F) and .1230 (11) be addressed in detail. In addition, the city has requested we address pier design foundations in more detail and the presence of seeps on the site. The following summarizes our review and response to these comments.

PMC 21.06.1230 (2) (a)

This section of the PMC requires that the proposed development in a landslide hazard area not decrease the factor of safety for landslide occurrences below 1.5 for static conditions and 1.2 for dynamic (seismic) conditions. To address this comment, we completed a stability analysis of a representative cross section of the slope that included grading and application of building loading from the proposed development. We also completed additional subsurface exploration to better define the limits of the unsuitable existing fill soils and underlying competent native soils. Supplemental test pit locations and test pit logs are attached as Figures 1 through 9. The location of the cross section analyzed is also shown on Figure 1.

We completed the stability analysis using the SLIDE2 computer program published by RocScience. Results of the analysis indicate that with the exiting unsuitable fill soils removed and replaced with structural fill placed and compacted in accordance with recommendations in our geotechnical report, the minimum safety factor under static conditions of 1.5 or greater would be met. A graphic of the cross section showing these results along with soil parameters used in the analysis is attached as Figure 10.

Seismic (Psuedostatic) analysis was then completed along this section. The acceleration input into the analysis was the Peak Ground Acceleration (PGA) for the maximum considered event (MCE) as defined by the current International Building Code (IBC). This value represents an earthquake with a 2 percent chance of exceedance in 50 years (1 in 2500 years). This acceleration was adjusted for sloping conditions. The results of this analysis indicate safety factors less than the required 1.2 minimum would be present. These results are shown on attached Figure 11.

We would note that pseudostatic safety factors of less than 1 (one) do not necessarily reflect that a slope failure or a landslide would occur. The ground shaking may cause the slope to displace downgradient, but the amount of displacement may not be significant or sufficient to cause damage to the facility that would be considered a life safety issue. To evaluate this condition, we completed additional dynamic analysis of the slope section to evaluate potential lateral downslope displacements (Newmark Analysis). The earthquake record used in this analysis was a Cape Mendocino event that had a PGA of .59 which is similar to this sites PGA. This analysis indicates that the maximum displacement along the western side of the building would be less than two-inches with displacements diminishing to less than one-half-inch towards the mid-point of the structure. This amount of movement would not be categorized as a slope failure or landslide. Damage to the building would occur, however, this amount of lateral movement would cause damage of a cosmetic nature and would not be a life safety issue that would require design which would mitigate the displacement, in our opinion. Results of this analysis are shown on attached Figure 12.

In our opinion, provided the owner is willing to accept the risk of building damage caused by minimal downslope displacement following a design level earthquake, no design measures need to be implemented to mitigate this movement. However, if the owner is not willing to accept this risk, then the western half of the building paralleling the crest of the slope should be supported on pile foundations.

PMC 21.06.1230 (2) (b)

The proposed development will actually decrease the potential for slope movements, particularly during a seismic event, than what currently exists.

PMC 21.06.1230 (2) (c)

The proposed development will reduce surface water discharge on the slope by collecting rainfall runoff in the stormwater system and discharging it to an approved controlled location.

PMC 21.06.1230 (2) (d)

The structure's location does not alter the slope's existing gradient. As shown on the structural drawings, spread footings parallel to the slope crest will be deepened to provide a minimum horizonal distance of one half the slope height (ten feet) from the edge of footing to the slope face in accordance with the IBC.

PMC 21.06.1230 (2) (e)

A short height engineered retaining wall will be used along the crest of the slope to create an access path on the west side of the building. The height of this wall is less than seven-feet.

PMC 21.06.1230 (2) (f)

As noted in response to PMC 21.06.1230 (2) (c), the development will improve drainage conditions on the slope by collecting rainfall runoff and directing it to a controlled approved point of discharge. This will reduce the landslide and erosion hazards that currently exist.

PMC 21.06.1230 (11)

For monitoring we would recommend adding the following note to the project drawings:

- During site grading and building construction the geotechnical engineer of record or his/her representative will perform bi-weekly reconnaissance of the slope and issue a field report regarding site conditions. These bi-weekly slope recons will continue until building shell construction and stormwater facilities are completed and functional. Post building construction slope recons shall occur on a quarterly basis for a period of no less than two years. If no instability or erosion issues are present at that time, monitoring can be terminated.

Rammed Aggregate Piers (RAP's)

RAPs are densely compact columns of aggregate, either processed crushed or non-crushed gravel, that are installed below the building foundations. Construction machinery used to construct the piers is similar to that used to construct drilled shaft piles or piers. The piers are not installed as structural elements but rather are a form of excavation and refilling with compacted structural fill. The number of piers required and spacing is calculated using a replacement ratio where the overall engineering characteristics of the fill is improved to the soil parameters required, to provide for suitable foundation support and/or site slope stability. If used, they are typically designed and constructed by a geotechnical specialty contractor.

Site Seepage

The site seepage mentioned in the referenced addendum took place on the east and south sides of the existing Lodge building. Flat grades along these sides of the building along with relatively low permeable fill soils resulted in ponding water areas that eventually seeped into the Lodge lower-level garage. Photographs documenting conditions observed in April 2019 are attached for reference.

This condition clearly demonstrates that infiltration of stormwater using low impact development elements such as permeable pavement would not be feasible at the site. To further demonstrate this, in addition to excavating the supplemental test pits, we performed a small-scale pilot infiltration test (PIT) in the proposed pavement area south of the new building. This PIT location is shown on Figure 1. Approximately 50 gallons of water was introduced into the test pit at a depth 2.5 feet. This resulted in a head of about six inches. After two hours, no reduction in the head occurred demonstrating the fill soils do not infiltrate. The log for the PIT along with testing comments is included with the test pit logs.

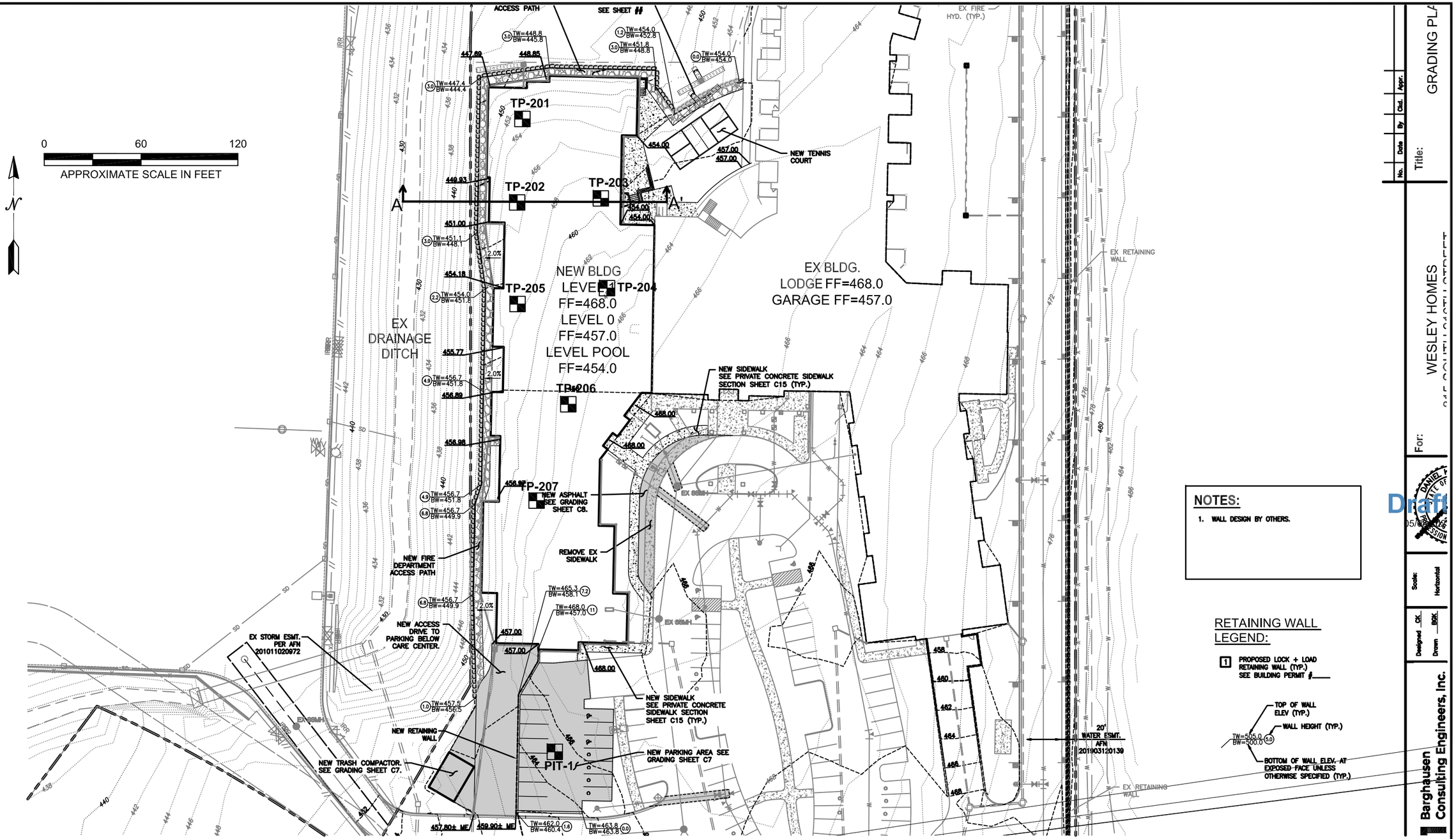
We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Theodore J. Schepper, P.E. 5-22-2023
Senior Principal Engineer

Cc: Ms. Jill Krance, In Site Architects
Mr. Dan Balmelli, P.E., Barghausen Consulting Engineers

Attachments: Figure 1 – Exploration Location Plan
Figures 2 through 9 – Test Pit Logs
Figures 10 through 12 – SLIDE2 Stability Analysis Results
Site Phots



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE:

SITE PLAN PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS

LEGEND:

APPROXIMATE TEST PIT LOCATION

Terra Associates, Inc.
Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

EXPLORATION LOCATION PLAN
WESLEY BRADLEY PARK PHASE 2
PUYALLUP, WASHINGTON

Proj. No.T-5915-3	Date MAY 2023	Figure 1

LOG OF TEST PIT NO. 201

FIGURE 2

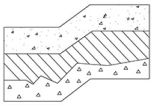
PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Grass, Brush **APPROX. ELEV:** ~452

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Fill: Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist, scattered cobbles, trace of geosynthetic fabric fragments. (SM)		
2		Fill: Brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, scattered cobbles, numerous organic silty sand pockets and layers, scattered wood debris. (SM) (Strippings)	Medium Dense	
7		- Numerous wood debris below about 7 feet.		
12	1	Gray-brown silty SAND to SAND with silt, fine grained, trace of fine gravel, moist, scattered mottling, trace of black organic fragments. (SM/SP-SM)	Medium Dense to Dense	21.6
14		Gray silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, trace of cobbles. (SM)		
15		Test pit terminated at 14.5 feet. No groundwater seepage.		
18				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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Geology and
Environmental Earth Sciences

LOG OF TEST PIT NO. 202

FIGURE 3

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Grass, Brush **APPROX. ELEV:** ~455

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Fill: Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist, scattered cobbles, trace of geosynthetic fabric fragments. (SM)	Medium Dense	
2		Fill: Brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, scattered cobbles, trace of 1.5- to 2-foot diameter boulders, numerous organic silty sand pockets and layers, numerous wood debris. (SM) (Strippings)		
12		Gray-brown silty SAND to SAND with silt, fine grained, trace of fine to coarse gravel, wet, scattered mottling, trace of black organic fragments. (SM/SP-SM)		
13		Test pit terminated at 13 feet. No groundwater seepage.		
18				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 203

FIGURE 4

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Grass, Brush **APPROX. ELEV:** ~459

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–1		Fill: Brown silty GRAVEL with sand, fine to coarse gravel, fine to coarse sand, wet. (GM)	Dense	
1–2		Fill: Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist, trace of cobbles. (SM)	Medium Dense	
2–13		Fill: Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist, scattered cobbles, numerous dark brown organic silty sand pockets and layers, scattered to numerous wood debris. (SM) (Strippings)		
13–16	1	Gray-brown SILT with sand to silty SAND, fine sand, scattered fine to coarse gravel, wet (grading moist with depth). (ML/SM)	Medium Dense to Dense	24.3
16–18		Test pit terminated at 16 feet. No groundwater seepage.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 204

FIGURE 5

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Grass, Brush **APPROX. ELEV:** ~464

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Fill: Brown silty GRAVEL with sand, fine to coarse gravel, fine to coarse sand, moist to wet. (GM)	Dense	
3		Fill: Gray to brown silty GRAVEL with sand, fine to coarse gravel, fine to medium sand, moist to wet, scattered cobbles, trace of 1-foot diameter boulders. (GM)		
4		Fill: Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist, scattered cobbles, scattered dark brown organic silty sand pockets and layers, scattered to numerous wood debris. (SM) (Strippings)	Medium Dense	
14		Gray-brown silty SAND, fine grained, moist to wet. (SM)		
15		Test pit terminated at 15 feet. No groundwater seepage.		
18				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Consultants in Geotechnical Engineering
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Environmental Earth Sciences

LOG OF TEST PIT NO. 205

FIGURE 6

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Grass, Brush **APPROX. ELEV:** ~458

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–1		Fill: Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist. (SM)	Medium Dense	
1–12		Fill: Brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, scattered cobbles, scattered dark brown organic silty sand pockets and layers, scattered to numerous wood debris. (SM) (Strippings)		
12–14		Gray silty SAND, fine grained, trace of fine to coarse gravel, moist to wet, scattered faint mottling. (SM)		
14–18		Test pit terminated at 14 feet. No groundwater seepage.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 206

FIGURE 7

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Sparse grass **APPROX. ELEV:** ~465

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–3		Fill: Gray-brown silty GRAVEL with sand, fine to coarse gravel, fine to coarse sand, wet. (GM)	Dense	
3–10		Fill: Brown silty SAND with gravel, fine sand, fine to coarse gravel, moist, scattered cobbles, scattered dark brown organic silty sand pockets and layers, trace of wood debris. (SM) (Strippings)	Medium Dense	
10–11	1	Gray-brown silty SAND to SAND with silt, fine grained, moist, scattered mottling. (SM/SP-SM)		17.1
12–18		Test pit terminated at 12 feet. No groundwater seepage.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

LOG OF TEST PIT NO. 207

FIGURE 8

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Sparse grass **APPROX. ELEV:** ~464

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** 1.5-2 ft **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Fill: Gray-brown silty GRAVEL with sand, fine to coarse gravel, fine to coarse sand, wet, numerous cobbles. (GM)	Dense	
1 ▼				
2		Fill Gray-brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet. (SM)	Medium Dense	
3				
4				
5		Fill: Gray to gray-brown silty SAND with gravel, fine to coarse sand, fine to coarse gravel, moist to wet, scattered cobbles, trace of wood debris. (SM)	Dense	
6				
7				
8				
9	1	Brown silty GRAVEL with sand, fine to coarse gravel, fine to coarse sand, moist to wet. (GM)	Medium Dense to Dense	9.1
10	2	Brown SAND with silt, fine to medium grained, trace of fine gravel, moist. (SP-SM)	Medium Dense	25.1
11				
12	3	Gray-brown SILT with fine sand, moist, mottled. (ML)	Medium Dense to Dense	32.2
13				
14		Test pit terminated at 14 feet. Light groundwater seepage between 1.5 and 2 feet.		
15				
16				
17				
18				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Environmental Earth Sciences

LOG OF PILOT INFILTRATION TEST NO. 1

FIGURE 9

PROJECT NAME: Wesley Homes Puyallup **PROJ. NO:** T-5915-3 **LOGGED BY:** JCS

LOCATION: Puyallup, Washington **SURFACE CONDITIONS:** Sparse grass **APPROX. ELEV:** ~464

DATE LOGGED: January 31, 2023 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Fill: Brown silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist to wet, scattered rounded to angular cobbles. (SM)		
1				
2		- Infiltration test surface at approximately 2.5 feet.	Dense	
3		Small-Scale Test: PIT Dimensions approximately 3 feet x 4 feet. Test Depth approximately 2.5 feet. - Ran approximately 48 gallons into pit at approximately 3.5 gallons per minute. - Started flow at approximately 8:00 AM. - Stopped flow when water depth reached 0.5 feet at 8:11 AM. - Observed water level from 8:11 AM to 10:00 AM. - No change in water level. - Not infiltrating.		
4				
5		Test pit terminated at 5 feet. No groundwater seepage. Small-scale pilot infiltration test performed at approximately 2.5 feet.		
6				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
New Structural Fill		125	Mohr-Coulomb	50	36	Water Surface	Custom	1
Existing Fill		115	Mohr-Coulomb	50	26	Water Surface	Custom	1
Native Silty Sand/ Sandy Silt		120	Mohr-Coulomb	100	34	Water Surface	Custom	1

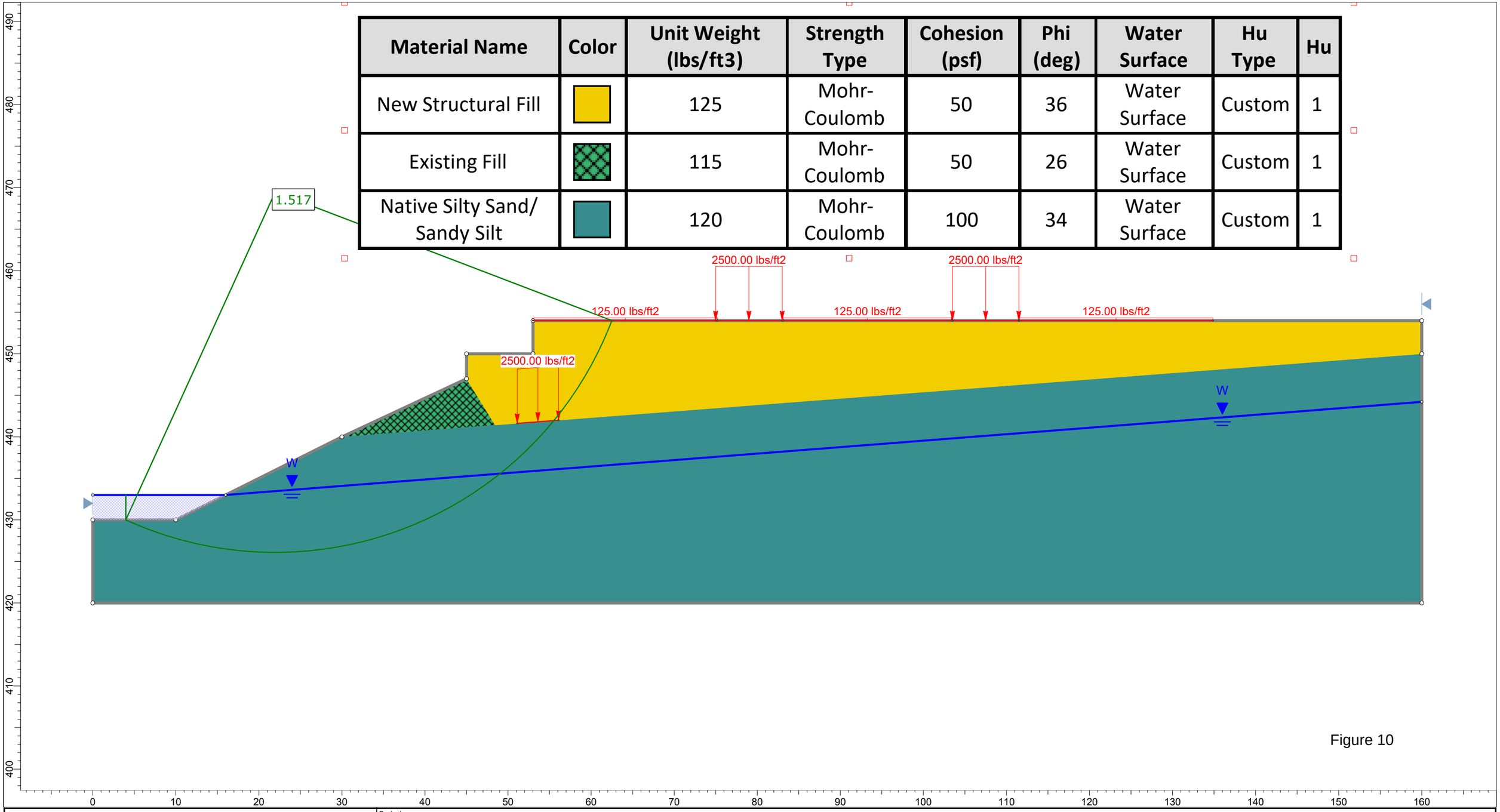

Figure 10

rocscience	Project	SLIDE - An Interactive Slope Stability Program	
	Group	Group 1	Scenario: Master Scenario
	Drawn By		Company: Terra Associates, Inc.
	Date	5/16/2023, 9:57:40 AM	File Name: Care Center Section A-A' Built Condition.slmd

SLIDEINTERPRET 9.008

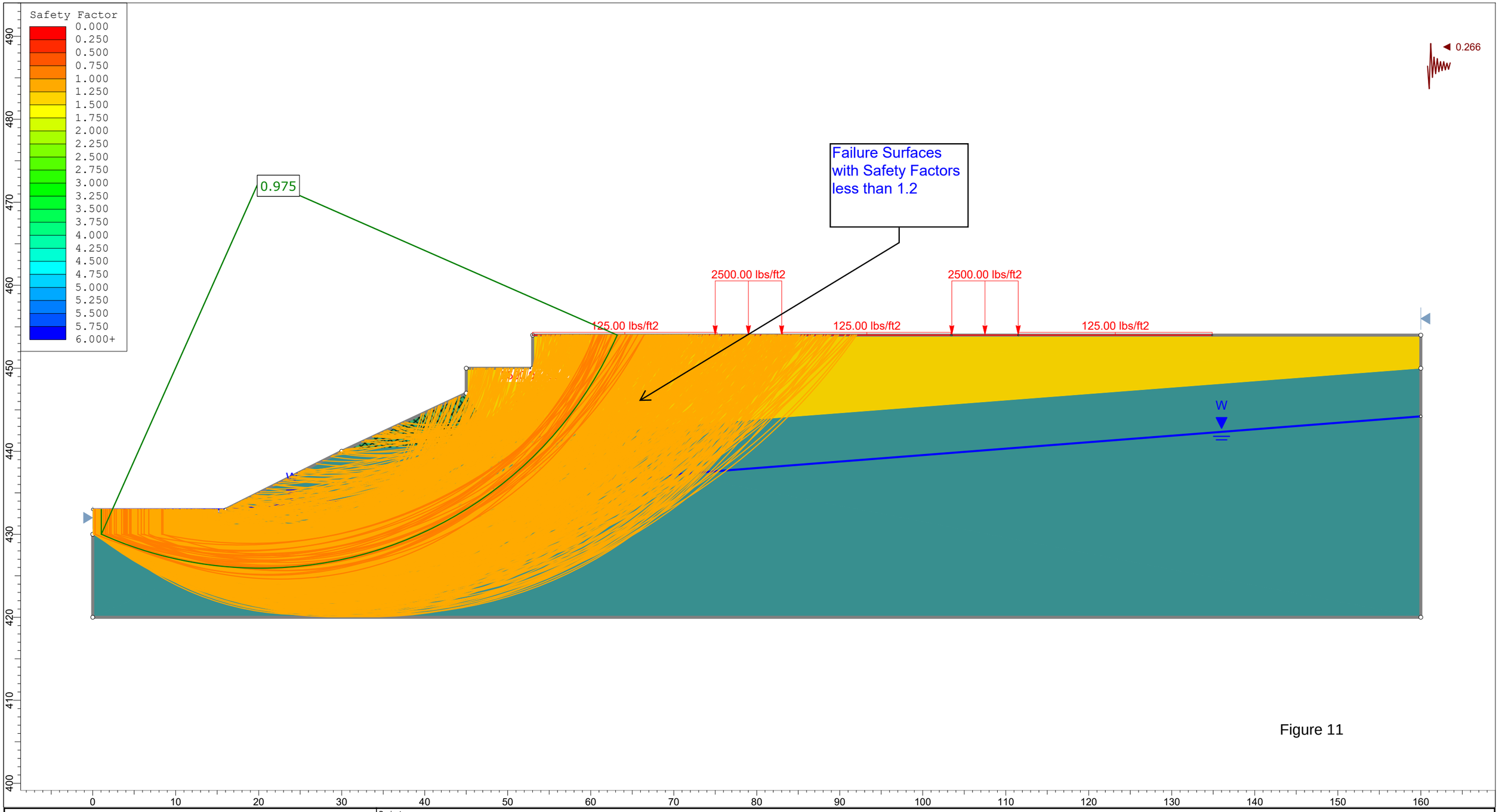

Figure 11

rocscience	*Project*	SLIDE - An Interactive Slope Stability Program	
	Group	Group 1	*Scenario* Master Scenario
	Drawn By		*Company* Terra Associates, Inc.
SLIDEINTERPRET 9.008	*Date*	5/16/2023, 9:57:40 AM	*File Name* Care Center Section A-A' Built Condition Seismic.slmd

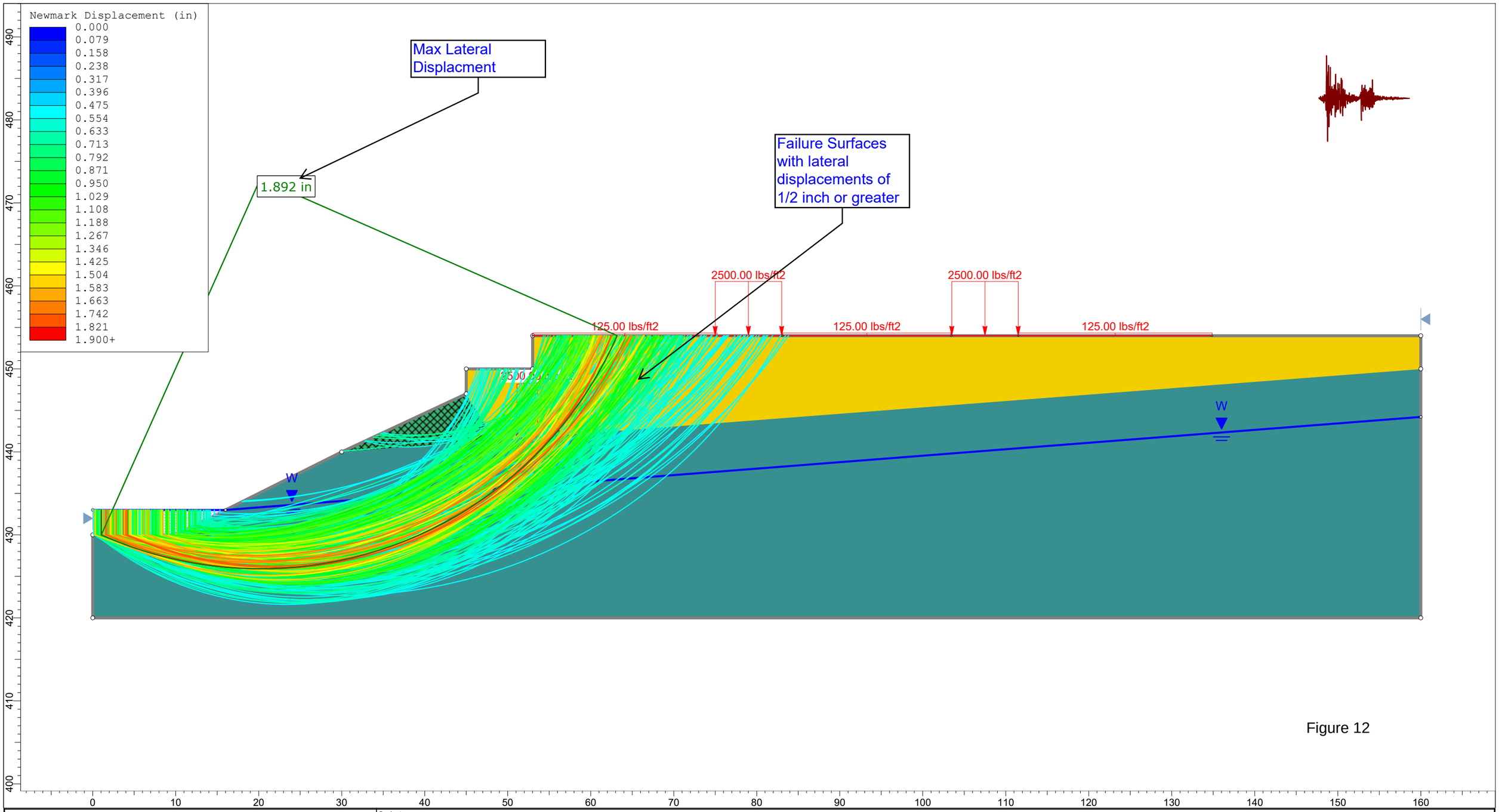

Figure 12

rocscience	*Project*	SLIDE - An Interactive Slope Stability Program	
	Group	Group 1	*Scenario* Master Scenario
	Drawn By		*Company* Terra Associates, Inc.
SLIDEINTERPRET 9.008	*Date*	5/16/2023, 9:57:40 AM	*File Name* Care Center Section A-A' Built Condition Newmark Seismic.slmd

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TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

December 29, 2022
Project No. T-5915-3

Mr. Stephen Nornes
Presbyterian Homes & Services and Senior Housing Partners
2823 Hamline Avenue N
Roseville, Minnesota 55113

Subject: Geotechnical Report Addendum
Wesley Homes Expansion
Puyallup, Washington

Reference: Geotechnical Report, Wesley Homes Puyallup, 39th Avenue SE, Puyallup, Washington, Project No. T-5915-3, prepared by Terra Associates, Inc., revised date November 14, 2016

Dear Mr. Nornes:

This geotechnical report addendum has been prepared in response to comments from the City of Puyallup Planning Division. The comments were outlined in a Development Review Team (DRT) letter dated November 23, 2022. Specifically, the city has requested our current referenced report be updated to address geologically hazardous areas focusing on the steep sloped area west of the planned 36 bed care center building and infiltration feasibility for hardscape permeable pavements.

Project Description

The project consists of completing the development by constructing two previously planned buildings that were not constructed when the first phase was constructed. One building (Brownstone) is located in the southeast corner of the site with the second building (Care Center) located west and adjacent the existing Lodge building. Based on review of preliminary grading plans prepared by Barghausen Consulting Engineers, stamp dated June 21, 2022, the Care Center building will have its main floor level constructed at elevation 458 feet with the southeast Brownstone building floor constructed at elevation 475 feet. Review of Architectural drawings prepared by In Site Architects, indicates the Care Center will have a lower level constructed at floor elevations of 454 feet in the northern half of the building rising up to elevation 457 feet in the southern half of the building. The northern lower floor portion of the building will feature a fitness area that will include an indoor pool. The southern portion of the building will serve are below grade parking matching the parking grade of the adjacent Lodge building.

Geologically Hazardous Areas

Erosion Hazard

Title 21.06.1210 of the Puyallup Municipal Code (PMC) defines erosion hazardous areas as follows:

- Erosion hazard area are those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) or identified by a special study as having a "moderate to severe,""severe," or "very severe" erosion potential.

The NRCS maps the soils on the site as Neilton gravelly loamy sand, 8 to 25 percent slopes. This soil category has a severe erosion potential ranking. Therefore, the site is an erosion hazard area as defined by the PMC. In our opinion, the erosion hazard can be adequately mitigated by implementing appropriate erosion control best management practices (BMP's) during and following construction. These practices would include temporary and permanent drainage control elements and cover measures that would prevent erosion from occurring.

Landslide Hazard

The PMC defines landslide hazard areas as follows:

a. Landslide hazard areas include areas subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include any areas susceptible to landslide because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors, and include, at a minimum, the following:

   i. Areas of historic failures, such as:

      1. Those areas delineated by the United States Department of Agriculture Natural Resources Conservation Service as having a significant limitation for building site development;

      2. Those coastal areas mapped as class u (unstable), uos (unstable old slides), and urs (unstable recent slides) in the Department of Ecology Washington coastal atlas; or

      3. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the United States Geological Survey or Washington Department of Natural Resources.

   ii. Areas with all three of the following characteristics.

      1. Slopes steeper than 15 percent;

      2. Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

      3. Springs or groundwater seepage.

iii. Areas that have shown movement during the holocene epoch (from 10,000 years ago to the present) or which are underlain or covered by mass wastage debris of this epoch;

iv. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;

v. Slopes having gradients steeper than eighty percent subject to rockfall during seismic shaking;

vi. Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action, including stream channel migration zones;

vii. Areas that show evidence of, or are at risk from snow avalanches;

viii. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and

ix. Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of bedrock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least 10 feet of vertical relief.

The east flank of the drainage swale immediately west and adjacent to the Care Center building is a 50 percent slope with vertical relief in excess of 20 feet. Therefore, it is a landslide hazard area as defined by the PMC. This is a manmade drainage constructed to convey runoff flows from a wetland complex south of 37th Avenue SE along the east side of the Lowes retail development north to Bradley Lake.

Recent reconnaissance of the slope area found no evidence of slope instability or erosion. The slope is well vegetated with a thick grass cover along with scattered young deciduous and coniferous trees and some brush. Tree growth is generally straight with no significant signs of leaning or pistol butted trunks.

The west side of the Care Center building is located on the slope. The proposed lower floor grade of the building will require placement of four to five fee of fill material to establish the floor subgrade along the western building margin with excavations of five to ten feet required in the central and eastern portions of the building. Provided site grading and building support is completed in accordance with recommendations outlined in the referenced geotechnical report, construction of the Care Center building at the planned location would have no adverse impact on the slope. These recommendations include excavation and removal of unsuitable fill material from below the central and northern portions of the building and replacing these soils with compacted structural fill. Alternatively supporting the building in this unsuitable fill area on foundation piles or on ground improved using rammed aggregate piers can also be considered.

Seismic Hazard

The PMC defines seismic hazard areas as follows:

- Seismic Hazard Areas. Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement or subsidence, soil liquefaction, or tsunamis.

Settlement and soil liquefaction conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow ground water table.

Seismic considerations as discussed in the referenced report continue to remain valid for the project. The exception to this is the seismic design parameters. The parameters in the referenced report are based on the 2015 International Building Code (IBC). Per the current 2018 IBC, for site class C, the following parameters should be used in calculating seismic forces:

Seismic Design Parameters (IBC 2018)

Spectral response acceleration (Short Period), S_{Ms}	1.509
Spectral response acceleration (1 – Second Period), S_{M1}	0.651
Five percent damped .2 second period, S_{Ds}	1.006
Five percent damped 1.0 second period, S_{D1}	0.434

These values were determined using latitude/longitude coordinates 47.156423/-122.283429 and the Structural Engineers Association of California (SEAOC) ground motion parameter calculator accessed on December 27, 2022 at the web site https://www.seismicmaps.org.

Infiltration Feasibility

Our discussion regarding infiltration feasibility as outlined in the referenced report continues to remain valid for the project. Based on conditions observed during phase I construction, it is also our opinion that site conditions are not suitable for using permeable pavements. During phase I construction shallow seepage conditions developed along the east side of the Lodge building and west and adjacent the soldier pile wall construction on the east property line. Persistent shallow seepage affected the subgrade and resulted in seepage into the lower garage level of the Lodge building. Shallow subsurface drains had to be installed to mitigate the seepage impacts. Even if field testing were to indicate infiltration rates of .3 inches per hour or greater were present at the pavement subgrade elevations, because of likely restrictions to flow at shallow depths, which could possibly redirect infiltrated water towards the building or the west drainage slope, use of permeable pavements is not recommended.

We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Theodore J Schepper 12-29-22

Theodore J. Schepper, P.E.
Senior Principal Engineer

Cc: Ms. Jill Krance, In Site Architects
Mr. Dan Balmelli, P.E., Barghausen Consulting Engineers

SECTION 00 72 00
GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

2.01 AIA DOCUMENT A201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, 2007 EDITION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR AND INCLUDED BY REFERENCE.

2.02

RELATED REQUIREMENTS

3.01 SECTION 00 73 00 - SUPPLEMENTARY CONDITIONS (1997).

3.02 AIA DOCUMENT A201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, 1987 EDITION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR.

END OF SECTION

SECTION 00 73 00

SUPPLEMENTARY CONDITIONS (1997)

PART 1 GENERAL

1.01 SUMMARY

1.02 THESE SUPPLEMENTARY CONDITIONS AMEND AND SUPPLEMENT THE GENERAL CONDITIONS DEFINED IN DOCUMENT 00 72 00 - GENERAL CONDITIONS AND OTHER PROVISIONS OF CONTRACT DOCUMENTS AS INDICATED BELOW. PROVISIONS THAT ARE NOT SO AMENDED OR SUPPLEMENTED REMAIN IN FULL FORCE AND EFFECT.

1.03 THE TERMS USED IN THESE SUPPLEMENTARY CONDITIONS THAT ARE DEFINED IN THE GENERAL CONDITIONS HAVE THE MEANINGS ASSIGNED TO THEM IN THE GENERAL CONDITIONS.

1.04 MODIFICATIONS TO GENERAL CONDITIONS

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

MODIFICATIONS TO AIA A201

4.01 ARTICLE 1 - GENERAL PROVISIONS

A. Add the following to the end of subparagraph 1.1.1: The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.

B. Add to subparagraph 1.2.1: If there is an inconsistency in the quality or quantity of Work required by The Contract Documents, the better quality or greater quantity of Work shall be provided unless otherwise indicated by the Architect's interpretation. No change in the Contract Sum shall be allowed.

C. Add a new subparagraph 1.6.2 to paragraph 1.6: Contractor's Use of Instruments of Service in Electronic Form

D. Add a new clause 1.6.2.1 to subparagraph 1.6.2: The Architect may, with the concurrence of the Owner, furnish to he Contractor versions of Instruments of Service in electronic form. The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.

E. Add a new clause 1.6.2.2 to subparagraph 1.6.2: The Contractor shall not transfer or reuse Instruments of Service in electronic or machine readable form without the prior written consent of the Architect.

F. Add the following paragraph 1.7 to Article 1: Representatives of the Owner, Contractor, and Architect shall meet periodically at mutually agreed-upon intervals for the purpose of establishing procedures to facilitate cooperation, communication and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist.

4.02 ARTICLE 2 - OWNER

A. Delete the content of subparagraph 2.2.5 in its entirety; substitute the following: The Contractor shall be furnished with one reproducible copy of The Drawings and one reproducible copy of The Project Manual(s) free of charge from which to make as many copies as are required for the Contractor's use.

4.03 ARTICLE 3 - CONTRACTOR

A. Add to subparagraph 3.2.1: No change in the contract sum will be allowed on account of minor differences between noted and actual dimensions.

B. Add a new subparagraph 3.2.4 to Paragraph 3.2: The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for the Architect to evaluate and respond to the

Contractor's requests for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

C. Add to subparagraph 3.4.1: No change in the contract sum will be allowed for work performed outside of regular working hours either as required by The Contract Documents or elected by the Contractor.

D. Add a new subparagraph 3.4.4 to paragraph 3.4: The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect to evaluate Contractor's proposed substitutions and to make agreed-upon changes in the Drawings and Specifications made necessary by the Owner's acceptance of such substitutions.

E. Add the following to subparagraph 3.7.1: The Contractor shall secure and pay for the Building Permit and other required permits. The Contractor shall make arrangements for required inspections. The Contractor shall obtain the Certificate of Occupancy for the project. The Contractor shall pay plan review fees and inspection fees. The Contractor shall arrange for installation of sewer, electrical, gas, water and other utilities required, except as otherwise indicated. The Owner shall pay sewer and water access charges (SAC and WAC) and park dedication fees, if any.

F. Delete the semicolon at the end of clause 3.8.2.2 and add the following: , except that if installation is included as part of an allowance in Divisions 1 - 16 of the Specifications, the installation and labor cost for greater or lesser quantities of Work shall be determined in accordance with Subparagraph 7.3.6.

G. Add the following Clause 3.10.1.1 to Subparagraph 3.10.1: The Owner may authorize construction activities to commence prior to completion of the Drawings and Specifications. If the Drawings and Specifications require further development at the time the initial construction schedule is prepared, the Contractor shall 1) allow time in the schedule for further development of the Drawings and Specifications by the Architect, including time for review by the Owner and Contractor and for the Contractor's coordination of Subcontractors' Work, and 2) furnish to the Owner in a timely manner information regarding anticipated market conditions and construction cost; availability of labor, materials and equipment; and proposed methods, sequences and time schedules for construction of the Work.

4.04 ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

A. Add a new clause 4.2.2.1 to subparagraph 4.2.1: The Contractor shall reimburse the Owner for compensation paid to the Architect for additional site visits made necessary by the fault, neglect or request of the Contractor.

B. Add the following to subparagraph 4.3.7.2: Data substantiating abnormal weather conditions shall include, at a minimum, local US Weather Bureau climatological reports for the period involved plus a report indicating the average precipitation and temperature for the past 10 years from the nearest US Weather Bureau reporting station.

4.05 ARTICLE 5 - SUBCONTRACTORS

A. Add a new subparagraph 5.2.5: Acceptance of any supplier or subcontractor shall not mean nor imply acceptance of any material or product not specified in The Contract Documents.

4.06 ARTICLE 7 - CHANGES IN THE WORK

A. Add a new subparagraph 7.1.4: Costs related to a change shall be direct costs. All indirect costs shall be included in the Contractor's overhead and profit. No allowance for overhead and profit shall be allowed if the change results in a net decrease in the Contract Sum The combined overhead and profit included in the total cost to the Owner of a change in the Work shall be based on the following schedule:
   1. Per the Owner Contractor Agreement
   2. In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a complete itemization of costs including labor, materials and

Subcontracts. Labor and materials shall be organized itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

4.07 ARTICLE 9 - PAYMENTS AND COMPLETION

A. Add a new clause 9.3.1.3 to subparagraph 9.3.1: Until Substantial Completion, the Owner shall pay 95 percent of the amount due the Contractor on account of progress payments.

B. Delete the second sentence of subparagraph 9.8.5 and substitute the following: Upon such acceptance and consent of surety, if any, the Owner shall make payment sufficient to increase the total payments to 98 percent of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims.

4.08 ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

A. Add a new clause 10.2.4.1 to subparagraph 10.2.4: When the use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the Owner reasonable advance notice.

4.09 ARTICLE 11 - INSURANCE AND BONDS

A. Add the following clauses 11.1.2.1 through 11.1.2.4 to subparagraph 11.1.2:

B. 11.1.2.1 The limits for Workers Compensation and Employers' Liability insurance shall meet statutory limits mandated by State and Federal Laws. If (1) limits in excess of those required by statute are to be provided or (2) the employer is not statutorily bound to obtain such insurance coverage or (3) additional coverages are required, additional coverages and limits for such insurance shall be as follows:
   1. $300,000 each accident/disease.
   2. $500,000 aggregate.

C. 11.1.2.2 The limits for Commercial General Liability insurance including coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations, Contractual Liability, Personal Injury and Broad Form Property Damage (including coverage for Explosion, Collapse and Underground hazards) shall be as follows:
   1. $1,000,000 Each Occurrence.
   2. $2,000,000 General Aggregate.
   3. $500,000 Personal and Advertising Injury
   4. $1,000,000 Products-Completed Operations Aggregate
      a. The policy shall be endorsed to have the General Aggregate apply to this Project only.
      b. The Contractual Liability Insurance shall include coverage sufficient to meet the obligations in AIA Document A201-1997 under Paragraph 3.18.
      c. Products and Completed Operations insurance shall be maintained for a minimum period of at least 1 year after either 90 days following Substantial Completion or final payment, whichever is earlier.

D. 11.1.2.3 Automobile Liability Insurance (owned, non-owned and hired vehicles) for bodily injury and property damage shall be as follows:
   1. $500,000 Each Accident

E. 11.1.2.4 Umbrella or Excess Liability coverage shall be as follows:
   1. $2,000,000 Over Primary Insurance

F. Add a new clause 11.1.3.1 to subparagraph 11.1.3: The Contractor shall furnish one copy each of Certificates of Insurance for each copy of the Agreement which shall specifically set forth evidence of all coverages required. The form of Certificate shall be ACORD 25-S, Certificate of Insurance and AIA Document G715, Supplemental Attachment for ACORD 25-S Certificate of Insurance.

G. Revise subparagraph 11.2.1 to read: The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract.

H. Modify the first sentence of 11.4.1 as follows: Delete "Unless otherwise provided, the Owner" and substitute "The Contractor".

I. Add the following to clause 11.4.1.1: The form of policy for this coverage shall be Completed Value and shall specifically name as insureds the Owner and the lenders. If the Owner is damaged by the failure of the Contractor to maintain such insurance, the Contractor shall bear all reasonable costs properly attributable thereto.

J. Delete clause 11.4.1.2.

K. Delete clause 11.4.1.3.

L. Delete clause 11.4.1.4.

M. Modify clause 11.4.1.5 to require the Builder's Risk coverage to allow for partial occupancy before completion of the project.

N. Modify subparagraph 11.4.2 by substituting "Contractor" for "Owner" in the first line.

O. Delete subparagraph 11.4.4.

P. Delete subparagraph 11.4.6 and substitute the following:
   1. 11.4.6 Before any exposure to loss may occur, the Contractor shall file with the Owner two certified copies of the policy or policies providing this Property Insurance coverage, each containing those endorsements specifically, related to the Project. Each policy shall contain a provision that the policy will not be cancelled nor allowed to expire until at least 30 days' prior written notice has been given to the Contractor.

Q. Modify subparagraph 11.4.7 by substituting "Contractor" for "Owner" at the end of the first sentence.

R. Modify subparagraph 11.4.8 by substituting "Contractor" for "Owner" as fiduciary; except that at the first reference to "Owner" in the first sentence, the word "this" shall be substituted for "Owner's".

S. Modify subparagraph 11.4.9 by substituting "Contractor" for "Owner" each time the latter word appears except in the last sentence.

T. Add a new paragraph 11.6 ADDITIONAL INSURANCE to Article 11.

U. Add a new subparagraph 11.6.1 to 11.6: The insurance requirements set forth in this Document are minimum requirements only. Any additional coverage that may be necessary to further protect the Contractor is the sole responsibility of the Contractor.

END OF SECTION

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Wesley Bradley Park Ph2 - Care Center_Rev

B. Owner's Name: Owner Wesley Homes.

C. Owner's Rep: SHP

D. General Contractor's Name:

E. Architect's Name: InSite Architects.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

1.03 WORK BY OWNER

A. Items NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion. Work to be supplied by Owner includes commercial kitchen equipment and low voltage systems (TV, data, nurse call). Contractor to coordinate installation of systems and provide rough-ins and final connections for kitchen equipment.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: As allowed by the City of Puyallup.

B. Arrange use of site and premises to allow:
   1. Work by Others.
   2. Work by Owner and its contractors.

C. Provide access to and from site as required by law and by Owner:

1.05 SMOKING

A. Do not permit smoking in the building.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

B. Forms filled out by hand will not be accepted.

C. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.

D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.

F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

G. Revise schedule to list approved Change Orders, with each Application For Payment.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Present required information in typewritten form.

E. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

I. Submit ____ an electronic copy of each Application for Payment.

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.

B. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.

C. The Architect/Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.

D. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

E. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within ____ days.

F. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 60 00.

G. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
   1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
   2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
   3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
   4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

H. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
   3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

I. Execution of Change Orders: Contractor shall prepare and issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

J. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

K. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

L. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 70 00.
   2. Remove temporary protection devices and facilities.
   3. Submit final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
   4. Submit a copy of the Architect's final Punch-List of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
   5. Submit Consent of Surety Company to Final Payment. (AIA Document G707)
   6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   7. Submit final meter reading for utilities and similar data either as of the date of substantial completion or the date when the Owner took possession of and responsibility for corresponding elements of the Work.
   8. Submit assurance, satisfactory to Owner, that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.
   9. Submit proof, satisfactory to Owner, that taxes, fees and similar obligations of Contractor have been paid. (AIA Documents G706 and 706A)
   10. Change over door locks and other Contractor's access provisions to Owner's property.
   11. Submit lien waivers from Contractor, subcontractors and material suppliers in the full amount of the Contract.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.
B. Site mobilization meeting.
C. Progress meetings.
D. Construction progress schedule.
E. Submittals for review, information, and project closeout.
F. Number of copies of submittals.
G. Submittal procedures.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SITE MOBILIZATION MEETING

A. Architect will schedule meeting at the Project site prior to Contractor occupancy.
B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Major Consultants.
   5. Contractor's superintendent.
   6. Major subcontractors.
C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements.
   3. Survey and building layout.
   4. Security and housekeeping procedures.
   5. Schedules.
   6. Application for payment procedures.
   7. Procedures for testing.
   8. Procedures for maintaining record documents.
   9. Requirements for start-up of equipment.
   10. Inspection and acceptance of equipment put into service during construction period.
D. Record minutes and distribute copies within five days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
C. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.

4. Contractor's superintendent.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of RFIs log and status of responses.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to work.

E. Record minutes and distribute copies within five days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that mechanical and electrical contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.04 SUBMITTALS FOR REVIEW

A. Within 10 days after date of the Agreement, submit a Schedule (Matrix) of Required Submittals.

B. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection. Physical color selection cards from manufacturer's shall be sent to Architect. Electronic copies are NOT acceptable.
4. Samples for verification.

C. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

D. Samples will be reviewed for aesthetic, color, or finish selection.

E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.05 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
   2. Do not reproduce Contract Documents to create shop drawings.
   3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Transmit each submittal with approved form.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

G. Deliver submittals to Architect at business address.

H. For Structural, Mechanical and Electrical Submittals, Deliver one copy to architect and remaining copies of submittals to appropriate engineer at business address. Architect shall review mechanical and electrical items for coordination only.

I. Schedule submittals to expedite the Project, and coordinate submission of related items.

J. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

K. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

L. Provide space for Contractor and Architect review stamps.

M. When revised for resubmission, identify all changes made since previous submission.

N. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

O. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Submittals.

C. Mock-ups.

D. Control of installation.

E. Tolerances.

F. Testing and inspection agencies and services.
   1. Sound control testing, if included below.
   2. Code required air barrier testing.

G. Control of installation.

H. Mock-ups.

I. Tolerances.

J. Manufacturers' field services.

K. Defect Assessment.

1.02 REFERENCE STANDARDS

A. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.

B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.

C. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.

E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

D. Test Reports: After each test/inspection, promptly submit copies of report to Architect, Structural Engineer, and to Contractor. Additionally, submit copies to Building Officials if directed.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.

i. Results of test/inspection.
j. Compliance with Contract Documents.
k. When requested by Architect, provide interpretation of results.

E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.04 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ services of an independent testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.

B. Special Inspections:
1. The Owner shall engage an independent testing agency to perform specified testing.
2. The Owner is the party responsible for paying for Special Inspections as defined by the applicable Building Code.

C. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing and inspection, including concrete and soil compaction testing

D. Clarify that Soils and fill inspections will be Special Inspections.

E. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

F. Contractor Employed Agency:
1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1077, ASTM C1093, and ASTM D 3740.
2. Laboratory: Authorized to operate in State in which Project is located.
3. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
4. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship. Architect to provide mock up drawings or areas on the building to be mocked up.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required in addition to the testing specified below:

B. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.

2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
   a. To provide access to Work to be tested/inspected.
   b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
   c. To facilitate tests/inspections.
   d. To provide storage and curing of test samples.
4. Notify Architect and laboratory 48 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

G. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment, and _____ as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telecommunications services.

B. Temporary telephone service.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Project identification sign.

I. Field offices.

J. Temporary Fire Protection.

1.02 TEMPORARY UTILITIES - SEE SECTION 01 51 00

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. New permanent facilities may be used.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
   2. Telephone Land Lines: One line, minimum; one handset per line.
   3. Internet Connections: Minimum of one; DSL modem or faster.
   4. Email: Account/address reserved for project use.

C. Provide, maintain and pay for facsimile service to field office at time of project mobilization.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. New permanent facilities located at _____ may be used during construction operations.

C. Maintain daily in clean and sanitary condition.

D. At end of construction, return facilities to same or better condition as originally found.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Coordinate roadway closings with the Local Government Entity.

D. Provide protection for plants designated to remain. Replace damaged plants.

E. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.09 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

E. Designate three parking spaces for Owner and Architect use.

1.10 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
   1. RECYCLED CONTENT: 50% of all wasted disposed of to be recycled.
      a. Provide schedule of materials to be recycled meeting the 50% requirement.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
   1. Dispose of waste beyond visual view of project site, including from any floor of the new building .

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction described below:
   1. One painted sign, 32 sq ft area, bottom 4 feet above ground.
   2. Content:
      a. Project title, logo and name of Owner as indicated on Contract Documents.
      b. Names and titles of Architect and Consultants.
      c. Name of Prime Contractor and major Subcontractors.
   3. Graphic Design, Colors, Style of Lettering: Designated by Architect.

B. Erect on site at location established by Architect.

C. No other signs are allowed without Owner permission except those required by law.

1.12 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 10 - 12 persons.

C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.13 TEMPORARY FIRE PROTECTION

A. Develop and supervise an overall fire prevention and fire protection program for personnel at the project site. Review needs with the local fire department officials and establish procedures to be followed.

B. Instruct personnel in methods and procedures to be followed.

C. Comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". Locate fire extinguishers where they are most convenient and effective for their intended purpose.

D. Store combustible materials in containers in recognized fire-safe locations. Post warnings and information and enforce strict discipline. Maintain unobstructed access to fire extinguishers, fire hydrants and other hazardous fire exposure areas.

E. Prohibit smoking in hazardous fire exposure areas. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of ignition for possible fires.

1.14 SNOW REMOVAL

A. Remove snow, if any, from drives, construction parking areas, material storage areas, and work areas.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 COORDINATION

A. Contractor to coordinate with onsite Wesley Homes staff to maintain access to and operation of existing building.

END OF SECTION

SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.02 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.03 TEMPORARY ELECTRICITY

A. Cost: By Contractor.

B. Provide power service required from utility source.

C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required. Each subcontractor shall provide their own extension cords.

D. Provide main service disconnect and over-current protection at convenient location and meter.

E. Permanent convenience receptacles may be utilized during construction.

F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
   1. Provide 20 ampere duplex outlets, single phase circuits for power tools; space so that all parts of the building and the exterior side of exterior walls can be reached with a 100 foot maximum length extension cord.
   2. Provide 20 ampere, single phase branch circuits for lighting.

1.04 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lighting and provide routine repairs.

D. Permanent building lighting may be utilized during construction.

1.05 TEMPORARY HEATING

A. Cost of Energy: By Contractor.

B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.

C. Provide temporary heating units that have been tested and labeled by UL, FM, or other recognized trade association related to the fuel being consumed.

D. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

E. Owner's new heat plant may be used.

F. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

G. Use of the permanent heating equipment for construction purposes shall not alter nor shorten the Owner's warranty in any way.

1.06 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Do not utilize permanent nor existing ventilation equipment. Provide temporary fan units to maintain clean air for construction operations.

1.07 TEMPORARY WATER SERVICE

A. Cost of Water Used: By Contractor.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 58 13
TEMPORARY PROJECT SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project identification sign.

B. Project informational signs.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawing: Show content, layout, lettering, color.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: New, wood, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install sign surface plumb and level, with butt joints. Anchor securely.

3.02 MAINTENANCE

A. Maintain signs and supports clean, repair deterioration and damage.

3.03 REMOVAL

A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations.

E. Procedures for Owner-supplied products.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Where other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 61 16.
   2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
   3. Are extracted, harvested, and/or manufactured closer to the location of the project.
   4. Have longer documented life span under normal use.
   5. Result in less construction waste. See Section 01 74 19

C. Motors: Refer to Division 15 and 16, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.

D. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

E. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision that No Substitutions Nor Equivalents Are Acceptable: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with or without a Stated Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.03 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

B. MAKE NO CONTACT WITH THE OWNER REGARDING PRODUCTS, SUBSTITUTIONS, NOR BIDDING.

C. Architect will consider requests for substitutions only within 15 days after date of Agreement.

D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

E. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

G. Substitution Submittal Procedure:
   1. Submit one copy of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 OWNER-SUPPLIED PRODUCTS

A. See Section 01 10 00 - Summary for identification of Owner-supplied products.

B. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

J. Prevent contact with material that may cause corrosion, discoloration, or staining.

K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

I. General requirements for maintenance service.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

1.03 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in Washington and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Washington. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

1.04 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   2. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.05 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of examination, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and site structures.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

C. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.

J. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

K. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

L. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from completed landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Verify that wiring and support components for equipment are complete and tested.

E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

F. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Division 15 and Section 01400.

3.12 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, wash resilient flooring and finish in accordance with manufacturer's recommendations, leave concrete floors broom clean, vacuum carpeted and soft surfaces.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Replace filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and _____.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

J. Replace burnt out lamps and bulbs.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Operation and maintenance data.

B. Warranties and bonds.

1.02 SUBMITTALS

A. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

B. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.02 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.03 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Provide control diagrams by controls manufacturer as installed.

J. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

K. Include test and balancing reports.

L. Additional Requirements: As specified in individual product specification sections.

3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

L. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.
      d. Photocopies of warranties and bonds.

3.05 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 02 41 01
SITE PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

C. Abandonment and removal of existing utilities and utility structures.

1.02 PROJECT CONDITIONS

A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

B. Comply with other requirements specified in Section 01 70 00.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 23 23 - Fill and Backfill

PART 3 EXECUTION

3.01 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.02 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.

B. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.

C. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

D. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   2. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.

E. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

3.03 EXISTING BUILT ELEMENTS

A. Scope:
   1. Remove paving and curbs as required to accomplish new work.
   2. Remove other items indicated, for removal, salvage, relocation, and recycling.
   3. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   3. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   4. Do not close or obstruct roadways or sidewalks without permit.
   5. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

C. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

D. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.04 DEBRIS

A. Remove debris, junk, and trash from site.

3.05 WASTE REMOVAL

A. Remove from site all materials not to be reused on site; do not burn or bury.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 2 PRODUCTS

1.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

END OF SECTION

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:
   1. Section 033816 “Unbonded Post-Tensioned Concrete.”

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete Subcontractor.
      e. Special concrete finish Subcontractor.
   2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   1. Location of construction joints is subject to approval of the Architect.

E. Samples: For waterstops and vapor retarder.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer, manufacturer, and testing agency.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.
   4. Steel reinforcement and accessories.
   5. Fiber reinforcement.
   6. Waterstops.
   7. Curing compounds.
   8. Floor and slab treatments.
   9. Bonding agents.
   10. Adhesives.
   11. Vapor retarders.
   12. Semirigid joint filler.
   13. Joint-filler strips.
   14. Repair materials.

D. Material Test Reports: For the following, from a qualified testing agency:
   1. Aggregates.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.
   1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

E. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
   1. Build panel approximately 200 sq. ft. for slab-on-grade and 100 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301.
   2. ACI 117.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
      b. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

C. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:
   1. Portland Cement: ASTM C 150/C 150M, Type I/II.
   2. Fly Ash: ASTM C 618, Class F or C.
   3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
   1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. Water: ASTM C 94/C 94M.

2.6 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BoMetals, Inc.
      b. Sika Corporation.
      c. Vinylex Waterstop & Accessories.
      d. CETCO, a Minerals Technologies company.

B. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BoMetals, Inc.

b. Sika Corporation.
c. Vinylex Waterstop & Accessories.
d. CETCO, a Minerals Technologies company.

C. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Carlisle Coatings & Waterproofing Inc.
b. CETCO, a Minerals Technologies company.
c. Concrete Sealants Inc.
d. Henry Company.
e. JP Specialties, Inc.
f. Sika Corporation.

D. Verify waterstop manufacturer application for suitability with waterproofing manufacturer / system. Waterstops shall meet waterproofing manufacturer's requirements for warranty.

2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745. Include manufacturer's recommended adhesive or pressure-sensitive tape.

B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 15 mils thick.
1. Manufacturers: Subject to compliance with requirements, provide one of the following:
a. Stego Wrap by Stefo Industries, LLC
b. Moistop by Henry Company
c. Viper II by ISI Building Products

C. Bituminous Vapor Retarder: 110-mil- thick, semiflexible, seven-ply sheet membrane consisting of reinforced core and carrier sheet with fortified asphalt layers, protective weathercoating, and removable plastic release liner. Furnish manufacturer's accessories, including bonding asphalt, pointing mastics, and self-adhering joint tape.
1. Water-Vapor Permeance: 0.0011 grains/h x sq. ft. x inches Hg; ASTM E 154.
2. Tensile Strength: 140 lbf/inch; ASTM E 154.
3. Puncture Resistance: 90 lbf; ASTM E 154.

2.8 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.9 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 according to ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.

E. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.10 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
   1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 25 percent.
   2. Combined Fly Ash and Pozzolan: 25 percent.
   3. Slag Cement: 50 percent.
   4. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
   5. Silica Fume: 10 percent.
   6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
   7. Combined Fly Ash or Pozzolans, Slag Cement, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

D. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Normal-weight concrete.
1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

B. Foundation Walls: Normal-weight concrete.
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.

C. Slabs-on-Grade: Normal-weight concrete.
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
3. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

D. Elevated Slabs (Excluding Post-Tensioned Slabs): Normal-weight concrete.
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
3. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

E. Building Walls: Normal-weight concrete.
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class C, 1/2 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete, unless indicated otherwise.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
   2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
   2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
   1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints 6 inches and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

3.6 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
   1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Locate joints for beams and slabs in the middle third of spans.
   4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOP INSTALLATION

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
   1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
   2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
   3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
   1. Apply scratch finish to surfaces indicated, to receive concrete floor toppings, and to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces indicated, to receive trowel finish, and to be covered with fluid-applied or sheet waterproofing, or built-up or membrane roofing.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply a trowel finish to surfaces indicated on architectural drawings
   2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on architectural drawings. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.12 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:
   1. Coordinate sizes and locations of concrete bases with actual equipment provided.
   2. Construct concrete bases 4 inches high unless otherwise indicated, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
   3. Minimum Compressive Strength: 3000 psi at 28 days.
   4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
   5. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   6. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least [**one**] [**six**] month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
   5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
   7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:
   1. Steel reinforcement placement.
   2. Steel reinforcement welding.
   3. Headed bolts and studs.
   4. Verification of use of required design mixture.
   5. Concrete placement, including conveying and depositing.
   6. Curing procedures and maintenance of curing temperature.
   7. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
   1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
   2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
      a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
   6. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   7. Compression Test Specimens: ASTM C 31/C 31M.
   8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
      a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
      b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
   9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
   10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
   11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

3.18 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

SECTION 03 37 13
SHOTCRETE

PART 2 PRODUCTS

END OF SECTION

SECTION 03 54 00
SELF-LEVELING UNDERLAYMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Liquid-applied self-leveling floor underlayment.

1.02 REFERENCE STANDARDS

A. ASTM F2170 - Standard Test Method for Determining RH in Concrete Floor Slab.

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on mixing instructions.

C. Acoustical Data: Submit sound tests according to the IBC code criteria ASTM E492 (IIC) and ASTM E90 (STC)
   1. Submit in writing that all sound tests or data provided has been tested according to UL (Underwriters Laboratory) fire resistance design number.

D. Test Results: Indicate results of cube testing specified in Article titled Field Quality Control.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience and authorized by the manufacturer.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire resistance and acoustical requirements.

1.06 FIELD CONDITIONS

A. Do not install underlayment until partitions, floor penetrations, and peripheral work are complete.

B. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and after installation of underlayment. Temperature to be maintained until Underlayment is tested dry with a Delmhorst Moisture Meter G79 or BD2100

C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Engineered Cementitious Underlayment:
   1. Acceptable Manufacturers:
      a. United States Gypsum Co. (USG); Product LEVELROCK Underlayment 2500 FR: www.usg.com/ig.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Cementitious Underlayment:
   1. Maxxon Corp.; Product [LEVEL-RIGHT]: www.maxxon.com.
   2. Other Acceptable Manufacturers:
      a. Hacker Industries, Inc.; Product TRUE-SCREED CLU: www.hackerindustries.com.
      b. United States Gypsum Co. (USG); Product LEVELROCK SLC 200: www.usg.com/ig.

2.02 MATERIALS

A. Engineered Cementitious Underlayment:

1. Compressive Strength: Minimum 2500 psi or 3500, depending on product location, tested per ASTM C472 Modified.
2. Density: Maximum 115 lb/cu ft.
3. Final Set Time: 1 to 2 hours, maximum.
4. Thickness: 3/4 inch to maximum 3-1/2 inch.
5. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.

B. Water: Potable and not detrimental to underlayment mix materials.

C. Subfloor Primer: Manufacturer's recommended type.

D. Sand Aggregate: Sand shall beet ASTM C33 as well as specifications outlined in manufacturer's applicator manual.

E. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

F. Underlayment Sealer: USG Durock Brand X2 primer sealer or as recommended by underlayment manufacturer.

G. Acoustical Mat: SRM-N25 Sound Mat or equivalent of other approved manufacturers that meet the UL fire resistance assembly; polyester core of entangled filaments bonded to a non-woven fabric.

2.03 MIXING

A. Site mix materials in accordance with manufacturer's instructions.

B. Mix to achieve following characteristics:
1. Density: 115 lb/cu ft minimum dry density.
2. Compressive Strength:
   a. 2,500 - 3,000 psi gypsum based mix in accordance with ASTM C472 Modified.
3. Fire Hazard Classification: Flame/Smoke rating of 0/0 in accordance with ASTM E84.

C. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.02 PREPARATION

A. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.

B. Vacuum clean surfaces.

C. Seal Wooden Subfloor: The day before the pour, seal the wood with 1-2 coats of Maxxon Surface Conditioner, Maxxon Acrylic, or Maxxon Overspray diluted 1:1 with water or staple slip sheet such as Maxxon Moistop across entire wood floor.

D. Prime substrate in accordance with manufacturer's instructions. Allow to dry. If a slip sheet is used, the subfloor does not have to be primed.

E. If specified for the project, install acoustical mat in accordance with manufacturer's instructions:
1. at dwelling unit floors to receive ceramic tile, non-cushion sheet vinyl, and wood finish flooring.

F. Close floor openings.

3.03 APPLICATION

A. Install underlayment in accordance with manufacturer's instructions.

B. Place to thickness indicated.

3.04 CURING

A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

B. Air cure in accordance with manufacturer's instructions.

3.05 UNDERLAYMENT SEALER

A. 24 to 48 hours prior to application of glued-down finish flooring, install one coat of underlayment sealer at rate recommended by underlayment manufacturer.

3.06 APPLICATION TOLERANCE

A. Top Surface: Level to 1/8 inch in 10 ft.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field inspection and testing, as specified in Section 01 40 00.

B. Placed Material: Agency will inspect and test for conformance to specification requirements.

C. Take at least one set of 3 molded cube samples of each mixture from each days pour during application. Test cubes in accordance with ASTM C472 Modified or ASTM C109 Modified, as appropriate to mix design.

3.08 PROTECTION

A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.

B. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 2 PRODUCTS

1.01 CONCRETE MASONRY UNITS

1.02 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
   1. Hydrated Lime: ASTM C207, Type S.
   2. Mortar Aggregate: ASTM C144.
   3. Grout Aggregate: ASTM C404.

B. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.

C. Water: Clean and potable.

1.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Heckmann Building Products, Inc: www.heckmannbuildingprods.com.
   3. Hohmann & Barnard, Inc: www.h-b.com.
   4. WIRE-BOND; _____www.wirebond.com/#sle.

B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.

C. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

D. Multiple Wythe Joint Reinforcement: Truss type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

E. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
   1. Vertical adjustment: Not less than 2 inches.
   2. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.

F. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/2 in width, 0.1875 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, hot dip galvanized to ASTM A 153/A 153M, Class B.

1.04 FLASHINGS

A. Forty (40) mil thickness pre-cleaned EPDM sheet; Firestone Building Products Co. FLASHGUARD, Carlisle SynTec Systems CCW-705-TWF, or approved equivalent.

B. Flashing Adhesive and Sealant: Type as recommended by flashing manufacturer.

1.05 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

C. Weep/Cavity Vents: Polypropylene honeycomb design.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

E. Foamed In Place Insulation: All non-grouted concrete masonry cores to be filled completely with foam insulation.

1.06 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Masonry below grade and in contact with earth: Type M.
   2. Exterior above grade masonry: Type S.
   3. Interior, loadbearing masonry: Type S.
   4. Interior, non-loadbearing masonry: Type N.

B. Use only portland cement/lime/sand mortar.

C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect 's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

D. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

E. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

2.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

2.03 COLD AND HOT WEATHER REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

2.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

2.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints, except lay first course above footings and slabs in full bed of mortar.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners, except for units laid in stack bond.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where sheet waterproofing is applied or wall tile is scheduled.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

2.06 PROTECTION OF WORK

A. Prevent grout mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect newly laid masonry from exposure to precipitation, excessive drying, freezing, soiling, backfill and other harmful elements.

B. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface. Protect sills, ledges and projections from droppings or mortar.

C. Keep air cavity spaces clear of mortar. Dry-brush masonry work at end of each day's work.

D. During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

E. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

2.07 WEEPS

A. Install weeps in veneer and cavity walls at 16 inches on center horizontally above through-wall flashing.

2.08 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Build inner wythe ahead of outer wythe to receive cavity insulation.

2.09 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Reinforce non-"toothed" joint corners and intersections with strap anchors 16 inches on center.

F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

G. Install masonry reinforcement, horizontal and vertical, as indicated on the drawings.

2.10 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
2. At corners and bends, turn flashing, fold, and seal watertight.
3. At discontinuous flashings, fold and turn up ends to form dams; seal watertight.
4. Remove or cover protrusions or sharp edges that could puncture flashings.
5. Lap end joints 3 inches minimum. Seal lapped ends and penetrations of flashing before covering with mortar.
6. Coordinate installation of flashing with weather barrier covering wall. Install flashing up-turned vertically on sheathing and behind weather barrier to shed moisture from weather barrier unto flashing and not behind flashing.
7. Provide two piece metal slip flashing at window and door sills to accomodate the differential movement between the bricks swelling and the wood framing shrinking. Provide increasing heights of flashing at higher elevations above brick support.

B. Extend flashings to within 1/4 inch of exterior face of masonry.

2.11 LINTELS

A. Install loose steel lintels over openings. Lintels to be primed for painting.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
1. See Structural Drawings for size and reinforcing.
2. Do not splice reinforcing bars.
3. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
4. Place and consolidate grout fill without displacing reinforcing.
5. Allow masonry lintels to attain specified strength before removing temporary supports.

C. Maintain minimum 8 inch bearing on each side of opening.

2.12 GROUTED COMPONENTS

A. Lap splices as noted on Structural Drawings.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

2.13 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Form control joints in concrete masonry units using specially shaped "slotted end" units and preformed joint device. Form control joints in brick with open joint, free of mortar, 3/8 inch wide, full depth of brick wythe.

C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

D. Size control joint in accordance with Section 07 90 05 for sealant performance.

E. Locate control joints:
1. At exterior masonry, at 26 feet oc in walls which exceed 24 feet in length and within 2'-8" of one side of each building "outside" corner and all inside corners.
2. Where interior masonry partitions meet exterior masonry walls; reinforce with cavity wall ties 24 inches oc vertically.
3. At other interior locations at maximum 30 feet oc in walls which exceed 30 feet in length.

F. When control joints are located in line with the jambs of door, glazed, or other openings, install lintels which bridge the control joints with Neoprene or Korolath bearing pads to permit movement.

1. Keep bearing free of mortar for installation of sealant specified in Section 07900.

2.14 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

2.15 TOLERANCES

A. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

2.16 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

2.17 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

D. Observe reinforcement placed for reinforced masonry construction.

2.18 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Do not use high pressure water spray for cleaning masonry.

E. Use non-metallic tools in cleaning operations.

2.19 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 26 17
MANUFACTURED MASONRY VENEER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured masonry to match Phase 1, including simulated stone veneer and trim at building exterior (including sill stones all wall openings - windows, louvers, etc.).

1.02 REFERENCES

A. ASTM C67 Test Methods of Sampling and Testing Brick and Structural Clay Tile.

B. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 1999.

C. ASTM C150 Specification for Portland Cement.

D. ASTM C177 Test Method for Thermal Conductivity by Means of the Guarded Hot Plate.

E. ASTM C207 Specification for Hydrated Lime for Masonry Purposes.

F. ASTM C270 Specification for Mortar for Unit Masonry.

G. ASTM C482 Test Method for Bond Strength of Ceramic Tile to Portland Cement.

H. ASTM C567 Test Method for Unit Weight of Structural Lightweight Concrete.

I. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1995.

J. UL 723: Test for Surface Burning Characteristics of Building Materials.

K. UBC Standard No. 32-12 for Water Absorption.

L. UBC Standard No. 14-1 Kraft Waterproof Building Paper

M. UBC Standard No. 26-10 Parts I and IV: Test Method for Compressive Strength of Cylindrical Concrete Specimens.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for manufactured masonry units.

C. Shop Drawings: Indicate layout, profiles, and product components, including anchorage, accessories, finish colors, patterns and textures.

D. Samples: Submit two manufactured masonry veneer samples, 12 x 12 inch in size, illustrating finishes, colors and textures.

E. Manufacturer's Instructions: Indicate installation recommendations and limitations.

F. Maintenance Data: Include methods for maintaining installed products, and precaution against cleaning materials and methods detrimental to finishes and performance.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

C. Material Approvals: Provide manufactured masonry veneer products with the following approvals:
   1. National Evaluation Service.
   2. Underwriters Laboratories, Inc., listed in UL Material Approval Guide.

1.05 MOCK-UP

A. Provide manufactured masonry veneer mock-up, 6 feet long by 4 feet high, illustrating field pattern of veneer, field cutting of units where required, and color and tooling of joints.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.06 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.
   1. Verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

C. Store mortar and other moisture-sensitive materials in protected enclosures; handle by methods which avoid exposure to moisture.

1.08 PROJECT CONDITIONS

A. Allow no construction activity on opposite side of wall during installation, and for 48 hrs after completion of work.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature at minimum 40 degrees F prior to, during, and for 48 hours after installation of manufactured masonry veneer.

B. Protect materials from rain and moisture prior to, during, and for 48 hours after completion of work.

1.10 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide 50 year manufacturer warranty for manufactured masonry veneer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. El Dorado; eldoradostone.com

2.02 MANUFACTURED ITEMS

A. Stone Units: El Dorado, Type: to be verified - Mountain Ledge Panels: Color: to be verifiied

B. Trim Units: _____ Use at all wall openings - windows, louvers, etc.
   1. Capstones: Color as selected from manufacturer's full range.
   2. Water Table/Sill: Color as selected from manufacturer's full range.
   3. Trim Stones: Color as selected from manufacturer's full range.
   4. Electrical Box Stone Veneer - receptacle and light fixture .

2.03 ACCESSORIES

A. Mortar:
   1. Portland Cement: ASTM C150, Type I
   2. Mortar Aggregate: ASTM C 144.
   3. Lime: ASTM C207.

B. Weather-Resistant Barrier: Kraft waterproof building paper, IBC Standard No. 15-1 or ASTM D226 for Type 1 felt or house wrap complying with ICC-ES AC38 - Tyvek Commercial Wrap.
   1. 2 layers; Layers of materials may be in any combination.

C. Metal Lath: Galvanized 2.5 lb flat diamond mesh.

D. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints; lightweight product formulation. .
   1. Acceptable Products: One of the following: .
      a. Custom Building Products, Wonderboard Lite.
      b. USG, Durock.
      c. National Gypsum, PermaBase series.
   2. Thickness: 1/2 inch.

2.04 MORTAR MIXES

A. Mix proprietary materials in accordance with manufacturer's instructions, including product data and product technical bulletins.

B. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C 270, Type N.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

2.05 SOURCE QUALITY CONTROL AND TESTS

A. Obtain manufactured masonry veneer materials form a single manufacturer.

B. Shipping Weight of Manufactured Units: 8 - 12 lb/sq ft.

C. Compressive Strength: Test in accordance with UBC Standard No. 26-10, Parts I and IV.

D. Shear (Adhesion) Strength: Test in accordance with ASTM C482 using a unit thickness approximately the same as the stone unit.

E. Thermal Resistance: K factor 2.82 in accordance with ASTM C177; R factor 0.355 per 1" of thickness.

F. Freeze/Thaw: Test in accordance with ASTM C67.

G. Fire Hazard Test on 1-7/8" Thick Sample: Flamespread of 0, smoke development of 0 in accordance with UL 723.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate conditions, that have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.02 PREPARATION

A. Sheathed Surfaces: Install two layers of weather-resistant barrier with lap joints 4" shingle fashion. Inner layer over sheathing as the drainage plane; outer layer is intended as a slip sheet to keep the scratch coat from contacting the inner layer. Apply specified metal lath, attach with galvanized nails or staples which penetrate a minimum of 1". Apply 6" on center vertically and 16" on centers horizontally.
   1. Wrap weather resistant barrier and metal lath a minimum of 16" around all outside and inside corners.
   2. Cement Board option: Cement board may be used in place of lath and scratch coat and outer layer of WRB, if desired.
      a. When using cement board, only modified mortars complying with ANSI A118.4 or ANSI A118.15 should be used as the setting bed mortar. Do not use conventional mortars (Type S or N) with cement board installations. Refer to ASTM C1780 and manufacturer recommendations for additional details on cement board installations.

B. Concrete and Masonry Surfaces, New, Clean and Untreated: No preparation needed.
   1. Examine newly poured concrete closely to ensure that its finished surface contains no releasing agents (form oil). If it does contain form oil, etch surface with muriatic acid, rinse thoroughly and/or score with a wire brush, or use high pressure water or sandblasting to remove.

C. Blending:

1. Spread out manufactured masonry veneer products at the job site so there is a good variety of sizes, shapes, and colors from which to choose.
2. Plan some variety and contrast in the overall design. Use small stones next to large ones, heavy-textured pieces next to smooth, and thick stones next to thinner ones.
3. Mix manufactured masonry veneer products from different boxes during application to allow a desirable balance of individual stones on the finished project.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. If stone is being applied in hot or dry weather, moisten the back of each piece with a fine spray of water or a wet brush to adequately prevent excessive absorption of moisture from the mortar.
   1. If being installed over concrete, masonry or scratch coat substrate, also dampen the substrate surface area before applying mortar.
   2. Protect applications from freezing.

C. Apply mortar and stone working from the top down, except for Ledgestone types which, if used, shall be installed from the bottom up.

D. Mortar: Apply 1/2" to 3/4" of mortar to lath, covering a maximum of 10 sq ft at one time.

E. Setting Units: Press each stone into the mortar setting bed firmly enough to squeeze some mortar out around the stone's edges. Apply pressure to the stone to ensure a good bond. Ensure complete coverage between the mortar bed and back surface of the stone.
   1. Mortar may also be applied to the entire back of the stone.

F. Joints: Place units with uniform mortar joints. Stone joints should not be over 1/2" to 3/4" in width. When installing "pre-fitted" stone textures, units should be fitted tight against each other with no allowance for mortar joints.

G. Provide 'soft' control joints at every floor level. Lap wire lath to allow movement and caulk joint between stone; following stone pattern - DO NOT cut stone.

H. Remove excess mortar; do not allow mortar to set up on face of units. Point and tool joints before mortar has set. Clean and finish joints in accordance with manufacturer's instructions.

I. Cutting: Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking unit corners or edges.

3.04 FIELD QUALITY CONTROL

A. Perform field observation in accordance with Section 01400.

B. Upon Architect's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.05 CLEANING AND PROTECTION

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Remove construction debris from project site and legally dispose of debris.
   1. Cleaning: Use a strong solution of granulated soap or detergent and water with a bristle brush. Do NOT use a wire brush as it will cause damage to the surface. Rinse immediately with fresh water.
      a. Do NOT attempt to clean using acid or acid based products.
      b. Do NOT clean with high pressure power washer.

B. Salt and De-icing Chemicals: Do not use de-icing chemicals on areas immediately adjacent to a manufactured masonry veneer products application.

C. Scuffing: Remove scuff marks by cleaning as specified herein.

D. Efflorescence: To remove efflorescence, allow stone to dry thoroughly, then scrub vigorously with a stiff bristle brush and clean water. Rinse thoroughly. Do not use a wire brush.
   1. For difficult efflorescence problems, scrub thoroughly with a solution of 1 part white household vinegar to 5 parts water. Rinse thoroughly.

E. Protection: Protect installed product and finish surfaces from damage during construction.

END OF SECTION

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

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. Structural steel.
   2. Grout.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.
   1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
   2. Include embedment Drawings.
   3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
   4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Mill test reports for structural steel, including chemical and physical properties.

D. Product Test Reports: For the following:
   1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   2. Shear stud connectors.
   3. Shop primers.
   4. Nonshrink grout.

E. Survey of existing conditions.

F. Source quality-control reports.

G. Field quality-control and special inspection reports.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

B. Comply with applicable provisions of the following specifications and documents:
1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes and C and MC shapes 8” or larger: ASTM A 992/A 992M.

B. M, S, HP, and L-shapes: ASTM A 36/A 36M.

C. Plates that are part of the seismic force resisting system: ASTM A 572 Gr. 50.

D. Other Plates and C and MC shapes smaller than 8”: ASTM A 36/A 36M.

E. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade C, structural tubing.

F. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.

G. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

C. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
1. Configuration: Straight.
2. Nuts: ASTM A 563 heavy-hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436, Type 1, hardened carbon steel.

D. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
1. Nuts: ASTM A 563 heavy-hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436, Type 1, hardened carbon steel.

E. Threaded Rods: ASTM A 36/A 36M.
1. Nuts: ASTM A 563 heavy-hex carbon steel.

2. Washers: ASTM F 436, Type 1, hardened carbon steel.

2.3 PRIMER

A. Primer: Comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.4 GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
   1. Camber structural-steel members where indicated.
   2. Fabricate beams with rolling camber up.
   3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
   4. Mark and match-mark materials for field assembly.
   5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Surfaces enclosed in interior construction.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

E. Prepare test and inspection reports.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
   1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
   1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.
   2. Weld plate washers to top of baseplate.
   3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
   4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
   2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
   3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
   1. Verify structural-steel materials and inspect steel frame joint details.
   2. Verify weld materials and inspect welds.
   3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
   1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
      c. Ultrasonic Inspection: ASTM E 164.
      d. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
   1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
   2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

D. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION

SECTION 05 3100 – STEEL DECKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Roof deck.

B. Composite floor deck.

1.2 REFERECNCE STANDARDS

A. ASTM A36/A36M – Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

C. ASTM A1008/A1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

D. AWS D1.1/D1.1M – Structural Welding Code – Steel; 2015.

E. AWS D1.3/D1.3M – Structural Welding Code – Steel Sheet; 2008.

F. SDI (DM) – Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

I. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

J. UL (FRD) - Fire Resistance Directory; current edition.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

1.4 QUALITY ASSURANCE

A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Washington.

B. Manufacturer Qualifications: Company specializing in performing the work of this Section with minimum 10 years of experience.

C. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

1.5 DELICERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Store deck on dry wood sleepers; slope for positive drainage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Steel Deck:

1. Canam Steel Corporation; ____: www.canam-steeljoists.ws.

2. Nucor-Vulcraft Group; ____: www.vulcraft.com/#sle.
3. Wheeling Corrugating Co: www.wheelingcorrugating.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 STEEL DECK

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
   1. Calculate to structural working stress design and structural properties specified.
   2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
   3. Maximum Vertical Deflection of Roof Deck: 1/240 of span.

B. Roof Deck: Non-composite type, fluted steel sheet:
   1. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 33, Type 1.
   2. Minimum Metal Thickness, Excluding Finish: 22 gage, unless otherwise indicated on drawings.
   3. Nominal Height: 7/8 inch.
   4. Profile: Fluted; SDI IR.
   5. Formed Sheet Width: 36 inch.
   6. End Joints: Lapped, welded.
   7. Fire Resistance Classification: Comply with UL (FRD) Assembly Number ____.

C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
   2. Span Design: Multiple.
   3. Minimum Metal Thickness, Excluding Finish: 22 gage, unless otherwise indicated on the drawings.
   4. Nominal Height: 1-1/2 inches.
   5. Profile: Fluted; SDI IR.
   6. Formed Sheet Width: 36 inch.
   7. End Joints: Lapped, welded.
   8. Fire Resistance Classification: Comply with UL (FRD) Assembly Number ____.

D. Metal Roof Deck:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
   2. Minimum Metal Thickness, Excluding Finish: See plans.
   3. Nominal Height: See plans.
   4. Formed Sheet Width: 24 inch or 36 inch sufficient length for 3-span installation.

E. Composite Metal Deck:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grage 35/230 with G90/2275 Galvanized Coating.
   2. Minimum Metal Thickness: See Plans.
   3. Nominal Height: See Plans.
   4. Formed Sheet Width: 24 inch or 36 inch. Sufficient length for 3-span installation.

2.3 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.

B. Welding Materials: AWS D1.1/D1.1M.

C. Fasteners: Galvanized hardened steel, self-tapping, #10 hex head.

D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. Weld deck in accordance with AWS D1.3/D1.3M.

END OF SECTION

SECTION 05 4000 – COLD-FORMED METAL FRAMING

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. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Interior non-load-bearing wall framing.
4. Floor joist framing.
5. Roof rafter framing.
6. Ceiling joist framing.
7. Soffit framing.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
3. Section 092216 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Cold-formed steel framing materials.
2. Load-bearing wall framing.
3. Exterior non-load-bearing wall framing.
4. Interior non-load-bearing wall framing.
5. Vertical deflection clips.
6. Drift clips.
7. Floor joist framing.
8. Roof-rafter framing.
9. Ceiling joist framing.
10. Soffit framing.
11. Post-installed anchors.
12. Power-actuated anchors.
13. Sill sealer gasket.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of code-compliance certification for studs and tracks.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:

1. Floor and Roof Systems: AISI S210.
2. Wall Studs: AISI S211.
3. Headers: AISI S212.
4. Lateral Design: AISI S213.

B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

1. Grade: ST33H or as required by structural performance.
2. Coating: G60 or equivalent.

2.3 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-5/8 inches unless noted otherwise.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise on structural drawings.
2. Flange Width: 1-1/4 inches unless noted otherwise on structural drawings.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges.

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-5/8 inches unless noted otherwise.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise on structural drawings.
2. Flange Width: 1-1/4 inches unless noted otherwise on structural drawings.

C. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-5/8 inches unless noted otherwise.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise on structural drawings.
2. Flange Width: 1-1/4 inches unless noted otherwise on structural drawings.

C. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 FLOOR JOIST FRAMING

A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, punched with standard holes, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-5/8 inches unless noted otherwise.

B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise on structural drawings.
2. Flange Width: 1-1/2 inches unless noted otherwise on structural drawings.

2.7 ROOF-RAFTER FRAMING

A. Steel Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-5/8 inches unless noted otherwise.

2.8 CEILING JOIST FRAMING

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with standard holes, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-5/8 inches unless noted otherwise.

2.9 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch unless noted otherwise.
2. Flange Width: 1-1/4 inches unless noted otherwise.

2.10 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Joist hangers and end closures.

2.11 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.

C. ICC-ES AC01 and ICC-ES AC193 are for expansion anchors in masonry and mechanical anchors in concrete respectively, and ICC-ES AC58 and ICC-ES AC308 are for adhesive anchors in masonry and concrete. Do not use expansion-type anchors where expansion can cause damage to the substrate material.

D. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction.

E. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

F. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

2.12 MISCELLANEOUS MATERIALS

A. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.13 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for 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. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.

C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 INSTALLATION OF LOAD-BEARING WALL FRAMING

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch (3 mm) between the end of wall-framing member and the web of track.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls to supporting structure.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INSTALLATION OF EXTERIOR NONLOADBEARING WALL FRAMING

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

E. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18 inches (450 **mm)** of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 INSTALLATION OF INTERIOR NONLOADBEARING WALL FRAMING

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to studs and anchor to building structure.
4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

E. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18 inches (450 **mm)** of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.7 INSTALLATION OF JOIST FRAMING

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as indicated on Drawings

D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.

E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.

1. Install web stiffeners to transfer axial loads of walls above.

F. Install bridging at intervals indicated on Structural Drawings. Fasten bridging at each joist intersection.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.8 INSTALLATION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.9 REPAIR

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items.

B. Prefabricated aluminum railing and guardrail.

C. Primed stair gates.

D. Primed stair guardrail components.

1.02 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

F. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

J. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
   2. Rungs: one inch diameter solid round bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.

B. Guard Rails: As detailed; galvanized at lower level garage and exterior; at residential levels, prime paint finish.

C. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

D. Lintels: As detailed; prime paint finish.

E. Stair Gates: As detailed; prime paint finish.

F. Aluminum component deck and railing system:
   1. Rail Pro.; Product: railpro.us
      a. Unit Decks: Picket style: Picket w/ open midrail with Contemporary Square top rail over 2" nominal square posts - to match Phase 1.
      b. Guardrails at retaining walls: Picket Style to match Phase 1.
      c. Finish: Powdercoating - to match Phase 1 (previous phase was Phantom Bronze).

2.04 FINISHES - STEEL

A. Prime paint all steel items, except as otherwise noted.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 51 00
METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stairs at garage level (Type IA construction) if req'd by the Building Official.

1.02 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

C. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

E. Design railing assemblies, wall rails, and attachments in accordance with applicable Code but at a minimum to resist lateral force of 75 lbs at any point without damage or permanent set.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
   1. Include certification of the responsible design engineer.

1.04 QUALITY ASSURANCE

A. Perform design, per applicable building codes, and prepare shop drawings under direct supervision of a Qualified Professional Engineer experienced in design of this work and licensed in the State in which the project is located.

1.05 PERFORMANCE REQUIREMENTS

A. Structural Performance of Stairs: Provide metal stairs capable of withstanding following structural loads without exceeding allowable design working stress of materials involved, including anchors and connections. Apply each load to produce maximum stress in each component of metal stairs.
   1. Treads and Platforms of Metal Stairs: Capable of withstanding uniform live load of 100 lb/sq ft or concentrated load of 300 lb/sq ft on area 4 sq. in., whichever produces greater stress.
   2. Stair Framing: Capable of withstanding stresses resulting from loads specified above in addition to stresses resulting from railing system loads.
   3. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

B. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses withing limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stair runs of the design specified including framing for ancorage to building walls and landings.

B. Metal Jointing and Finish Quality Levels:
   1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
      a. Welded Joints: Continuously welded and ground smooth and flush.

b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
c. Exposed Edges and Corners: Eased to small uniform radius.
d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 HANDRAILS AND GUARDS

A. Guards:
1. Top Rails: Round pipe or tube rails unless otherwise indicated.
a. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
2. End and Intermediate Posts: Same material and size as top rails.
a. Horizontal Spacing: As indicated on drawings.
b. Mounting: Welded to top surface of stringer.

2.03 MATERIALS

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.

2.04 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Form balusters as indicated, welded to stringers; do not exceed Code required maximum open space between balusters.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Tread and Riser Variations: In accordance with applicable Code.

END OF SECTION

SECTION 05 53 05
METAL GRATINGS AND FLOOR PLATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed metal area well gratings.

B. Perimeter closure.

1.02 REFERENCE STANDARDS

A. ASTM A 48 - Standard Specification for Gray Iron Castings; 1994a.

1.03 PERFORMANCE REQUIREMENTS

A. Conform to applicable code for loading requirements.

B. Maximum Allowable Deflection Under Live Load: 1/240 of span; size components by single support design.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide span and deflection tables.

C. Shop Drawings: Indicate details of component supports, openings, perimeter construction details, and tolerances.

D. Manufacturer's Installation Instructions: Indicate special requirements for opening and perimeter framing.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that opening sizes and dimensional tolerances are acceptable.

B. Verify that supports are correctly positioned.

2.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions.

B. Mechanically cut galvanized finish surfaces. Do not flame cut.

C. Anchor by bolting through saddle clips.
   1. Do not anchor trench drain castings.

D. Secure to prevent movement.

2.03 TOLERANCES

A. Maximum Space Between Adjacent Sections: 1/2 inch.

B. Maximum Variation From Top Surface Plane of Adjacent Sections: 1/8 inch

SECTION 06 1000 - 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.

1.2 SUMMARY

A. Section Includes:
1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.
4. Shear wall panels.
5. Rooftop equipment bases and support curbs.
6. Wood blocking, cants, and nailers.
7. Wood furring and grounds.
8. Wood sleepers.
9. Utility shelving.
10. Plywood backing panels.

B. Related Requirements:
1. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
2. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimension lumber.

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. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 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, GENERAL

A. Lumber: 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 or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
   1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   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 MATERIALS

A. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

B. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

2.4 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.
1. Application: Interior partitions not indicated as load bearing.
2. Species:
a. Hem-fir; WCLIB, or WWPA.
b. Western woods; WCLIB or WWPA.

B. Load-Bearing Partitions: No. 2 grade.
1. Application: Exterior walls and interior load-bearing partitions as indicated in structural wall schedule.
2. Species:
a. Douglas fir-larch; WCLIB or WWPA.
b. Hem-fir; WCLIB or WWPA.

C. Joists, Rafters, and Other Framing Not Listed Above: No. 2 grade.
1. Species:
a. Douglas fir-larch; WCLIB or WWPA.

D. Exposed Framing Indicated to Receive a Stained or Natural Finish: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
1. Species and Grade: Douglas fir-larch; No. 1 grade; WCLIB or WWPA.

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 D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
1. Modulus of Elasticity, Edgewise: 2,000,000 psi.

C. 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 or product made from any combination solid lumber, wood strands, and veneers.
3. Minimum Thickness: 1-1/4 inches.
4. Comply with APA PRR-401, rim board plus grade. Factory mark rim boards with APA-EWS trademark indicating thickness, grade, and compliance with APA-EWS standard.

2.6 MISCELLANEOUS LUMBER

A. General: 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.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of the following species:
1. Spruce-pine-fir; NLGA.
2. Hem-fir; WCLIB or WWPA.
3. Western woods; WCLIB or WWPA.

C. 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.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.7 PLYWOOD BACKING PANELS

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

2.8 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
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 A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, as appropriate for the substrate.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.9 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
1. Use for wood-preservative-treated lumber and where indicated.

D. Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch- wide nailing flanges at least 85 percent of joist depth.

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.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry 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.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

E. Install shear wall panels to comply with manufacturer's written instructions.

F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

H. Do not splice structural members between supports unless otherwise indicated.

I. 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.

J. 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.

K. 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.

L. Comply with AWPA 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.

M. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

N. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.9.1, "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.

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.

P. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
1. Comply with approved fastener patterns where applicable.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- size furring horizontally and vertically at 24 inches o.c.

END OF SECTION

SECTION 06 1516 - WOOD ROOF DECKING

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 solid-sawn or glued-laminated wood roof decking

B. Related Requirements:
   1. Section 061000 "Rough Carpentry" for dimension lumber items associated with wood roof decking.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. For glued-laminated wood roof decking, include installation instructions and data on lumber, adhesives, and fabrication.
   2. For preservative-treated wood products, include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

B. Samples: 24 inches long, showing the range of variation to be expected in appearance of wood roof decking.

1.4 INFORMATIONAL SUBMITTALS

A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, from ICC-ES.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

A. Schedule delivery of wood roof decking to avoid extended on-site storage and to avoid delaying the Work.

B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings. Stack wood roof decking with surfaces that are to be exposed in the final Work protected from exposure to sunlight.

PART 2 PRODUCTS

2.1 WOOD ROOF DECKING, GENERAL

A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

2.2 SOLID-SAWN WOOD ROOF DECKING

A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.

B. Roof Decking Species: Douglas fir-larch, Douglas fir-larch (North), hem-fir, hem-fir (North), spruce pine-fir (North), western hemlock, or western hemlock (North), or approved equivalent.

C. Roof Decking Nominal Size: 2 by 6.

D. Roof Decking Grade: Commercial Decking.

E. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are not exposed to view.

F. Moisture Content: Provide wood roof decking with 19 percent maximum moisture content at time of dressing.

G. Face Surface: Smooth.

H. Edge Pattern: Vee grooved.

2.3 GLUED-LAMINATED WOOD ROOF DECKING

A. Face Species: Alaska cedar, Douglas fir-larch or Douglas fir-larch (North), Ponderosa pine, Southern pine, Western cedars or western cedars (North).

B. Roof Decking Nominal Size: 2 by 6.

C. Roof Decking Configuration: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide tongue-and-groove configuration that complies with research/evaluation report.

D. Face Grade: Decorative: Sound knots and natural characteristics are allowed, including chipped edge knots, short end splits, seasoning checks, and some pin holes. Face knot holes, stains, end slits, skips, roller splits, and planer burns are not allowed.

E. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.

F. Face Surface: Rough sanded or wire brushed.

G. Edge Pattern: Vee grooved.

H. Laminating Adhesive: Wet-use type complying with ASTM D 2559.

2.4 ACCESSORY MATERIALS

A. Fasteners for Solid-Sawn Roof Decking: Provide fastener size and type complying with AITC 112 for thickness of deck used.

B. Fasteners for Glued-Laminated Roof Decking: Provide fastener size and type complying with requirements in "Installation" Article for installing laminated roof decking.

C. Nails: Common; complying with ASTM F 1667, Type I, Style 10.

D. Fastener Material: Hot-dip galvanized steel.

E. Sealants: Latex, complying with applicable requirements in Section 079200 "Joint Sealants" and recommended by sealant manufacturer and manufacturer of substrates for intended application.

F. Penetrating Sealer: Clear sanding sealer complying with Section 099300 "Staining and Transparent Finishing" and compatible with topcoats specified for use over it.

2.5 FABRICATION

A. Shop Fabrication: Where preservative-treated roof decking is indicated, complete cutting, trimming, surfacing, and sanding before treating.

B. Predrill roof decking for lateral spiking to adjacent units to comply with AITC 112.

C. Seal Coat: After fabricating and surfacing roof decking, apply a saturation coat of penetrating sealer in fabrication shop.

D. Apply indicated finish materials to comply with Section 099300 "Staining and Transparent Finishing" in fabrication shop.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine walls and support framing in areas to receive wood roof decking for compliance with installation tolerances and other conditions affecting performance of wood roof decking.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install solid-sawn wood roof decking to comply with AITC 112.
   1. Locate end joints for controlled random lay-up.

B. Install laminated wood roof decking to comply with manufacturer's written instructions.
   1. Locate end joints for controlled random lay-up.
   2. Glue adjoining roof decking courses together by applying a 3/8-inch bead of adhesive to the top of tongues, according to research/evaluation report.

C. Where preservative-treated roof decking must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.
   1. For solid-sawn roof decking, use inorganic boron (SBX).
   2. For laminated roof decking, use copper naphthenate.

D. Apply joint sealant to seal roof decking at exterior walls at the following locations:
   1. Between roof decking and supports located at exterior walls.
   2. Between roof decking and exterior walls that butt against underside of roof decking.
   3. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

3.3 ADJUSTING

A. Repair damaged surfaces and finishes after completing erection. Replace damaged roof decking if repairs are not approved by Architect.

3.4 PROTECTION

A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.

END OF SECTION

SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

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. Wood floor trusses.
2. Wood roof trusses.
3. Wood girder trusses.

1.3 ALLOWANCES

A. Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 012100 "Allowances."

1.4 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.5 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for trusses.
1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

B. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.

C. Evaluation Reports: For the following, from ICC-ES:
1. Metal-plate connectors.
2. Metal truss accessories.

1.7 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.

2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
1. Design Loads: As indicated.
2. Maximum Deflection under Design Loads:
a. Floor Trusses: Vertical deflection of 1/240 of span.
b. Roof Trusses: Vertical deflection of 1/240 of span.

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
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, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

2.3 METAL CONNECTOR PLATES

A. General: Fabricate connector plates to comply with TPI 1.

B. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
1. Use for interior locations unless otherwise indicated.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
   2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
   1. Use for interior locations unless otherwise indicated.

C. Floor and Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
   1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.8 SOURCE QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
   1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
   2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.

B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Anchor trusses securely at bearing points; use metal truss tie-downs or truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

G. Securely connect each truss ply required for forming built-up girder trusses.
   1. Anchor trusses to girder trusses as indicated.

H. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
   1. Install bracing to comply with Section 061000 "Rough Carpentry."
   2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

I. Install wood trusses within installation tolerances in TPI 1.

J. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

K. Replace wood trusses that are damaged or do not comply with requirements.
   1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION

SECTION 06 18 00
GLUED-LAMINATED CONSTRUCTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glue laminated wood beams and braces.

B. Steel hardware and attachment brackets.

1.02 RELATED REQUIREMENTS

A. Section 06150 - Wood Decking.

B. Section 09 91 13 - Exterior Painting: Field finishing.

1.03 REFERENCE STANDARDS

A. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber; 2007.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

C. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

D. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2014.

E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).

F. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.

G. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions; 2012a.

H. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; 2000.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings .
   1. Submit design calculations signed and sealed by design engineer.

1.05 QUALITY ASSURANCE

A. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

B. Erector Qualifications: Company specializing in erection of products of the type specified with _____ years documented experience, and approved by manufacturer.

C. Design structural members under direct supervision of a Qualified Professional Engineer experienced in design of this work and licensed in Washington.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect members to AITC requirements for bundle wrapped.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glued-Laminated Structural Units:
   1. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 GLUED-LAMINATED UNITS

A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Industrial grade.
   1. Verify dimensions and site conditions prior to fabrication.

2. Cut and fit members accurately to length to achieve tight joint fit.
3. Fabricate member with camber built in.
4. Do not splice or join members in locations other than those indicated without permission.
5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

2.03 MATERIALS

A. Lumber: Softwood lumber complying with RIS (GR) grading rules with 12 percent maximum moisture content before fabrication. Design for the following values:
   1. Bending (Fb): 2,400 psi.
   2. Tension Parallel to Grain (Ft): 1,100 psi.
   3. Compression Parallel to Grain (Fc): 1,600 psi.
   4. Compression Perpendicular to Grain Bottom (Fc1): 650 psi.
   5. Compression Perpendicular to Grain Top (Fc1): 650 psi.
   6. Horizontal Shear (Fv): 190 psi.
   7. Modulus of Elasticity (E): 1,600,000 psi.

B. Steel Connections and Brackets: ASTM A36/A36M weldable quality, prime paint except where embedded in concrete.

C. Hardware: 4 (1) Type 1 high strength heavy hex bolts and 3 (2) nuts, primed, except where cast in concrete, matching washers.

D. Anchor Bolts: 3 (1) Type 1 heavy hex high strength bolts and 2 (A 563M) nuts, matching washers.

E. Laminating Adhesive: Tested for wet/exterior service in accordance with ASTM D2559.

2.04 FABRICATION

A. Fabricate glue laminated structural members in accordance with AITC Industrial grade.

B. Verify dimensions and site conditions prior to fabrication.

C. Cut and fit members accurately to length to achieve tight joint fit.

D. Fabricate member with camber built in.

E. Do not splice or join members in locations other than those indicated without permission.

F. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.

G. Field Finishing of Members: Specified in Section 09 90 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that supports are ready to receive units.

B. Verify sufficient end bearing area.

3.02 PREPARATION

A. Coordinate placement of bearing items.

3.03 ERECTION

A. Lift members using protective straps to prevent visible damage.

B. Set structural members level and plumb, in correct positions or sloped where indicated.

C. Provide temporary bracing and anchorage to hold members in place until permanently secured.

D. Fit members together accurately without trimming, cutting, splicing, or other unauthorized modification.

3.04 TOLERANCES

A. Framing Members: 1/2 inch maximum from true position.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.
   1. As indicated on drawings.
   2. Refer to Schedule at end of Section.

B. Wood casings and moldings.

C. Hardware and attachment accessories as specified.

1.02 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2009.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

D. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2009.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide data indicating that materials are urea-formaldehyde free.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

D. Submit two samples of wood trim 12 inch long illustrating each type of pre-finishing, including factory priming.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect from moisture damage.

1.06 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.02 LUMBER MATERIALS

A. Exposed Softwood Lumber: PS 20, C Select grade; See schedule for species, plain sawn, maximum moisture content of 15 percent; with vertical grain of quality suitable for transparent finish.

B. Concealed Softwood Lumber: PS 20, #3 Common for boards and #2 for joists and planks grade; any commercial softwood species, plain sawn, S4S, maximum moisture content of 19 percent; with mixed grain .

C. Hardwood Lumber for Transparent Finish: See schedule for species, plain sawn, maximum moisture content of 6 percent; with vertical grain of quality suitable for transparent finish, with knots, weather checks, splits and similar defects graded out.

D. Hardwood Lumber for Paint Finish: MDF or poplar species, plain sawn, maximum moisture content of 6 percent; with mixed grain , with knots, weather checks, splits and similar defects graded out..

2.03 SHEET MATERIALS

A. Hardwood Plywood: Face species as indicated, plain sawn, book matched, medium density fiberboard core; HPVA HP-1, Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.

B. Particleboard: ANSI A208.1; Composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.

2.04 MANUFACTURED PRODUCTS

A. Wood Base and Miscellaneous Trim within Apartment Units: Contact Lumber Co. (800-547-1038) EMBARK SL, comparable by Teton Sales Co. (208-459-6334), or equivalent. Prefinish embossed lumber or MDF with fintek to match prehung door jambs and casings. Wall and shelf caps to be prefinished oak to match prehung door jambs and casings.

B. Vinyl Face Shelving: Use particle board as previously specified, with one bullnose edge and vinyl covering on at least both faces and the bullnose edge. Depth of shelving to match depth of recess in which installed.

2.05 FASTENINGS

A. Fasteners: Of size and type to suit application; plain finish in interior locations and hot dipped galvanized or stainless steel finish in exterior locations.

2.06 ACCESSORIES

A. Primer: For factory-primed units, manufacturer's recommended primer.

B. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 HARDWARE

A. Shelf Standards: Wall standard and resilient rest style, zinc plated finish; #255/256R manufactured by Knape and Vogt (KV) or approved equivalent.

B. Stair Handrail Brackets: finish to match door hardware; #C-3601B as distributed by Coffman Stairs, a Division of Visador Co. LLC, Marion, VI, (540) 783-7251 or (800) 833 7330; #PS601B as distributed by J.B. O'Meara Co., Burnsville, MN, (952) 882-2400 or (800) 352-2832; or approved equivalent.
   1. Fasteners: Countersunk flat head wood screws; finish to match brackets.

C. Corridor Handrail Brackets: To be Ives #159, finish to match door hardware.

2.08 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Standing and Running Trim: Fabricate from specified hardwood to profiles indicated, minimum 18 knife cuts per inch; grade for uniformity of color when transparent finish is indicated (Ferche numbers or profiles are indicated on drawings).

C. Handrails at Exit Stairs: Fabricate from species in schedule or maple- round, 1-5/8 x 1-3/4 profile (Ferche F901), mount at 34" to the top.

D. Handrails at Corridors: Fabricate from species in schedule or maple (Ferche F6010), mount at 34" to the top.

1. Care Center (CC): Ferche 959, install on both sides of corridor to within six inches of openings, and as shown on drawings.

E. Picture rail and chair rail: Fabricate from species in schedule, 2-1/4" x 3/4" square profile. See ID for locations.
   1. Picture rail mounted at 6'6" to the top, or as shown on drawings. COORDINATE WITH FIRE EQUIPMENT/APPLIANCES.
   2. Chair rail mounted at 3'0" to the top.

F. Door Casing: Fabricate from species in schedule, 2-1/4" x 3/4" square profile.
   1. Provide at all doors in public spaces.

G. Wall base (WD1): 5 1/4" x 3/4" square profile, stained, fabricate from species in schedule.
   1. Provide in all public spaces.

H. Wall Base (WD2): 3-1/2" x 5/8" square profile, stained, fabricate from species in schedule.
   1. Provide in all corridors.

I. Crown Moulding: 4" two piece square profile, see schedule for species, stained.
   1. See ID for location.

J. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.09 SHOP FINISHING

A. All standing and running hardwood trim to be pre-finished. Color to match factory finished doors and frames. Any millwork scheduled for painting to be pre-primed.

B. Sand work smooth and set exposed nails and screws.

C. Apply wood filler in exposed nail and screw indentations.

D. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.

E. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), for grade specified and as follows:
   1. Transparent:
      a. System - 5, Varnish, Conversion, System - 11, catalyzed polyurethane, or System - 12, water-based polyurethane
      b. Stain: As selected by Architect.
      c. Sheen: Satin.

F. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level. Shim as required using concealed shims.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

D. Anchor finish carpentry work securely to supports and substrates, using concealed fasteners and blind nailing where possible. Use fine finishing nails for exposed nailing, except as indicated, set below finish surface and filled flush with finished surface.

E. Finish work shall be free of defects including hammer marks. Exposed edges shall be coped and mitered.

F. Make exterior joints water resistant by careful fitting. Prime end cuts during installation.

G. Handrails: Install handrail brackets at 4' o.c. maximum. Mount handrails to brackets in a manner to maintain 1-1/2 inch clear between handrail and face of wall. Extend railings as required by applicable code, but not less than 1'-0" beyond last riser on one side. Return all railing ends to wall.

H. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces from maximum length of lumber available. Cope at returns, miter at corners to produce tight fitting joints. Use scarf joints for end-to-end joints. Provide miter returns at all ends of pre-finished materials.

I. Vinyl Faced Shelving: Unless otherwise indicated, open shelving shall be 18" deep vinyl faced shelving. Install supports with fasteners appropriate to substrate. Install shelving and supports plumb and level, firmly anchored.

J. Install hardware supplied by Section _____ in accordance with manufacturer's written instructions.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 90 00.

3.04 SCHEDULE

A. Exterior:
   1. Fascias and Other Trim as Indicated: Substrate for sheetmetal cladding

B. Interior common areas: Unless noted otherwise on the drawings, all non-painted interior wood to be clear maple:
   1. On-site Constructed Stairs, Handrails: Clear maple; prefinished.
   2. Moldings, Bases, Casings, and Miscellaneous Trim (including corridor side of unit entry doors): Clear maple; stained.
   3. Window sills, aprons, extension jambs at common areas, stained maple
   4. Vinyl Faced Shelving: Factory applied finish; installed on standards and rests.

C. Interior Units.
   1. Base and casing: MDF, painted.
   2. Wall caps: MDF, painted.
   3. Window sills and aprons: hemlock, painted.

END OF SECTION

SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work of this Section which occurs in other than dwelling units.

B. Specially fabricated cabinet units - liquor lockers at Clubroom.

C. Hardware.

D. Factory finishing.

E. Preparation for installing utilities.

1.02 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

C. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.

D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

E. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

F. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, schedule of hardware, and schedule of finishes.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit two samples, 4 x 12 inch in size, illustrating transparent cabinet.

E. Samples: Submit actual sample items of proposed pulls and hinges, demonstrating hardware design, quality, and finish.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years of experience .

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.06 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.03 LUMBER MATERIALS

A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated,, Grade III/Economy; average moisture content of 4-9 percent.
   1. Use for internal construction and as substrate for plastic laminate finish.
   2. Use for drawer construction.
   3. Concealed surfaces.

B. Hardwood Lumber: NHLA; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated,, Grade II/Custom; average moisture content of 4-9 percent; See schedule for species, plain sawn.
   1. Use for external cabinet frame and exposed shelves for transparent finish.
   2. Exposed surfaces.
   3. Semi-exposed surfaces.

2.04 PANEL MATERIALS

A. Softwood Plywood: NIST PS 1; Graded in accordance with AWI Architectural Woodwork Quality Standards Illustrated, core materials of veneer; any commercial softwood species, rotary cut.
   1. Use for internal construction and for substrate for plastic laminate finish.

B. Hardwood Plywood: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core materials of veneer (wood plies), type of glue recommended for application; see schedule for species face veneer, plain sawn.
   1. Use for door and drawer fronts, end panels, exposed shelves, and other exposed panels of transparent finish cabinets.

C. Particleboard: ANSI A208.1; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips, medium density, made with moisture resistant; of grade to suit application; sanded faces, located as follows:
   1. Door and drawer fronts, end panels, and other exposed panels of plastic laminate clad cabinets.
   2. Substrate for plastic laminate clad countertops.

D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth one side (S1S), except smooth both sides when both sides are exposed; use for drawer bottoms, dust panels, cabinet backs, "pigeon hole" dividers, and other components indicated on drawings.

2.05 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Concealed Joint Fasteners: Threaded steel.

2.06 HARDWARE

A. Shelf Standards and Rests: surface mounted metal shelf standards. When within cabinets use KV 255/256 or comparable.

B. Shelf Standards and Brackets: Formed steel channel standards and Formed steel brackets, formed for attachment with lugs; satin finish.
   1. For Open Wall Shelving 12 Inches or Less in Depth: Use KV 80/180 or comparable.
   2. For Open Wall Shelving Greater Than 12 Inches in Depth: Use KV 87/187 or comparable.

C. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with finish to match Door Hardware.

D. Catches: Magnetic.

E. Hinges: "European" concealed type, steel with satin finish.

F. Sliding Door Track Assemblies: Upper and lower track of satin anodized aluminum, with matching shoe equipped with nylon rollers.

2.07 SITE FINISHING MATERIALS

A. Stain, Shellac, Varnish and Finishing Materials: As specified in Section 09 90 00.

2.08 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Fit shelves, doors, and exposed edges of transparent finish items with 3/8 inch matching hardwood edging. Use one piece for full length only.

C. Cap exposed plastic laminate finish edges with material of same finish and pattern.

D. Door and Drawer Fronts: "Shaker Style", nominal 3/4 inch thick with 3/8" panel; reveal overlay style.

E. Countertops: Postformed type with integral backsplash.

F. Shelving in Cabinets: Fabricate wall cabinets between 15 and 24 inches high and base cabinets with one adjustable shelf. Fabricate wall cabinets greater than 24 inches in height with 2 adjustable shelves.

G. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

H. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

I. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

J. Provide cutouts for plumbing fixtures and outlet boxes. Verify locations of cutouts from on-site dimensions. Seal cut edges.

K. Shop glaze glass materials using the Interior Dry method as specified in Section 08 80 00.

2.09 FACTORY FINISHING

A. Sand work smooth and set exposed nails and screws.

B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.

C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.

D. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, CAB Acrylic Lacquer, Opaque.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components, minimum of four attachments, two top and two bottom, of each cabinet.

C. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets and counter bases to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

B. Remove labels and related adhesive residue.

3.05 SCHEDULES

A. Public Spaces: Clear Maple or Birch, stained.

END OF SECTION

SECTION 07 17 13
BENTONITE PANEL WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Bentonite clay waterproofing panels and accessories for elevator pits and below grade foundation walls.

1.02 RELATED REQUIREMENTS

A. Section 07 21 00 - THERMAL INSULATION: Rigid insulation board used as protection board.

B. Section 31 23 23 - Fill.

C. Section 33 41 00 - Subdrainage.

1.03 REFERENCE STANDARDS

A. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product criteria, characteristics, accessories, jointing and seaming methods, and termination conditions.

C. Shop Drawings: Show location of manufacturer standard details on drawing specific to this project, including manufacturer proposed products used at required flashings, and sealing at openings and penetrations.

D. Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Installation Instructions: Indicate special preparation of substrate, panel attachment methods, and perimeter conditions requiring special attention.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.06 MOCK-UP

A. Construct mock-up of 100 sq ft of horizontal waterproofing, representing finished work including internal and external corners.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Maintain bentonite products dry. Protect with waterproof cover.

C. Maintain minimum ambient storage temperatures of 40 degrees F for bentonite gel products.

1.08 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water.

1. Exception: Where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: CETCO; Voltex DS.

B. Bentonite Panel Waterproofing:
   1. Epro Waterproofing Systems; Bento-Pro Plus: www.eproserv.com/#sle.
   2. Tremco Commercial Sealants and Waterproofing; _____: www.tremcosealants.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Bentonite: Granulated pure, dry, bentonite clay comprised of 90 percent minimum sodium montmorillonite; 90 percent minimum passing No. 20 mesh sieve and 10 percent maximum passing No. 200 mesh sieve.

B. Geotextile-Faced Panels: One layer of non-woven polypropylene geotextile fabric, center core filled with self healing, self expanding bentonite clay granules and one layer of woven polypropylene geotextile fabric; all layers needlepunched together with high-strength polypropylene yarn.

2.03 ACCESSORIES

A. Polyethylene Sheet/Liner: 56 mil inch thick. self-adhering waterproofing sheet membrane of rubberized asphalt integrally bonded to a 4 mil (0.1mm) cross-laminated, high-density polyethylene film.
   1. Envirosheet by CETCO

B. Drainage Panel: 0.4 inch thick twopart prefabricated sheet drain, consisting of a 3-dimensional polypropylene formed dimple core covered with a non-woven polypropylene filter fabric on one side..
   1. Product: Aquadrain 15x manufactured by CETCO.

C. Joint Packing: HYDROBAR TUBES consist of a thin, watersoluble tubing filled with granular sodium bentonite.

D. Below Grade waterproofing accessory: Trowel-grade, sodium bentonite/buytl-rubber based sealant for fillet materials, repair of small surface defects or irregularities, flashing around penetrations and terminations.
   1. Bentoseal by CETCO

E. Waterstop: Hydrophilic strip waterstop; active bentonite/butyl-rubber based
   1. Waterstop RX by CETCO for cast-in-place concrete joints.

F. Primer: Solvent-based primer for adhesion to structural substrates
   1. ENVIROPRIMER SB, by CETCO.

G. Sealant/Adhesive: single component polyether moisture cure, low VOC, 100% solids, nonshrinking with excellent UV resistance.
   1. CETSEAL by CETCO: at grade termination, membrane lap sealant, and waterstop adhesive

H. Termination Bar: As recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are smooth and durable; free of matter detrimental to application of waterproofing system.

C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

A. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

B. Remove concrete fins, projections, and form ties.

C. Fill holes, cracks, honeycombs, and voids with bentonite gel seal, at least 1/8 inch thick, extending 3 inches, minimum, beyond defect.

3.03 INSTALLATION - GENERAL

A. Install panels in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

B. Cut panels parallel to corrugations to prevent bentonite loss.

C. Seal construction joints with joint seal.

3.04 INSTALLATION - VERTICAL SURFACES

A. Install single-ply panels with masonry nails, starting at base of foundation.

B. Fold panels around corners with corrugations vertical, and install unfolded panels with corrugations horizontal.

C. Lap adjoining panels 4 inches.

D. Place joint packing continuous along junction of wall and footing; secure properly to prevent movement.

3.05 INSTALLATION - BELOW SLABS UNDER HYDROSTATIC CONDITIONS

A. Install polyethylene sheet over subgrade; lap joints 4 inches.

B. Lay single-ply panels in slab form, and align panels with edge of slab; do not lay panels over pile caps or footings supporting slab edges, and stagger joints of adjoining panel rows.

C. Lap joints 1-1/2 inch, minimum, and secure laps to prevent displacement.

D. Install joint seal in 1 inch high beads around penetrations through panels and 1/2 inch high beads around chair legs not placed on pads; cover beads with polyethylene sheet collars, cut to size.

E. Lay joint seal continuously along and around protrusions, penetrations, and at abutting walls; secure to prevent movement.

3.06 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

A. Install drainage panel directly over waterproofing, lap joints per manufacturer installation instructions, and position to ensure downward drainage.

B. Scribe and cut boards around projections, penetrations, and interruptions.

3.07 PROTECTION

A. Do not permit traffic over unprotected or uncovered waterproofing.

B. Cover installed waterproofing with temporary polyethylene sheeting, including top of walls; remove sheeting just before backfilling begins.

END OF SECTION

SECTION 07 18 02
TRAFFIC COATINGS PEDESTRIAN TRAFFIC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Polyurethane traffic coatings for pedestrian traffic applications on raised unit decks.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 "Joint Sealants" for joint sealants and accessories and joint preparation.

1.03 REFERENCES

A. References, General: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section.

B. ASTM International (ASTM): www.astm.org:
   1. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
   2. ASTM C 957 - Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Integral Wearing Surface
   3. ASTM C 1127 - Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
   4. ASTM C 1193 - Standard Guide for Use of Joint Sealants
   5. ASTM D 4258 - Standard Practice for Surface Cleaning Concrete for Coating
   6. ASTM D 4259 - Standard Practice for Abrading Concrete
   7. ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces

C. Sealant, Waterproofing, and Restoration Institute (SWRI): www.swrionline.org:
   1. SWR Institute Validation Program

D. UL Laboratories, Inc.(UL): www.ul.com:
   1. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings

E. U. S. Environmental Protection Agency (EPA): www.epa.gov:

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project Site.
   1. Review requirements for traffic coating products and installation, including surface preparation, substrate conditions, project and manufacturer's details, installation procedures, mockups, testing and inspection requirements, protection and repairs, and coordination and sequencing of traffic coating work with work of other Sections.

1.05 ACTION SUBMITTALS

A. Product Data: For each type of traffic coating product specified, indicating compliance with requirements.

B. Shop Drawings: Show locations for traffic coating system components. Show manufacturer standard details for each type of substrate, movement joints, corners, and edge conditions, including penetrations, transitions, and terminations.

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Product Test Reports: Test data for traffic coating products and traffic coating system, by qualified testing agency, indicating proposed traffic coating meets performance requirements, when requested by Architect.

C. Warranty: Sample of unexecuted manufacturer and installer special warranties.

D. Field quality control reports.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: A manufacturer-approved firm with minimum five years' experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing similar work, and able to communicate verbally with Contractor and employees.

B. Manufacturer Qualifications: A qualified manufacturer listed in this Section with minimum five years' experience in manufacture of traffic coating as one of its principal products.
   1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least five years.
   2. Approval of Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
      a. Completed and signed Substitution Request form.
      b. Product data, including certified independent test data indicating compliance with requirements.
      c. Sample shop drawings from similar project.
      d. Project references: Minimum of five installations of similar system not less than five years old, with Owner and Architect contact information.
      e. Name and resume of proposed qualified Inspector.
      f. Sample warranty.

C. Mockups: Provide traffic coating mockup application within mockups required in other sections, or if not specified, in an area of not less than 150 sq. ft. (14 sq. m) of surface where directed by Architect for each type of substrate condition. Include examples of surface preparation, crack and joint treatment, traffic coating application, slip-resistant aggregate application, and flashing, transition, and termination conditions, to set quality standards for execution.
   1. Include intersections of deck traffic coating with adjacent vertical coating and moisture control system applications.

1.08 DELIVERY, STORAGE AND HANDLING

A. Accept materials on site in manufacturer's unopened original packaging.

B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by traffic coating manufacturer.

C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Division 01 Section Temporary Facilities and Controls.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Environmental Limitations: Apply traffic coating within the range of ambient and substrate temperatures recommended by traffic coating manufacturer.
   1. Protect substrates from environmental conditions that affect coating performance.
   2. Do not apply traffic coating to a damp or wet substrate or during snow, rain, fog, or mist or when dew is present.

1.10 SCHEDULING

A. Coordinate installation of traffic coating with completion of roofing and other work requiring interface with traffic coating.

B. Schedule work so traffic coating applications may be inspected prior to concealment.

1.11 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which traffic coating manufacturer agrees to furnish traffic coating material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Access for Repair: Owner shall provide unimpeded access to the Project and the traffic coating system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding and overburden materials upon completion of repair.
2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
3. Warranty Period: [2] years date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of traffic coating materials from the following:
1. Movement of the structure caused by structural settlement or stresses on the traffic coating exceeding manufacturer's written specifications for elongation.
2. Mechanical damage caused by outside agents.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Products: Provide traffic coating products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing Division, An RPM Company, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com, or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements.

B. Source Limitations: Provide traffic coating system materials and accessory products from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

A. General: Traffic coating system shall be capable of performing as a continuous watertight installation and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the structure exterior. Traffic coating shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without resultant moisture deterioration.

B. Compatibility: Provide traffic coating system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by traffic coating manufacturer based on testing and field experience.

C. Fire-Test-Response Characteristics: Provide traffic-coating materials with the fire-test-response characteristics as determined by testing identical products per test method below for deck type and slopes indicated by an independent testing and inspecting agency that is acceptable to authorities having jurisdiction.
1. [Class A] covering per UL 790

D. VOC Content: 350 g/L maximum per 40 CFR 59, Subpart D (EPA Method 24) and complying with requirements of authorities having jurisdiction.

2.03 TRAFFIC COATINGS FOR PEDESTRIAN TRAFFIC

A. Traffic Coatings: Manufacturer's low-odor, low-VOC, exterior exposure, pedestrian traffic-bearing, seamless, high-solids-content, cold liquid-applied, elastomeric, waterproofing membrane system meeting ASTM C 957, and SWRI validated.
1. Basis of Design Products: Tremco, Inc., Vulkem 360NF / 351NF.
2. VOC Content: Not greater than 60 g/L for base coat and 100 g/L for top coat.

B. Primer: Liquid primer recommended for substrate and conditions by traffic-coating manufacturer.

C. Base Coat: Aromatic Polyurethane.

D. Topcoat: Aliphatic Polyurethane with UV inhibitors.
1. Color: Gray

E. Topcoat Aggregate: Manufacturer's standard aggregate for each use indicated of particle sizes, shape, and minimum hardness recommended in writing by traffic-coating manufacturer.

2.04 ACCESSORY MATERIALS

A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete traffic coating system meeting performance requirements, and compatible with traffic coating material and adjacent materials..

B. Single-Component, Non-Sagging Polyurethane Joint Sealant: ASTM C 920, Type NS, Class 50.
   1. Basis of Design Product: Tremco Inc., Dymonic 100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Surface Condition: Before applying traffic coating materials, examine substrate and conditions to ensure substrates are fully cured and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.
   1. Verify plywood surfaces are visibly dry, have cured for time period recommended by traffic coating manufacturer, and are free from release agents, curing agents, laitance, and other contaminates.
   2. Test surfaces following cleaning and abrasion specified below.
      a. Test for capillary moisture by method recommended in writing by traffic-coating manufacturer.
      b. Test for traffic coating adhesion per manufacturer's recommended method.
      c. Notify Architect in writing of unsatisfactory conditions.

B. Proceed with installation once unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Preparation: Clean, prepare, and treat substrates in accordance with ASTM C 1127 and traffic coating manufacturer's written instructions.
   1. Remove contaminants, curing compounds, and film-forming coatings from substrates.
   2. Remove projections and excess materials and fill voids with manufacturer's recommended substrate patching material.
   3. Prepare surfaces to a uniform profile in accordance with ASTM D 4259 and meeting ICRI Surface Profile CSP 2 - 4. Do not acid etch.
   4. Clean prepared surfaces in accordance with ASTM D 4258.

B. Protect adjacent finished surfaces by masking. Mask termination point on vertical surfaces. Protect weep holes and drains.

3.03 TERMINATIONS AND PENETRATIONS

A. Detail Preparation: Prepare vertical and horizontal surfaces at horizontal to vertical transitions, terminations, joints, and penetrations through traffic coatings in accordance with ASTM C 1127 and manufacturer's written instructions, using accessory materials specified.
   1. At terminations of traffic coating exposed to traffic, rout 1/4 by 1/4 inch (6 by 6 mm) keyway in concrete.
   2. Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations, drains, and changes in plane in accordance with manufacturer's written instructions and details.
   3. Prepare joints and cracks in substrate in accordance with ASTM C 1127 and ASTM D 4258 and manufacturer's written instructions.

B. Joint Sealant Installation: Comply with ASTM C 1193 and manufacturer's written instructions. Allow joint sealants to cure adequately before coating with traffic coating.
   1. Provide joint sealant cants with backer rods at penetrations and at horizontal-to-vertical intersections. Tool sealant material to form 45 degree angle transition.
   2. Rout and fill cracks with joint sealant and tool flush with surface.
   3. Feather edges of joint sealant applications.
   4. Allow joint sealant to cure. Apply detail coat of base coat over unfilled and filled cracks and joints, and feather terminating edges.

5. Fill expansion joints with backer rod and joint sealant. Do not apply traffic coating over expansion joints.

3.04 PEDESTRIAN TRAFFIC-COATING APPLICATION

A. Primer: Prime metal surfaces, porous surfaces (when required), and preceding coats left uncoated for more than 24 hours or that have lost surface tack, with manufacturer's recommended primer. Allow to cure before proceeding.

B. Apply traffic coating according to ASTM C 1127 and manufacturer's written instructions. Use roller-applied or self-leveling formulations as recommended by manufacturer for project conditions.
   1. Verify that wet film thickness of each coat complies with requirements every 100 sq. ft. (9 sq. m).

C. Apply number of coats of specified compositions for pedestrian traffic coating at locations indicated on Drawings.
   1. Base Coat: Single application of not less than 25 mil (0.64 mm). For occupied spaces, single application of not less than 40 mil (1.02 mm) to 60 mil (1.52 mm). Refer to manufacturer’s written instructions.
   2. Top Coat: Single application at not less than 15 mil (.38 mm).
   3. Aggregate: Uniformly broadcast aggregate on coats specified to receive aggregate. Embed aggregate according to manufacturer's written instructions.

D. Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated; omit aggregate on vertical surfaces.

E. Cure traffic coatings. Prevent contamination and damage during application and curing stages.

3.05 FIELD QUALITY CONTROL

A. Coordination of Testing: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
   1. Do not cover Work until testing and inspection is completed and accepted.

B. Reporting: Forward written inspection reports to the Architect within 3 working days of the inspection and test being performed.

C. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

3.06 CLEANING AND PROTECTING

A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.

B. Protect traffic coating from damage from subsequent work. Protect traffic coating materials from exposure to UV light for period in excess of that acceptable to traffic coating manufacturer; replace overexposed materials and retest.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at perimeter foundation wall, underside of floor slabs, over roof deck, over roof sheathing, and exterior wall behind all wall finish.

B. Batt insulation and vapor retarder in exterior and interior wall, ceiling, and floor construction,

C. Insulation for filling crevices in exterior wall and roof.

D. Batt insulation for demising walls between units and corridor walls.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Supporting construction for batt insulation.

B. Section 07 21 19 - Foamed-In-Place Insulation

C. Section 07 21 26 - Blown Insulation

D. Section 07 27 00 - Vapor Retarders: Separate vapor retarder materials.

E. Section 07 53 00 - Elastomeric Membrane Roofing: Installation requirements for board insulation over low slope roof deck.

1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

E. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.06 COORDINATION

A. Coordinate the work with Section 07 25 00 for installation of vapor retarder.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation Under Slab on Grade Concrete Slabs: Extruded polystyrene board.

B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board, or as recommended by waterproofing manufacturer.

C. Insulation in Wood Framed Walls: Batt insulation with separate vapor retarder on interior side of exterior wall framing.

D. Insulation in Wood Framed Ceiling Structure: Batt insulation with separate vapor retarder.

E. Insulation in Wood Framed Window and Door Headers: Polyisocyanurate board.

F. Insulation Over Roof Deck: Extruded polystyrene (XPS) board.

G. Insulation over wood framed walls: Continuous. Polyico.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
   4. R-value; 1 inch of material at 72 degrees F: 5, minimum.
   5. Board Size: 48 x 96 inch.
   6. Board Thickness: 1-1/2 inches.
   7. Board Edges: Square.
   8. Thermal Conductivity (k factor) at 25 degrees F: 0.18.
   9. Compressive Resistance: 15 psi.
   10. Board Density: 1.20 lb/cu ft.
   11. Water Absorption, Maximum: 0.3 percent, by volume.
   12. Surface Burning Characteristics: Flame spread/Smoke developed index of 5/175 (maximum), when tested in accordance with ASTM E 84.

B. Polyisocyanurate (ISO) Board Insulation with Facers Both Sides and Water-Resistive Barrier: Rigid cellular foam, complying with ASTM C1289.
   1. Classifications:
      a. Type II: Faced with either organic felt facers or glass fiber mat facers on both major surfaces of the core foam.
         1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
         2) Compressive Strength: Classes 1-2-3, Grade 1 - 16 psi (110 kPa), minimum.
         3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Thermal Resistance: R-value of 38.
   5. Water Vapor Permeance: 1.2 perm, maximum, at 1 inch thickness, and when tested in accordance with ASTM E96/E96M, desiccant method.

2.03 BATT INSULATION MATERIALS

A. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
   1. Material: Glass fiber.
   2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   3. Thermal Resistance: R of 21 at exterior walls, unless otherwise indicated.
      a. Demising Walls: 2 layers of R-11 batt insulation.
      b. Corridor Walls: R-19 batt insulation.
   4. Thickness: 6 inch, unless otherwise indicated.
   5. Facing: Unfaced.
   6. Surface Burning Characteristics: Flame spread/Smoke developed index of less than or equal to 25/50, when tested in accordance with ASTM E 84.

2.04 ACCESSORIES

A. Sheet Vapor Retarder: See Section 07 25 00. See Drawings for optional methods to provide vapor control.

B. Flashing Tape: Special reinforced film with high performance adhesive.
   1. Application: Window and door opening flashing tape.
   2. Width: As required for application.
   3. Products:

a. Protecto Wrap Company; Protecto Seal 45 Butyl: www.protectowrap.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Staples: Steel wire; electroplated or galvanized; type and size to suit application.

D. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Apply adhesive to back of boards:
1. Dabs in size and quantity sufficient to hold insulation in place until backfill is placed.

B. Install boards horizontally on foundation perimeter.
1. Place boards to maximize adhesive contact.
2. Install in running bond pattern.
3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Extend boards over expansion joints, unbonded to foundation on one side of joint.

D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.
1. Install in running bond pattern.
2. Butt edges and ends tightly to adjacent boards and protrusions.

B. Extend boards over expansion joints, unbonded to wall on one side of joint.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Tape insulation board joints.

3.04 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.05 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

A. Board Installation Over Roof Deck, General:
1. See applicable roofing specification section for specific board installation requirements.
2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
3. Do not apply more insulation than can be covered with roofing on the same day.

3.06 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior and interior wall and ceiling spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

F. Where rim joist forms part of exterior wall envelope, install foil faced insulation in joist space to maintain continuity of thermal envelope.

G. Staple or nail facing flanges in place at maximum 6 inches on center.

H. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over face of member.

I. Tape seal tears or cuts in vapor retarder.

J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

K. Coordinate work of this section with requirements for vapor retarder, see Section 07 25 00.

3.07 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

3.08 SCHEDULES

A. Protection Board Referenced by Section 07 1400: Extruded polystyrene board insulation.

B. Foundation Wall and Cavity Wall Insulation: Extruded polystyrene, dab adhesive application.

END OF SECTION

SECTION 07 21 19
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.
   1. At rim joist
   2. At wall and roof cavities as indicated on drawings
   3. In exterior wall crevices.
   4. At junctions of dissimilar wall and roof materials to achieve a thermal and air seal, with protective overcoat.
   5. To seal between exterior weather barrier and interior vapor retarder.
   6. At top of walls and ceiling penetrations, except sprinkler heads.

1.02 REFERENCE STANDARDS

A. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2004.

B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

C. ASTM C 1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2009.

D. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

G. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

D. Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke limitations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Foamed-In-Place Insulation: Two compnent, medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Density (ASTM D1622): Nominal 2.0-lb/cu. ft.
   2. Thermal Resistance: R-value of 6.6, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
   3. Water Vapor Permeance: Vapor retarder; 2 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.

4. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
5. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
6. Closed Cell Content: At least 90 percent.
7. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
8. Compressive Strength (ASTM D1621): 26 psi (0.18 MPa) minimum.
9. Tensile Strength (ASTM D1623, Type C): 62.4 psi (0.43 MPa) minimum
10. Manufacturers:
    a. BASF Corporation; WALLTITE US: www.spf.basf.com/#sle.
    b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation: ASTM C 1029, Type II, polyurethane.

2.02 ACCESSORIES

A. Primer: As required by insulation manufacturer.

B. Overcoat (if required for flame spread): Intumescent coating of type recommended by insulation manufacturer where required to comply with applicable codes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete prior to insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply insulation by spray method, to a uniform monolithic density without voids.

C. Apply to achieve a thermal resistance R value as indicated on the drawings.

D. Patch damaged areas.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Inspection will include verification of insulation and overcoat thickness and density.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

3.06 SCHEDULES

A. At rim joists.

B. Fill un-grouted block wall cores surrounding heated spaces..

C. Wall and ceiling cavities indicating spray foam.

END OF SECTION

SECTION 07 21 26
BLOWN INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Ceiling and Attic: Blown insulation pneumatically placed into joist spaces through access holes.

1.02 REFERENCE STANDARDS

A. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation; 2011.

B. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation; 2006 (Reapproved 2011).

1.03 SYSTEM DESCRIPTION

A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements, in conjunction with Section 07 21 00.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and limitations.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

1.05 PROJECT CONDITIONS

A. Coordinate the work with Section 07 21 00 for placement of insulation materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Blown Insulation:
   1. Johns Manville; _____: www.jm.com/#sle.

2.02 MATERIALS

A. Applications: Provide blown insulation in attic, exterior walls, and ceiling as indicated on drawings.

B. Blown Insulation: ASTM C764, fiberglass type, nodulated for pour and bulk for pneumatic placement.
   1. Thermal Transmittance (U-value): 0.27 BTU/hr sq ft deg F, maximum.
   2. Total Thermal Resistance: As indicated on drawings.

C. Ventilation Baffles: Formed plastic.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate and adjacent materials are dry and ready to receive insulation.

B. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.

C. Verify spaces are unobstructed to allow for proper placement of insulation.

3.02 INSTALLATION

A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.

B. Place insulation pneumatically to fill the attic "floor" to the depth required to achieve the thermal resistance value indicated (R 49).

C. Place insulation against baffles, and do not impede natural attic ventilation to soffit.

D. Place against and behind mechanical and electrical services within the plane of insulation.

E. Completely fill intended spaces leaving no gaps or voids.

F. If work is done in the attic after insulation, restore insulation to full depth.

3.03 CLEANING

A. Remove loose insulation residue.

END OF SECTION

SECTION 07 25 00
VAPOR RETARDER MEMBRANE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vapor Retarder Membranes (Option in lieu of PVA Paint): Materials to make interior side of exterior walls and at underside of roof framing water vapor-resistant and air tight. If product is used, DO NOT use vapor retarding paints.

1.02 DEFINITIONS

A. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
   1. Water Vapor Permeance: Class II - greater than 0.1 perms and less than or equal to 10 perms. For purposes of conversion, 57ng/(Pa s sq m) = 1 perm.

1.03 REFERENCE STANDARDS

A. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Shop Drawings: Provide drawings of special joint conditions.

PART 2 PRODUCTS

2.01 VAPOR RETARDENT ASSEMBLIES

A. Interior Vapor Retarder:
   1. On inside face of studs of exterior walls, under cladding, use mechanically fastened vapor retarder sheet.

2.02 VAPOR RETARDER MATERIALS

A. Wall and Roof/Ceiling Vapor Retarder : Polyamide film , clear.
   1. Thickness: 2 mil, 0.002 inch.
   2. Water Vapor Permeance: 1 perm or less when tested in accordance with ASTM E96 dry cup and 10 perms using the wet cup method.
   3. Manufacturers:
      a. Certainteed Corporation MemBrain Continuous Air Barrier and Smart Vapor Retarder. www.certainteed.com/membrain

2.03 ACCESSORIES

A. Vapor Retarder Tape: Transparent cellophane film tape; pressure sensitive rubber resin adhesive.
   1. Manufacturers:
      a. 3M Scotch 610; cellophane tape; width: 2 inch, minimum; 2.3 (0.058) inch thick, heat and chemical resistant.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Install vapor retardant sheet materials in conjunction with materials described in other sections to provide continuous sealed barrier in the exterior enclosure of the building.

C. In exterior stud-framed walls and truss or lumber framed roofs, attach vapor retarder to inside framing faces with staples in wood construction. Lap edges over framing faces, seal laps with tape. Lap ends onto adjacent construction and seal with tape.

D. At junction of exterior wall and roof lap wall vapor retarder onto roofing vapor retarder and attach with staples. Seal lap with tape. Position lap seal over firm bearing.

E. At steel stud framing, consult the manufacturer's options using screw or staple fasteners and spray or tape adhesives.

END OF SECTION

SECTION 07 25 01
WEATHER BARRIER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Weather barriers on exterior face of exterior wall sheathing and or/rigid insulation..

1.02 RELATED SECTIONS

A. Section 04810 - Unit Masonry Assemblies: Masonry exterior cavity wall.

B. Section 072500 - Vapor Retarders: Sheet vapor retarders.

C. Section 07410 - Metal Roof and Wall Panels: Underlayment used in conjunction with metal wall and roof panels.

D. Section 09260 - Gypsum Board Assemblies: exterior of Exterior Gypsum Sheathing.

E. Section 07 4646: Fiber Cement Siding.

1.03 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

1.04 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.05 PROJECT CONDITIONS

A. Coordinate weather barrier installation with installation of windows, doors, other exterior wall penetrations, and flashings related to same.

PART 2 PRODUCTS

2.01 MATERIALS

A. Weather Barrier: Spun bonded olefin, non-woven, non-perforated.
   1. Performance Characteristics:
      a. Air Penetration: 0.001 cfm/ft2 at 75 Pa when tested in accordance with ASTME2178. Type 1 when tested in accordance with ASTM E 1677. ≤0.04 cfm/ft @ 75 Pa when tested in accoradance with ASTM E2357.
      b. Water Vapor Transmission: Greater than 20 perms in accordance with ASTM E96, Method B.
      c. Water Penetration Resistance: Resist 235 cm hydrostatic head in accordance with AATCC Test Method 127.
      d. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.
      e. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D 822 , Method A.
      f. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84 . Flame Spread: 15, Smoke Developed: 25.
      g. Thickness:
         1) For Use Behind Siding: 2.4 oz/sy basis weight.
         2) For Use Behind Portland Cement Plaster: 2.1 oz/sy basis weight with surface texture.
   2. Manufacturer:
      a. For Use Behind Siding: Dupont TYVEK; Product COMMERCIAL WRAP.
      b. For Use Behind Siding: Soprema SopraSeal Stick VP.
      c. Substitutions: See Section 01600 - Product Requirements.

2.02 ACCESSORIES

A. Barrier Tape: Self-adhesive oriented polypropylene tape, 3 inch nominal width.

B. Flashing: Flexible membrane flashing materials for window openings and penetrations as recommended by the weather barrier manufacturer..

1. Liquid Applied Flashing Membrane: Prosoco R-Guard FastFlash.
    a. R-GUARD Joint & Seam Filler - For use where Fastflash gaps exceed ½".
    b. R-GUARD AirDam - Accessory product to specified R-Guard Fastflash
    c. R-GUARD GypPrime - Accessory product to specified R-Guard Fastflash
    d. Soprema SopraSeal Liquid Flashing
2. Self-Adhering Membranes:
    a. Protecto Wrap Protecto Seal-45 - Asphalt adhesive foil-face SAM for use as the foil-face SAM at the window sills.
    b. Protecto SafSeal-45 Butyl - Butyl-based foil-face SAM for window opening sills if weather or substrate conditions are not suitable for an asphaltic foil-faced SAM.
    c. Protecto Wrap PW 100/40 - Typical SAM for all non-foil face and non-high-temp conditions.
    d. Protecto Wrap Detail Tapes - 6"x6" PSDS squares for inside window corner detailing.
    e. Jiffy Seal Butyl HT
    f. Soprema SopraSeal Stick 1100T

C. Primer: Protecto Wrap #100 VOC Primer - Accessory primer for all Protecto Wrap SAMs.
    1. Protecto Wrap BP primer
    2. Soprema Elastocol stick primer

D. Sealant: Dow-758 - Weather barrier and air seal sealant to be used at the WRB laps and penetrations for air barrier continuity seal, as well as the window and door perimeters.

E. Attachment: Stinger Staple Caps or Tyvek Wrap Caps.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall sheathing is complete, fastened, and contains no voids or holes.

B. Verify that windows are installed and that flashings and seam sealing tape on nailing fins is complete.

C. All weather barriers, flashings, drip caps, etc. must be inspected by Contractor's personnel before installation of the finish material, and must be installed in substantial portions of elevations before calling for inspection.

3.02 INSTALLATION

A. Install in horizontal pattern over exterior sheathing.

B. Install in accordance with manufacturer's instructions.

C. Install in accordance with applicable code requirements.

D. Overlap end and horizontal joints in shingle fashion to shed water to the base of the wall.

E. Coordinate with sheetmetal flashings to ensure that water flow is downward and outward.

F. Secure with capped staples on stud lines to hold in place until wall finish is applied.

G. Seal joints and penetrations through air infiltration barrier with air infiltration barrier tape.

H. Maintain weather barrier free from holes, tears, and punctures until covered with exterior finish material.

3.03 SCHEDULE

A. Use weather barrier behind masonry veneer on wood stud exterior wall finish.

B. Use weather barrier behind siding exterior wall finish.

END OF SECTION

SECTION 07 31 13
ASPHALT SHINGLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Asphalt shingle roofing to match existing.

B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

C. Associated metal flashings and accessories.

1.02 REFERENCE STANDARDS

A. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.

C. ASTM D 3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral granules.

D. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules; 2016.

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).

F. ASTM D4869/D4869M - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing; 2015.

G. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2013.

H. NRCA (RM) - The NRCA Roofing Manual; 2017.

I. UL 997 - Wind Resistance of Prepared Roof Covering Materials.

J. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating material characteristics and wind resistance rating.

C. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.

1.04 QUALITY ASSURANCE

A. Products are Required to Comply with Fire Resistance Criteria: UL (DIR) listed and labeled.

1.05 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer's Warranty: Furnish shingle manufacturer's lifetime material replacement warranty.

C. Warranty Transferability Clause: Make available to Owner shingle manufacturer's standard option for transferring warranty to a new owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Asphalt Shingles:
   1. Malarky Roofing Products -Vista AR; www.malarkeyroofing.com
      a. Malarky Roofing Products - Smart Start Starter Shingles
      b. Malarky Roofing Products - RidgeFlex Hip and Ridge Shingles
   2. CertainTeed Model Landmark Premium.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ASPHALT SHINGLES

A. Asphalt Shingles: Laminated asphalt-coated glass felt, mineral granule surfaced, complying with ASTM 3018 Type I - Self Sealing and ASTM D 3462; Class A fire resistance; UL 997 Wind Resistance.
   1. Algae Resistant.
   2. Weight: 300 lb/100 sq ft.
   3. Self-sealing type.
   4. Style: Square.
   5. Color: Antique Brown (to match previous phases).

2.03 SHEET MATERIALS

A. Eave Protection Membrane and other areas including but not limited to valleys, roof to wall interfaces, penetrations, etc: Rubberized asphalt sheet bonded to sheet polyethylene, complying with ASTM D 1970, 40 mil total thickness, with strippable treated release paper mineral granule; W.R. Grace & Co. ICE AND WATER BARRIER, Certainteed WINTERGUARD, Carlisle Coatings and Waterproofing, Inc. CCW-707, Mirafi MIRADRI WIP, or equivalent.

B. Underlayment: Asphalt-saturated organic roofing felt, unperforated, complying with ASTM D 226, Type I ("No.15") or ASTM D 4869, Type I.

C. Underlayment: Self-adhering elastomeric styrene-butadiene-styrene (SBS) polymer modified bitumen sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable release film and high- strength tri-laminate polyethylene film top surface and the underside is surfaced with protective polyolefin.
   1. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
   2. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
   3. Manufacturers:
      a. Soprema Lastobond Shield HT.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 ACCESSORIES

A. Roofing Nails: Standard round wire shingle type, hot dipped galvanized steel, minimum 3/8 inch head diameter, 12 gage, 0.109 inch nail shank diameter, 1-1/2 inch long and complying with ASTM F1667.

B. Nails: Standard round wire shingle type, of hot dipped galvanized steel, 10 wire gage, 0.1019 inch shank diameter, 3/8 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.

C. Plastic Cement: ASTM D4586/D4586M, asphalt roof cement.

D. Ridge Vents: SHINGLEVENT II by Air Vent Inc., a Certainteed company.

E. Roof Vent: NorWesCo Ventilation by Construction Metals, Inc, or equal. Galvanized steel roof vent RV038 or size required to acheive venting as indicated on drawings. Color as selected by Architect to complement the shingle color.

F. Ridge Anchors: Guardian Fall Protection "Ridge-It Anchor", or equal.

2.05 METAL FLASHINGS

A. Metal Flashings: Provide pre-finished sheet metal eave edge, gable edge, ridge vents, open valley flashing, chimney flashing, dormer flashing, kick out flashing, saddle flashing,, and other flashing indicated.
   1. Form flashings to profiles indicated on drawings.
   2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

B. Sheet Metal: Galvanized steel, 0.018 inch/26 gauge thick, minimum G90/Z275 hot-dipped galvanized.

C. Fabricate eave and gable drip flashing to "D" style, 4 inches wide.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that roof deck is of sufficient thickness to accept fasteners.

C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

D. Verify roof openings are correctly framed.

E. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.02 PREPARATION

A. Remove snow and ice, if any. Ensure roof deck is dry before installing roof underlayment.

B. Broom clean deck surfaces before installing underlayment or eave protection.

C. Install eave edge flashings tight with fascia boards, weather lap joints 2 inches and seal with plastic cement, and secure flange with nails spaced ____ inches on center.

3.03 INSTALLATION

3.04 INSTALLATION - EAVE PROTECTION MEMBRANE

A. Install eave protection membrane from eave edge to minimum 3 ft up-slope beyond interior face of exterior wall.

B. Install eave protection membrane in accordance with manufacturer's instructions and 1 applicable requirements.

3.05 INSTALLATION - UNDERLAYMENT

A. At Roof Slopes Less Than 4:12 : Install eave protection membrane over entire roof area, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer.

B. At Roof Slopes Greater Than 4:12 : Install underlayment parallel to eaves, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection membrane .

C. Weather lap and seal watertight with plastic cement any items projecting through or mounted on roof.

3.06 INSTALLATION - VALLEY PROTECTION

A. Install one ply of eave protection membrane, minimum 36 inches wide, centered over valleys.

B. Weather lap joints minimum 6 inches.

C. At Exposed Valleys: Install one layer of sheet metal flashing, minimum 24 inches wide, centered over open valley and crimped to guide water. Weather lap joints minimum 8 inch wide. Apply band of lap cement to lap seams.

1. Install cleats at 24 inch minimum each side; do not nail directly through sheet metal flashing.
2. Provide 5 inch minimum exposure at valley flashing. Apply band of lap cement along each edge of sheet metal flashing; press shingles into cement. Shingles shall lap flashing at least 8 inches on each side.

3.07 INSTALLATION - METAL FLASHING AND ACCESSORIES

A. At roof intersection with higher vertical wall, install one ply of eave protection membrane, minimum 18 inches wide, centered over intersection.

B. Install flashings in accordance with manufacturer's instructions and 1 applicable requirements.

C. Install continuous eave and gable drip sheet metal flashing.

D. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.

E. Secure in place with nails at ____ inches on center, and conceal fastenings.

F. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

3.08 INSTALLATION - SHINGLES

A. Install shingles in accordance with manufacturer's instructions manufacturer's instructions and 1 applicable requirements.
   1. Fasten strip shingles using four nails per strip, or as required by manufacturer and local building code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area, and provide double course of shingles at eaves.

C. Project first course of shingles 1 inch beyond fascia boards and flush with drip edge of eave and gable flashing.

D. Extend shingles 1 inch beyond face of gable edge fascia boards and flush with drip edge of eave and gable flashing.

E. Cap hips and ridges, including over ridge vent, with individual shingles, maintaining 5 inch weather exposure. Place to avoid exposed nails.

F. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.

G. Provide ridge vents where indicated on drawings.
   1. Supplement ridge vents with roof vents so that quantity of total net free ventilating area provided equals not less than 1/300 ratio of "attic floor".

H. Complete installation to provide weather tight service.

3.09 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 41 13
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural roofing system of preformed steel panels at front porch roofs.

B. Fastening system.

C. Factory finishing.

D. Accessories and miscellaneous components.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations.
   2. Installation methods.
   3. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions. Details must allow for expansion and contraction.
   1. Show work to be field-fabricated or field-assembled.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Test Reports: Indicate compliance of metal roofing system to specified requirements.

F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Finish Warranty: Provide manufacturer’s special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 10 year period from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Architectural Metal Roof Panels:
   1. AEPSpan; DesignSpan hp

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:

1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
3. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.

2.03 ARCHITECTURAL METAL ROOF PANELS

A. Architectural Metal Roof Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Architectural Metal Panels: Factory-formed panels with factory-applied finish.
   1. Steel Panels:
      a. Aluminum-zinc alloy-coated steel complying with ASTM A792/A792M; minimum AZ50 coating.
      b. Steel Thickness: Minimum 22 gauge, 0.0299 inch.
   2. Profile: Standing seam, with minimum 1.75 inch seam height; concealed fastener system for field seaming with special tool.
   3. Texture: Smooth.
   4. Width: Maximum panel coverage of 12 inches.

2.04 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.05 FINISHES

A. Metallic Fluoropolymer Coating System: Manufacturer’s standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss Cool Metallic Copper to match Phase 1.
   1. DuraTech® mx metallic finish, consisting of a baked-on primer (0.15-0.2 mil.) and a baked-on Polyvinylidine Fluoride finish coat (0.7-0.8 mil.) with a specular gloss of 20-35% when tested in accordance with ASTM D-523 at 60°

2.06 ACCESSORIES

A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, and closure strips of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

C. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

D. Wood Substrate: T-111 plywood decking with striated surface exposed. Thickness per metal roof panel manufacturer.

E. Underlayment for Wood Substrate at Porte Cochere: ASTM D226/D226M roofing felt, perforated type; covered by water-resistant rosin-sized building paper as approved by the metal panel manufacturer.

2.07 FABRICATION

A. Panels: Fabricate panels and accessory items at factory, using manufacturer’s standard processes as required to achieve specified appearance and performance requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
   2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

3.03 CLEANING

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.04 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured metal panels for walls, with related flashings and accessory components.

1.02 REFERENCE STANDARDS

A. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, methods of anchorage.

C. Samples: Submit two samples of wall panel, ____ inch by ____ inch in size illustrating finish color, sheen, and texture.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in installing the products specified in this section with minimum three years of documented experience.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after the Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

C. Correct defective Work within a five year period after the Date of Substantial Completion, including defects in water tightness and integrity of seals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:
   1. AEPSpan; NuWave Corrugated to match Phase 1. 7/8 inch deep corrugations with 34 2/3" wall coverage.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MANUFACTURED METAL PANELS

A. Corrugated Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
   1. Provide exterior panels.
   2. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall.
   3. Maximum Allowable Deflection of Panel: 1/90 of span.
   4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
   5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
7. Corners: Factory-fabricated in one continuous piece with minimum 18 inch returns.
8. Exterior Panel Back Coating: Panel manufacturer's standard polyester wash coat.
9. Custom Fluoropolymer Coating System: Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer's full line of colors..

B. Composite wall panels between windows in corrugated metal panel to match Phase 1:
1. Manufacturer: Citadel Architectural Products, Inc; Envelope 2000® is a fabricated wall
a. Profile: Vertical and horizontal, as indicated; style as indicated.
b. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.
c. Material: Precoated aluminum sheet, ___ gage, .024 inch minimum thickness laminated to 0.105 inch thermoset phenolic resin substrate with .010 inch primed smooth aluminum backer.
d. Finish: Smooth
e. Color to match existing: Series G Premium Kynar 500; Color: Terra Cotta.

C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.

D. Expansion Joints: Same material, thickness and finish as exterior sheets; ___ gage, ___ inch thick; manufacturer's standard brake formed type, of profile to suit system.

E. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

F. Anchors: Galvanized steel.

2.03 MATERIALS

A. Metallic Precoated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

B. Precoated Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper, smooth surface texture; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.04 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

B. Sealants:
1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

B. Verify that water-resistive barrier has been installed over substrate completely and correctly.

3.02 INSTALLATION

A. Install panels on walls in accordance with manufacturer's instructions.

B. Locate joints over supports. Lap panel ends minimum 2 inches.

3.03 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.04 CLEANING

A. Remove site cuttings from finish surfaces.

B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 46 46
FIBER-CEMENT SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory primed wood-fiber cement siding to be field painted.

B. Trim, flashings, accessories, and fastenings.

C. Through-body color fiber cement board.

1.02 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

C. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2012).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.

1.04 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.

C. Store products under waterproof cover and elevated above grade, on a flat surface ensuring a constant minimum temperature of 60 degrees F and maximum relative humidity of 55 percent.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
   1. Style: Standard lap style.
   2. Texture: Simulated cedar grain.
   3. Length: 12 ft, nominal.
   4. Thickness: 5/16 inch, nominal.
   5. Finish: Factory applied primer; paint finish.
   6. Exposure: to match Phase 1 Brownstone.
   7. Warranty: 30 year limited; transferable.
   8. Products:
      a. James Hardie Building Products, Inc HZ10 Products or as recommended by the manufacturer for project location.: www.jameshardie.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Miscellaneous Trim: Same material as siding, 3/4 inch thick x 3.5 inch at typical window and door trim. 5/4 trim at horizontal bands, widths as indicated.

2.02 THROUGH-BODY COLOR FIBER CEMENT SIDING

A. Manufacturer: Swisspearl; Swisspearl Vintago

1. Panel thickness: 8mm
2. Color to be selected from manufacturer's full range of colors.

2.03 ACCESSORIES

A. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inch, minimum.

B. <ALTERNATE FOR ALUMINUM SOFFIT> Exterior Soffit Vents: One piece, perforated, ASTM B221 (ASTM B221M), 6063 alloy, T5 temper, aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.

C. Joint Sealer: As specified in Section 07 90 05.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that weather barrier has been installed over substrate completely and correctly.

C. Do not begin until unacceptable conditions have been corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with terms necessary to maintain warranty coverage.
   2. Fasten siding in place, level and plumb.
      a. Arrange for orderly nailing pattern.
      b. Install siding for natural shed of water.
      c. Postition cut ends over bearing surfaces. Sand exposed cut edges smooth and clean.
      d. Prime cut or trimmed ends per manufacturers instructions.
   3. Install metal flashings at internal and external corners, sills, and heads of wall openings.

B. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses. Provide metal flashing behind butt joints as required by manufacturer.

C. Exterior Soffit Vents: Install in accordance with manufacturer's written instructions and at locations indicated on drawings; provide vent area as indicated.

D. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

3.03 INSTALLATION TOLERANCES

A. Maximum Variation from Plumb and Level: 1/4 inch per 10 feet.

B. Maximum Offset from Joint Alignment: 1/16 inch.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, ballasted conventional and adhered conventional application.

B. Insulation, flat and tapered for drainage

C. Vapor retarder.

D. Cover boards.

E. Flashings.

F. Roofing stack boots and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

B. Section 07620 - Sheet Metal Flashing and Trim: Counterflashings, gravel stops, and copings.

C. Section 07 71 00 - Roof Specialties: Prefabricated roofing expansion joint flashing.

D. Section 07 7123 - Manufactured Gutters and Downspouts.

E. Section 07 72 00 - Roof Accessories: Roof-mounted units; prefabricated curbs.

F. Division 15 - Mechanical: Roof drains, roof mounted fans, and other roof mounted mechanical equipment.

1.03 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

D. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2012.

E. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2013.

F. FM (AG) - FM Approval Guide; current edition.

G. FM DS 1-28 - Wind Design; 2007.

H. SPRI RP-4 - Wind Design Standard for Ballasted Single-Ply Roofing Systems; 2008.

I. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and paver layout.

D. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store materials in weather protected environment, clear of ground and moisture.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Protect foam insulation from direct exposure to sunlight.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide 10 year manufacturer's material and a 2 year installation warranty to cover failure to prevent penetration of water.
   1. Warranty shall not be limited to the original installation cost.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle Roofing Systems, Inc; FleeceBACK Fully Adhered EPDM with Factory Applied Tape: www.carlisle-syntec.com/#sle.
   2. Firestone Building Products, LLC; _____: www.firestonebpco.com/#sle.

B. Insulation:
   1. Acceptable to EPDM membrane manufacturer.

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation. (at all flat roofs, except over pool)

B. Roofing Assembly Requirements:
   1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class B. Verify with Code Sheets.
   2. Insulation Thermal Value (R), minimum average: 38 when used continuously on top of the roof structure; provide insulation of thickness required. Verify with Code sheets.

C. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.
   1. Minimum 2 layers of polyisocyanurate board, staggered edge joints.

D. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.

2.03 ROOFING - BALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: One-ply membrane loose-laid under insulation with separation sheet and water pervious fabric over insulation, with ballast. (at roof over pool. all other flat roofs to be adhered).

B. Roofing Assembly Requirements:
   1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
   2. Insulation Thermal Value (R), minimum average: 20; provide insulation of thickness required.

C. Acceptable Insulation Types- Under Membrane - Constant Thickness Application: Any of the types specified.
   1. Minimum 2 layers of extruded polystyrene or isocyanurate board.

D. Ballast: Use aggregate ballast of 1000 lbs/square (100 sq ft).

2.04 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-monomer (EPDM); externally reinforced with fabric; complying with minimum properties of ASTM D4637/D4637M.
   1. Thickness: 0.060 inch EPDM with total 115 mils.
   2. Sheet Width: 76 inches, maximum; factory fabricate into widest possible sheets.
   3. Color: Black.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Vapor Retarder: Self-adhered membrane, complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Product: 725TR manufactured by Carlisle, or equal as recommended by roofing manufacturer.

D. Flexible Flashing Material: Uncured EPDM sheet, except where recommended otherwise by membrane manufacturer; conforming to the following:
   1. Thickness: 60 mil.
   2. Color: Black.

E. Securement or Termination Strip: Reinforced EPDM strip, 6 or 9 inches wide, as recommended by membrane manufacturer.

F. Water-Pervious Fabric: Woven polyethylene, UV-stabilized, open to moisture movement, black.

G. Cushion Sheet: _____.

2.05 COVER BOARDS

A. Cover Boards: Faced with high compressive strength polyisocyanurate (ISO) insulation complying with ASTM C1289, and the following characteristics:
   1. Insulation Thermal Resistance, R-value: 1.0, nominal.
   2. Manufacturers:
      a. Carlisle:SecurShield HD Polyiso.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 2, polymer bonded glass fiber mat both faces and with the following characteristics:
   1. Board Size: 48 x 96 inch, unless required otherwise by membrane manufacturer.
   2. Board Thickness: 1.5 inch.
   3. Thermal Resistance: R-value of 5.6 per inch of thickness.
      a. DO NOT USE ANY OTHER VALUE FOR CALCULATING INSULATION PROPERTIES.
   4. Tapered Board: Slope as indicated; minimum thickness 1 inch; fabricate of fewest layers possible.
   5. Board Edges: Square.

B. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578, with natural skin surfaces and drainage channels on one face.
   1. Board Size: 48 by 96 inch.
   2. Board Thickness: 1 inches, unless required otherwise by membrane manufacturer.
   3. Tapered Board: Slope as indicated; minimum thickness 1/2 in; fabricate of fewest layers possible.
   4. Board Edges: Square.
   5. Thermal Conductivity (k factor) at 25 degrees F: 0.18 as determined by ASTM C177.
   6. Compressive Resistance: 15 psi.
   7. Board Density: 1.20 lb/cu ft.
   8. Water Absorption: 0.3 percent by volume, maximum.

2.07 BALLAST MATERIALS (AT AREAS VISIBILE FROM APARTMENTS AND COMMON AREAS)

A. No. 4 Aggregate: Sound, hard, washed rounded river gravel, ASTM D 448 Size Classification 4.

1. If rounded river gravel is not available in the project area, use crushed rock or crushed gravel and protection sheet as recommended by membrane manufacturer.

2.08 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

C. Insulation Fasteners: Appropriate for purpose intended.
1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

D. Membrane Adhesive: As recommended by membrane manufacturer.

E. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

F. Roofing Nails: Galvanized, hot-dipped type, size and configuration as required to suit application.

G. Sealants: As recommended by membrane manufacturer.

H. Walkway Pads: Rubber, 30 x 30 x 1/2 inch minimum, black, slip resistant finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips and nailing strips are in place.

3.02 GENERAL PREPARATION

A. Prevent roofing material and debris from entering and clogging drains and conductors, and liquids from spilling or migrating onto surfaces of other work.

3.03 PREPARATION - WOOD DECK

A. Verify flatness and tightness of joints of wood decking.

3.04 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE

A. Apply vapor retarder to deck surface in accordance with manufacturer's instructions.
1. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Overlap vapor retarder seams 2 inches minimum and seal with water vapor resistant tape.

D. Attachment of Insulation:
1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

E. Cover Boards: Mechanically fasten cover boards in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

F. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

G. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

H. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

I. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

J. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

K. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.

L. Do not apply more insulation than can be covered with membrane in same day.

3.05 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive to substrate at rate recommended by membrane manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact tape, minimum 2 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge when recommended by membrane manufacturer.

E. At intersections with vertical surfaces:
   1. Install membrane roofing system in accordance with manufacturer's recommendations for reinforcement strip termination details.
   2. Extend membrane over cant strips and blocking and up a minimum of 8 inches onto vertical surfaces.
   3. Fully adhere flexible flashing over membrane in accordance with membrane manufacturer's recommendations.

F. At gravel stops, extend membrane under gravel stop to the outside face of the wall and turn down over outside face of wall.

G. Around roof penetrations, seal flanges and flashings with flexible flashing.

H. Coordinate installation of roof drains and sumps and related flashings.

3.06 INSTALLATION - INSULATION OVER MEMBRANE

A. Place insulation boards over roofing membrane; butt edges in close contact; place channel cut face down; bevel insulation to allow snug fit at cant strips; cut neatly around protrusions through roof.

3.07 INSTALLATION - BALLAST

A. When recommended by membrane manufacturer, place cushion sheet over membrane prior to placing ballast.

B. Place water-pervious fabric over insulation boards in accordance with insulation manufacturer's instructions.

C. Ballast: Evenly distribute aggregate ballast, and install in accordance with SPRI RP-4.

D. Set roof drain inlets at membrane level and top grating at top of insulation.

3.08 ACCESSORIES INSTALLATION

A. Install walkway pads around all sides of rooftop mechanical equipment and between the equipment and the roof access location.
   1. Space pad joints to permit drainage.

3.09 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

C. Require site attendance of roofing and insulation material manufacturers periodically during installation of the work.

3.10 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

C. Remove markings resulting from roofing work from finished surfaces.

D. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

E. Repair or replace defaced or damaged finishes caused by work of this section.

3.11 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, fabricated sheet metal items, and prefinished fascia and soffit system.

B. Exterior sheet metal cladding of wood blocking and other decorative trim.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Wood blocking and trim to receive sheet metal cladding.

B. Section 07 31 13 - Asphalt Shingles: Non-metallic flashings associated with shingle roofing.

C. Section 07410 - Metal Roof Panels: Manufactured sheet metal roofing system.

D. Section 07530 - Elastomeric Membrane Roofing: Roofing system.

E. Section 07 71 23 - Manufactured Gutters and Downspouts.

F. Section 07 90 05 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. CDA A4050 - Copper in Architecture - Handbook; current edition.

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate manufactured products material finish characteristics, profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples ____by____ inch in size illustrating metal finish color.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with ____ years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; 0.0276 inch thick steel. Use for concealed work.

B. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.0276 inch thick base metal, shop pre-coated with PVDF coating. Use for exposed work including roof valleys.

1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; Black color as selected from manufacturer's standard colors.

C. Pre-Finished Aluminum: ASTM B 209 (ASTM B 209M); 0.024 inch thick; plain finish shop pre coated with polyester coating of color as selected.

2.02 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers for exposed fasteners.

B. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.

C. Sealant to be Exposed in Completed Work: 1; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

D. Sealant: Single Component Urethane Type specified in Section 07900.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate concealed cleats of galvanized type sheet metal, minimum 3 inches wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.04 FASCIA AND SOFFIT FABRICATION

A. Fabricate fascia and soffit system from prefinished aluminum sheet; as manufactured by Alcoa, Rollex, Norandex, or approved equivalent.

B. Roll form fascia from coil stock on job site in longest lengths possible allowing for thermal movement.

C. Factory form soffit in 12 to 18 inch wide vee groove panels; all ventilated.

D. Include related trim pieces of same material and finish as fascia and soffit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

3.03 INSTALLATION

A. Conform to drawing details.

B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Seal metal joints watertight.

E. Allow for thermal movement in materials with relief joints not over 50 feet oc.

F. Provide prefinished aluminum drip cap flashing at window heads, door heads, exterior wall base trim, and other exposed exterior locations as necessary to shed water to the exterior.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for field inspection requirements.

END OF SECTION

SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-finished aluminum gutters and downspouts.

B. Precast concrete splash pads.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: Submit two samples, 3 x 4 inches in size illustrating available colors.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B 209 (ASTM B 209M); 0.032 inch thick for gutters and 0.019 inch thick for downspouts.
   1. Finish: Plain, shop pre-coated with polyester coating.
   2. Color: As indicated.

2.02 COMPONENTS

A. Gutters: 6 inch nominal rectangular style profile.

B. Downspouts: 4 x 3 inch size; Rectangular profile, closed.

C. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: Type recommended by fabricator.

D. Fasteners: Same material and finish as gutters and downspouts .

2.03 ACCESSORIES

A. Splash Pads: Precast concrete type, 14-1/2 x 27-1/2 inch size, 2-1/2 inches thick, dished to direct water flow, minimum 4000 psi at 28 days, with minimum 5 percent air entrainment; similar to Molin Concrete Products Type B, (651) 786-7722. Locate where downspouts are not tied to underground storm sewer system. See Civil drawings

2.04 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.
   1. Roll form gutters on site.
   2. Use longest lengths possible, allowing for thermal movement.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.05 FINISHES

A. Polyester Coating: Manufacturer's standard baked enamel system.

B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that surfaces are ready to receive work.

3.02 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.

B. Connect downspouts to underground PVC drainage piping at all locations, as shown on civil drawings.

END OF SECTION

SECTION 07 72 01
ROOF HATCHES AND VENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prefabricated roof hatches, with integral support curbs, operable hardware, and counterflashings.

B. Siding vents in rain screen applications.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Roof Hatches and Vents:
1. Babcock-Davis Hatchways, Inc.: www.babcockdavis.com.
2. Bilco Co: www.bilco.com.
3. Dur-Red Products: www.dur-red.com.
4. Karp Associates, Inc.: www.karpinc.com.
5. Milcor Inc: www.milcorinc.com.
6. Nystrom Building Products: www.nystrom.com.
7. Substitutions: See Section 01 60 00 - Product Requirements.

B. Siding Vents:
1. Cor-A-Vent; Product SV-5; www.cor-a-vent.com

2.02 ROOF HATCHES

A. Unit: Single leaf type.
1. 36 x 54 inch size, unless indicated otherwise.

B. Integral Steel Curb: 14 gage galvanized steel with 1 inch rigid glass fiber insulation; integral cap flashing to receive roof flashing; extended flange for mounting.

C. Flush Steel Cover: 14 gage galvanized steel; 1 inch glass fiber insulation; 22 gage steel interior liner; continuous neoprene gasket to provide weatherproof seal.

D. Hardware: Cadmium plated finish:
1. Compression spring operator and shock absorbers.
2. Steel manual pull handle for interior and exterior operation.
3. Steel hold open arm with vinyl covered grip handle for easy release.
4. Padlock hasp on interior.
5. Hinges: Manufacturer's recommended type.

2.03 SIDING VENTS

A. Siding Vents: SV-5
1. Net free area: 8.75 sq in per lin ft
2. Dimensions: 3/4 inches wide by 48 inches long by 3 inches high.

2.04 FABRICATION

A. Fabricate components free of visual distortion or defects. Weld corners and joints.

B. Provide for removal of condensation occurring within components or assembly.

C. Fit components for weather tight assembly.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate with installation of roofing system and related flashings for weather tight installation.

C. Apply bituminous paint on surfaces of units in contact with cementitious materials or dissimilar metals.

D. Adjust hinges for smooth operation.

END OF SECTION

SECTION 07 81 00
APPLIED FIRE PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fireproofing (OPTION) of primary structural steel.

B. Preparation of applied fire protection for application of exposed overcoat finish specified elsewhere.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide data indicating product characteristics and limitations of use.

C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:
   1. Bond strength.
   2. Bond impact.
   3. Compressive strength.
   4. Fire tests using substrate materials similar those on project.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents, that primers applied to steel in shop or field are compatible with spayed-on fireproofing and will not impair its performance, and that sprayed-on fireproofing products are asbestos-free.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section, with minimum 5 years of experience.

C. Asbestos Content: Provide products that are 100 percent asbestos-free.

1.04 FIELD CONDITIONS

A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.

B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.

C. Provide temporary enclosure to prevent spray from contaminating air.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.
   1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
   2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Applied Fire Protection:

B. Grace Construction Products: www.na.graceconstruction.com.

2.02 APPLIED FIRE PROTECTION ASSEMBLIES

A. Provide assemblies as indicated on drawings.

B. Provide UL fire-rated assemblies to hourly ratings as follows:
   1. Interior columns: 2 hours.
   2. Interior girders: 2 hours.

2.03 MATERIALS

A. Applied Fire Protection Material for Interior Applications, Concealed: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire resistance, and complying with following requirements:
   1. Bond Strength: 150 pounds per square foot, minimum, when tested in accordance with ASTM E736 when set and dry.
   2. Compressive Strength: 8.33 pounds per square inch, minimum.
   3. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760.
   4. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937.
   5. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.

2.04 MATERIALS

A. Low Density Sprayed Fire-Resistive Material: Factory mixed, cementitious material blended for uniform texture with vermiculite or lightweight synthetic aggregate, and conforming to the following requirements:
   1. Bond Strength: ASTM E 736, 200 psf when set and dry.
   2. Bond Impact: ASTM E 760, no cracking, flaking or delamination.
   3. Dry Density: ASTM E 605, minimum average density of 14 lb/cu ft, with minimum individual density of any test sample of 13 lb/cu ft.
   4. Compressive Strength: ASTM E 761, minimum 7.0 psi.
   5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E 84.

2.05 ACCESSORIES

A. Primer Adhesive: Of type recommended by applied fire protection manufacturer.

B. Overcoat: As recommended by manufacturer of applied fire protection material.

C. Metal Lath: Expanded metal lath; minimum weight of 1.7 psf, galvanized finish.

D. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive fireproofing.

B. For substrates suspected of being coated with oil, rolling compounds or other substances not readily identifiable but potentially capable of impairing bond, conduct tests recommended by fireproofing manufacturer to determine their presence and effect on adhesion of fireproofing.

C. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

D. Verify that roofing system work is complete and rooftop equipment is set on roof decks without a concrete cover.

E. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.

F. Verify that voids and cracks in substrate have been filled.

G. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.

B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.

C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.

D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.

E. Post cautionary "Slippery When Wet" signs in all areas where foot-traffic may contact wet fireproofing material. Erect appropriate barriers to prevent entry by non-fireproofing workers into the fireproofing spray and mixing areas and any other areas exposed to wet fireproofing material.

F. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.

G. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.

B. Apply primer adhesive in accordance with manufacturer's instructions.

C. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.

D. Apply fireproofing in sufficient thickness to achieve 1 hour ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture.

E. Apply fireproofing materials by sprayed-on method to maximum extent possible. Following spray operation in each area, complete the coverage by trowel application or other placement method acceptable to manufacturer.

F. Repair or replace fireproofing within areas where test results indicate fireproofing does not comply with requirements.

G. Apply overcoat to a thickness of ____ inches.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00 - Quality Requirements.

B. An independent testing agency will perform field quality control tests, as specified in Section 01400.
   1. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
   2. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
   3. Conform to Special Inspection requirements of the applicable Building Code.

C. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

A. Remove excess material, overspray, droppings, and debris.

B. Remove fireproofing from materials and surfaces not required to be fireproofed.

C. Remove cautionary signs and access-restriction barriers.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; current edition.

B. FM (AG) - FM Approval Guide; current edition.

C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

D. UL (FRD) - Fire Resistance Directory; current edition.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Listed Assembly: Submit copies of each listed assembly included in the Schedule of Firestopping.

D. Product Data: Provide data on product characteristics.

E. Manufacturer's qualification statement.

1.03 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by CABO, ICBO or BOCA will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.04 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.02 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E 814 that:
      a. For Wall Penetrations: Has F Rating equal to fire rating of penetrated assembly: no T rating is required.
      b. For Floor/Ceiling and Roof/Ceiling Penetrations: Has F and T Ratings of 1-hour minimum, but is equal to fire rating of penetrated assembly, and that meets all other specified requirements.
   2. Fire Ratings: See drawings for required systems and ratings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

3.04 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 90 05
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

1.02 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2014.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

D. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.

E. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005 (Reapproved 2011).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Samples: Submit two samples, 3/8 x 2 inch in size illustrating sealant colors for selection.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.05 MOCK-UP

A. Provide mock-up of sealant joints in conjunction with window and wall under provisions of Section 01 40 00.

B. Construct mock-up with specified sealant types and with other components noted.

C. Locate where directed.

D. Mock-up may not remain as part of the Work.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a 2 year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Silicone Sealants: (Sanitary Sealant Only)
   1. Bostik Inc: www.bostik-us.com.
   2. Dow Corning Corp: www.dowcorning.com.
   3. GE Plastics: www.geplastics.com.

4. Pecora Corporation: www.pecora.com.
5. BASF Construction Chemicals-Building Systems: www.chemrex.com.
6. Tremco, Inc: www.tremcosealants.com.

B. Polyurethane Sealants:
1. Bostik Inc: www.bostik-us.com.
2. Pecora Corporation: www.pecora.com.
3. BASF Construction Chemicals-Building Systems: www.chemrex.com.
4. Tremco, Inc: www.tremcosealants.com.

C. Butyl Sealants:
1. Bostik Inc: www.bostik-us.com.
2. Pecora Corporation: www.pecora.com.
3. Tremco, Inc: www.tremcosealants.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

D. Acrylic Emulsion Latex Sealants:
1. Bostik Inc: www.bostik-us.com.
2. Pecora Corporation: www.pecora.com.
3. BASF Construction Chemicals-Building Systems: www.chemrex.com.
4. Tremco, Inc: www.tremcosealants.com.

2.02 SEALANTS

A. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; multi-component.
1. Color: Standard colors matching finished surfaces.
2. Applications: Use for:
a. Exterior and interior control, expansion, and soft joints in masonry.
b. Interior wall and ceiling control joints.
c. Exterior and interior joints between concrete or masonry and other materials.
d. Joints between metal frames in exterior walls and other materials.
e. Joints in exterior wood trim.
f. Joints around penetrations in exterior walls.
g. Other exterior joints for which no other sealant is indicated.

B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
1. Applications: Use for:
a. Concealed sealant bead in sheet metal work.
b. Concealed sealant bead in siding overlaps.

C. Exterior Cladding: - Fiber Cement Siding and vinyl products: ASTM C 920, Type S, Grade NS, Class 50, Uses NT, M, A, and O; High performance, very low modulus, high-movement, non-sagging, fast curing, hybrid sealant, paintable:
1. Applications: Vertical and horizontal exterior joints, joints with high movement, joints at vinyl windows
2. Products: BASF MasterSeal 150

D. Masonry and porous stone: ASTM Specification C 920, Type S, Grade NS, Class 100/50, Use T, NT, M, G, A, and O; One-part, ultra-low-modulus, neutral-curing silicone elastomeric sealant
1. Applications: high-movement weathersealing applications for concrete, masonry, and most porous substrates.
2. Products: Dow Chemical Company; DOW 790

E. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable. Siliconized Latex, paintable.
1. Applications: Use for:
a. Joints between interior door and glazed light frames and wall surfaces.
b. Joints in interior materials other than concrete and masonry.
c. Joints between precast concrete floor and roof units and exterior and interior walls; joints between individual precast concrete plank when exposed in a finished room.

d. Joints between kitchen and bath countertops and wall surfaces.

F. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
1. Applications: Use for:
a. Joints between plumbing fixtures and floor.
b. Joints between kitchen and bath countertops and wall surfaces.

G. Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; multi- component.
1. Color: Gray.
2. Applications: Use for:
a. Joints in sidewalks and vehicular paving.

H. Butyl Sealant: ASTM C1311; single component, solvent release, non-skinning, non-sagging.
1. Color: Standard colors matching finished surfaces.
2. Applications: Use for:
a. Setting door thresholds.
3. Products:
a. Substitutions: See Section 01 60 00 - Product Requirements.

I. Silicone Sealant: ASTM C920, Type S Grade NS, Class 25 minimum; ; single component, neutral curing, non-sagging, non-staining, non-bleeding.
1. Color: To be selected by Architect from manufacturer's standard range.
2. Movement Capability: Plus and minus 25 percent.
3. Applications: Use for:
a. Interior air seal.
4. Products:
a. Dow Corning Corporation; DOWSIL 758: www.dowcorning.com/#sle.

J. Silicone Building Sealant: ASTM C920, Type S, Grade NS, Class 50, Uses NT, A, G, O; single component, neutral-cured , non-sagging, non-bleeding.
1. Color: Selected from manufacturer's full range.
2. Movement Capability: Plus 50 percent, minus 50 percent.
3. Service Temperature Range: -40 to 170 degrees F.
4. Applications: Use for:
a. Weather sealing of exterior metal surfaces and cladding..
5. Products:
a. The Dow Chemical Company; DOWSIL 795.

2.03 ACCESSORIES

A. Primer: Non-staining type, when recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; bi-cellular; oversized 30 to 50 percent larger than joint width.
1. Products:
a. Nomanco SF Rod.
b. Substitutions: See Section 01 60 00 - Product Requirements.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 07 95 00
EXPANSION JOINT COVERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:
   1. Architectural joint systems for building interiors.
   2. Architectural joint systems for building exteriors.

B. Related Sections include the following:
   1. Section 03 30 00 "Cast-in-Place Concrete."
   2. Section 04 20 00 “Unit Masonry.”
   3. Section 07 62 00 "Sheet Metal Flashing and Trim" for sheet metal wall joint systems.
   4. Section 07 92 00 "Joint Sealants" for liquid-applied joint sealants.
   5. Section 09 29 00 “Gypsum Board.”

1.03 REFERENCES

A. Underwriters Laboratories:
   1. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
   2. UL 263 - Fire Tests of Building Construction and Materials.

B. ASTM International (ASTM):
   1. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   2. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   3. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   4. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
   5. ASTM D 2000 - A standardized system for classifying rubber physical properties.
   6. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   7. ASTM E 814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
   8. ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems
   9. ASTM E 1612 - Standard Specification for Preformed Architectural Compression Seals for Buildings and Parking Structures.
   10. ASTM E 1783 - Standard Specification for Preformed Architectural Strip Seals for Buildings and Parking Structures.
   11. ASTM E 1966 - Standard Test Method for Fire-Resistive Joint Systems.

1.04 DEFINITIONS

A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint openingpercentage (plus or minus) of nominal value of joint width.

D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.05 SUBMITTALS

A. Product Data: For each expansion control product indicated.

B. Shop Drawings: Provide the following for each joint system specified:
   1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
   2. Architectural Joint System Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
      a. Manufacturer and model number for each joint system.
      b. Joint system location cross-referenced to Drawings.
      c. Nominal joint width.
      d. Movement capability.
      e. Classification as thermal or seismic.
      f. Materials, colors, and finishes.
      g. Product options.
      h. Fire-resistance ratings.

C. Samples for Initial Selection: For each type of joint system indicated.
   1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for current products.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. All primary products specified in this section shall be provided by a single manufacturer with a minimum of 10 years experience in the design and fabrication of expansion joint cover assemblies.
   2. Manufacturers shall be ISO 9001-2000 Certified with documented management and control of the processes that influence the quality of its products and customer service.

B. Installer Qualifications:
   1. All products listed in this section shall be installed by a single installer with not less than three (3) years of demonstrated experience in installing products of the same type and scope as specified.
   2. Installer shall be insured and licensed as required by agencies within the project's jurisdiction and acceptable or authorized by the manufacturer.

C. Source Limitations:
   1. To the greatest extent possible, architectural joint systems are to be supplied from a single manufacturer.
   2. Where fire-rated joint systems are required, both the joint system and fire barrier assembly must be obtained from a single manufacturer.
   3. The total system, mechanical joint and fire barrier, must be as shown in the Fire Test Certification Listing Documents.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), and ICC A117.1.

F. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

G. Pre-installation Conference: Conduct conference at Project site.

H. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship and to verify selections made under submittals above and to set quality standards for installation.
   1. In locations designated by the Architect.
   2. Refinish mock-up area as required to produce acceptable work.
   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.

1.07 COORDINATION

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

C. Coordinate installation of exterior wall joint systems with roof expansion assemblies to ensure that wall transitions are watertight. Roof expansion assemblies are specified in Division 07.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

A. Manufacturer's Standard Warranty: For architectural joint system products.
   1. Warranty Period: Manufacturer to provide warranty for five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.
   1. Exterior EJC Covers;Mill Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified.)
   2. Interior EJC Covers: Floor Systems; Mill finish standard. Wall and Ceilings; Standard Class II Clear Anodized (Color Anodized, Kynar Painted Custom Color Painted or Factory Prime finish for field paint optional)

B. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Compression Seals: ASTM E 1612; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.

D. Strip Seals: ASTM E 1783; preformed elastomeric membrane or tubular extrusions having an internal baffle system and secured in or over a joint by a metal locking rail.

E. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

F. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.

G. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period equal to or greater than adjacent substrate fire rating. All fire barriers shall comply with UL-2079 Testing Standard and be performed and listed by an accredited testing agency. Fire Barriers, when used in chase wall conditions or within an expansion joint cover assembly of non-metallic materials shall be combined with a layer of 2 mill stainless steel foil to maintain tested assembly metallic component.

H. Moisture Barrier: Flexible elastomeric material, EPDM, minimum 45 mils thick.

I. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.02 ARCHITECTURAL JOINT SYSTEMS, GENERAL

A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
   1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
   2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

B. Design architectural joint systems for the following size and movement characteristics:
   1. Nominal Joint Width: As scheduled.
   2. Maximum Joint Width: As scheduled.
   3. Minimum Joint Width: As scheduled.
   4. Movement Capability: Plus or minus 100 percent.
   5. Type of Movement: As scheduled seismic.

2.03 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

A. Approved Manufacturers: Subject to compliance with requirements, provide the products, or a comparable product that provides comparable design and meets or exceeds the requirements indicated by one of the following:
   1. Basis of Design: JointMaster/InPro Corporation, S80 W18766 Apollo Dr.; Muskego, WI 53150; 800-222-5556; www.inprocorp.com
   2. Other pre-approved manufacturers meeting the specified requirements:
      a. Watson Bowman Acme Corp.
      b. Balco
      c. MM Systems Corporation.
      d. Nystrom, Inc.
      e. Emseal

B. Roof to Roof Joint Systems: Roof joints, .
   1. Basis-of-Design Product: JointMaster/InPro Corporation, 661 series, 3” wide.
   2. Roof Cants: Integral counter-flashing base extrusion.
   3. Factory Fabricated Transitions: all end caps, transitions and miters to be factory fabricated to ensure weather integrity. Field fabrication is not acceptable.
   4. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

C. Exterior Wall-to-Wall Joint Systems: Recessed/Flush Mount, Wall/Wall (and Ceiling/Ceiling) or Wall/Corner (and Ceiling/Wall).
   1. Basis-of-Design Product: Emshield WFR2 by Emseal, 3” wide, two water-repellant silicone sealing surfaces each adhered to fire-retardant impregnated foam backing.
   2. Fabricated Transitions: Straight-run sticks which can be joined in the field to custom, factory-fabricated transition pieces which are coated on both sides with silicone coating allowing them to be installed as an upturn or downturn transition.

3. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
4. Color: Selected from manufacturers standard range of colors.

D. Interior Wall-to-Wall Joint Systems: Recessed drywall aluminum frame with vinyl gaskets, with continuous aluminum center plate.
1. Basis-of-Design Product: JointMaster/InPro Corporation, 300 series, model 300-A09-075, 3” wide.
2. Type: Glide-Plate; Surface mounted.
a. Exposed Metal: Aluminum
1) Aluminum: ASTM B 209, Alloy 6061-T6, 3003-H14, 5005-H34.
2) Finish: Clear Anodized standard - Factory prime painted for field paint optional.
3. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

E. Floor-to-Floor Joint Systems: Floor cover plate, hinged aluminum plate fastened on one side of joint.
1. Basis-of-Design Product: JointMaster/InPro Corporation, 806-A01-075, 3” wide. Serrated and hinged cover plate with leading edge ratio not to exceed 1:8 (7 degrees), suitable for all floor finishes.
2. Type: Hinge Plate; Surface mounted.
a. Exposed Metal: Aluminum
1) Aluminum: ASTM B 209, Alloy 6061-T6, 3003-H14, 5005-H34.
2) Finish: Mill Finish: AA-M10.
b. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

F. Fire Barrier Systems:
1. Basis-of-Design Product: JointMaster, an Inpro Company, Fireline 935-075 Series - Fire Barrier Expansion System.
2. Fabricated Transitions: As directed by manufacturer's installation instructions.

2.04 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces and blockouts where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Prepare substrates according to architectural joint system manufacturer's written instructions.

B. Repair concrete slabs and blockouts using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.

C. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

D. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.03 INSTALLATION

A. A.

B. B.
   1. 1.
   2. 2.
   3. 3.
   4. 4.
   5. 5.
   6. a.
   7. 6.
   8. C.
      a. 1.
      b. 2.
      c. 3.
   9. D.
   10. E.
   11. F.
   12. B.
   13. C.
      a. 1.
   14. D.
      a. 1.
      b. 2.
      c. 3.

C. PROTECTION

D. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

E. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Fire-rated hollow metal doors and frames.

D. Thermally insulated hollow metal doors with frames.

E. Hollow metal borrowed lites glazing frames.

1.02 REFERENCE STANDARDS

A. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

B. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

D. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2012.

E. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

F. ITS (DIR) - Directory of Listed Products; current edition.

G. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

H. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.

I. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.

K. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

L. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.

M. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 PERFORMANCE REQUIREMENTS

A. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless, 16 gage.
   2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
   3. Door Thickness: 1-3/4 inches, nominal.
   4. Top Closures for Outswinging Doors: Flush with top of faces and edges.
   5. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   6. Weatherstripping: Refer to Section 08 71 00.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless, 18 gage.
   2. Door Thickness: 1-3/4 inches, nominal.

C. Fire-Rated Doors:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless, 18 gage.
   2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
   3. Stile and Rail Doors: Standard tubular stile and rail construction, 1-3/4 inches thick, fabricated from 16 gage cold-rolled steel. Provide removable steel muntin grilles where indicated on the drawings.
   4. Fire Rating: As indicated on Door and Frame Schedule, with temperature rise ratings as required by code, tested in accordance with NFPA 252.
      a. Provide units listed and labeled by UL (DIR) or ITS (DIR).
      b. Attach fire rating label to each fire rated unit.
   5. Smoke and Draft Control Door Opening Assemblies Forming Part of a Corridor Enclosure: In addition to required fire rating, comply with air leakage requirements of UBC Std 7-2, Part II; with "S" label.
   6. Door Thickness: 1-3/4 inches, nominal.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. ANSI A250.8 - SDI-100, Level 2 and 3 Door Frames: 14 gage, 0.067 inch, minimum thickness.
      b. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 2, 16 gage.
   2. Finish: Same as for door.
   3. Floor Clips: Adjustable floor sheet steel clips at each jamb, 14 gage thickness.
   4. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
   5. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

6. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
7. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.

C. Exterior Door Frames: Fully welded type.
1. Weatherstripping: Separate, see Section 08 71 00.

D. Door Frames, Fire-Rated: Knock-down type.
1. Fire Rating: Same as door, labeled.
a. Coordinate requirements for S-suffix labeled steel frames with wood door and door hardware manufacturers and suppliers.

2.05 ACCESSORIES

A. Glazing: As specified in Section 08 80 00, factory installed.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Astragals for Double Doors: Specified in Section 08 71 00.

D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.

E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 08 71 00.

F. Coordinate installation of electrical connections to electrical hardware items.

G. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 12 14
DRYWALL STEEL DOOR FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Slip-On Fixed-Throat Steel Door Frames.

B. Fixed-Throat Borrowed-Lite Frames.

C. Fixed-Throat Sidelite Frames.

1.02 REFERENCES

A. ANSI A250.3 - American National Standard Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames; 1993.

B. ASTM A 366/A 366M - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled Commercial Quality; 1996.

C. ASTM B 117 - Practice for Operating Salt Spray (Fog) Apparatus; 1995.

D. ASTM D 1735 - Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus; 1992.

E. BHMA A156.7 - American National Standard for Template Hinge Dimensions; Builders Hardware Manufacturers Association, Inc.; 1988 (R1997) (ANSI/BHMA A156.7).

F. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

G. NFPA 80 - Standard for Fire Doors and Windows; 1995.

H. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's descriptive literature demonstrating compliance with referenced standards.

C. Shop Drawings: Indicate the following:
   1. Frame schedule.
   2. Frame sizes, profiles, and throat depths.
   3. Hardware preparation.

D. Color: Custom color to be selected by Architect.

E. Verification Samples: Submit two samples, minimum 6 inches square each, of each custom color specified.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect products from moisture, construction traffic, and damage; store under cover.

B. Place units on 4 inch high wood sills to prevent rust or damage.

C. Do not use non-vented plastic or canvas shelters; should wrappers become wet, remove immediately.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. REDIFRAME Products Division, Dunbarton Corporation, Inc: www.dunbarton.com.

B. Timely Industries: www.TimelyFrames.com.

C. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Steel Sheet: Cold-rolled steel sheet conforming to ASTM A 366/A 366M, commercial quality.

B. Fasteners: Types and sizes specified in manufacturer's installation instructions for project conditions.

C. Glazing: Specified in Section 08800.

2.03 DOOR FRAMES

A. Frames for Fire-Rated Openings: Tested and listed by Intertek Testing Services (Warnock Hersey) for fire ratings indicated; with rating labels embossed on frames.
   1. Smoke and Draft Control Door [Opening Assemblies Forming Part of a Corridor Enclosure]: In addition to required fire rating, comply with air leakage requirements of UBC Std 7-2, Part II; with "S" label
   2. Coordinate requirements for S-suffix labeled steel frames with wood door and door hardware manufacturers and suppliers.

B. Frames Multi-piece knock-down slip-on fixed-throat steel door frames.
   1. Frames for interior use: Cold-rolled steel, 22 gage, except 18 gage where required due to fire label requirements.
   2. Profile: Double-rabbeted for indicated door thicknesses, with 5/8 inch high stop; throat dimension maximum 1/16 inch greater than indicated nominal thickness of partition to receive frame.
   3. Material texture: Standard smooth.
   4. Finish: Factory baked enamel finish. Color is to be a custom color to match sample provided by Architect.

C. Casings: Wood molding profiles by others, specified in Section 06 2000.

D. Silencers: Manufacturer's standard surface-mounted adhesive-applied felt silencer pads.
   1. Single interior door frames: 2 silencers on strike side, spaced 6 inches from top and bottom of door opening; one silencer at door head, at center of door opening.
   2. Double interior door frames: 2 silencers at door head, spaced 6 inches each way from meeting point of door swings.

2.04 FABRICATION

A. Hinge Preparation:
   1. Mortise frames for indicated size, type, and weight hinges; provide concealed reinforcement of same material as frame, minimum material thickness.
   2. Drill and tap holes for template hinges in accordance with ANSI/BHMA A156.7 template.

B. Strike Preparation: Prepare single-door frames for indicated strikes in accordance with lockset manufacturers' templates and instructions.

C. Closer Preparation: Provide reinforcement for frames indicated to receive closer hardware as follows:
   1. Standard-arm mounting: Manufacturer's standard aluminum extrusion, alloy 6063-T5.
   2. Parallel arm mounting: Same material as frame, minimum 16 gage material thickness.

D. Fixed-Throat Glazed-Lite and Sidelite Frames:
   1. Fabricate components of same material and gage as adjacent door frames for field assembly in accordance with profiles, sizes, and configurations indicated in approved shop drawings; provide concealed devices for connection and alignment of components.
   2. Supply loose stops of cold-formed steel channels, 3/4 inch web by 5/8 inch flange by 18 gage, in lengths for tight fit within indicated openings, formed for butted ends at intersections; drill stops for manufacturer's standard countersunk fasteners.

2.05 FINISHES

A. Chemical Treatment: Treat steel surfaces to promote paint adhesion.

B. Factory Baked Enamel Finish: Meet requirements of ANSI A250.3, and the following:
   1. 100-hour salt spray test without deterioration, in accordance with ASTM B 117.
   2. 200-hour humidity test in accordance with ASTM D 1735, with no blistering.

PART 3 EXECUTION

3.01 EXAMINATION

A. Have installer verify that project conditions are acceptable before beginning installation of frames; verify that completed openings to receive frames are of correct size and thickness.

B. Correct unacceptable conditions before preceding with installation.

3.02 INSTALLATION

A. Install frames in accordance with manufacturer's printed instructions, and approved shop drawings; in addition, install frames for fire-rated openings in accordance with requirements of NFPA 80.

B. Installation of door hardware is specified in Section 08 7100.

C. Installation of glazing is specified in Section 08 8000.

3.03 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 12 15
PRE-ASSEMBLED METAL DOOR & FRAME UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prehung insulated metal entrance doors.

B. Aluminum Clad Wood door frames.

C. Insulated metal sidelights and transoms.

D. Glass and glazing for door, sidelight, and transom, if any.

E. Retractable Screen fullview storm doors.

1.02 SUBMITTALS

A. See Section [] - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's descriptive literature demonstrating compliance with referenced standards.

C. Shop Drawings: Indicate the following:
   1. Door and frame schedule; include elevations, sizes, handing.
   2. Locations and sizes of lites and louvers, if indicated.
   3. Frame sizes, profiles, and throat depths.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Member of Insulated Steel Door Institute (ISDI).

B. Installer Qualifications: Minimum 5 years of documented experience installing products specified in this section.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect products from moisture, construction traffic, and damage; store under cover.
   1. Place units on 4 inch high wood sills to prevent rust or damage.
   2. Provide 1/4 inch space between doors to promote air circulation.

B. Do not use non-vented plastic or canvas shelters; should wrappers become wet, remove immediately.

1.05 WARRANTY

A. Provide manufacturer's warranty of its products, commencing at Substantial Completion, against the following:
   1. Defects in product workmanship and materials, excluding wood components, for two (2) years.
   2. Defects in glass, for ten (10) years.
   3. Rust, for two (2) years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Masonite International; Product Masonite Belleville Smooth Entry Door (Fiberglass) - 2 Panel Craftsman with insulated vision panel (to match Phase 1).

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. All Doors and Frames: Pre-assembled door and frame units, complying with the following:
   1. Physical Endurance: Standard 3 feet by 7 feet door to meet requirements of ANSI A250.4 procedure for level C doors for 250,000 cycles.
   2. Thermal transmittance of door without lite or louver, when tested in accordance with ASTM C 236 or C 1363 and ISDI 107: 0.25 BTU per hour per square foot per degree F, maximum.

3. Sound transmission class (STC) of door without lite or louver, when tested in accordance with ISDI 103 and ASTM E 90: STC 25.
4. Water penetration through door and frame assembly: No water penetration, when tested in accordance with ASTM E 331 and ISDI 104 at 25 miles per hour wind velocity.
5. Air infiltration through door and frame assembly, when tested in accordance with ASTM E 283 and ISDI 101: 0.20 cubic feet per minute per foot of crack at 25 miles per hour wind velocity.
6. Hardware preparation in accordance with DHI 115 Series.

B. Exterior Unit Entrance Doors @ Brownstone:
1. Pre-assembled and pre-hung with wood frames and hinges.
2. Style: As indicated.
3. Sidelights and Transoms: As indicated.

C. Storm doors: self-storing retractable screen, full glass
1. Product: Larson Platinum Retractable Screen
   a. Color: White Linen
   b. Handle and finish: Curved handle; aged bronze finish
   c. Glass: Clear

2.03 DOOR, SIDELIGHT, AND TRANSOM COMPONENTS

A. Doors - General Requirements:
1. Thickness: 1-3/4 inches nominal.
2. Face sheets: Electro-galvanized commercial steel (CS) sheet with coating conforming to ASTM A 591/A 591M, 40Z (12G) coating class; visible seams on face sheets not permitted.
3. Vertical Stiles and Top Rail: Molded Ponderosa Pine, mechanically locked to face sheets.
4. Bottom Rail: Steel or composite material with integral neoprene sweep.
5. Hardware reinforcement: Concealed within door construction.
6. Number of hinges: 3 hinges per jamb for doors less than 7 feet tall; 4 hinges per jamb for doors 7 feet and taller.
7. Sizes: Nominal sizes indicated on drawings, adjusted to fit specified frame type.

B. Doors: Insulated metal; wood edges.
1. Face Sheets: Minimum 24 gage thickness.
2. Core: Expanded polystyrene sheets or foamed in place CFC-free polyurethane, bonded to inside surface of both face sheets.
3. Vertical and Horizontal Edges: Wood stiles and rails, glued to face sheets, forming 5/32 inch planing allowance around door perimeter.
4. Lock Reinforcing: Solid blocking in full area of lockset and deadbolt.
5. Factory-glazed, using glazing specified in this section.
6. Finish: Factory primed with two part epoxy/polyester primer.

C. Sidelites and Transoms: Insulated metal, of same materials and construction as adjacent door.
1. Thickness: 1-3/8 inches nominal.
2. Glazing with curved edges and transom glazing: Field-installed.
3. Finish: Same as adjacent door.

D. Door, Sidelight, and Transom Glazing: Dual insulating units.
1. Outer and inner pane of 1/8 inch thick clear tempered glass, sealed air space, total unit thickness 1/2 inch. Provide internal blinds.

E. Glazing Stops: Raised molding profile, molded or extruded from thermoplastic compounds, screw fastened.

F. Muntins:
1. Entrance doors: Steel, installed in air space between outer and inner glazing panes.

G. Glazing: Low-E Clear.

2.04 FRAME COMPONENTS

A. Hinges: Manufacturer's proprietary hinges, 4 inches by 4 inches by 0.090 inch leaf thickness.
   1. Type: Standard removable pin, butt type, steel.
   2. Finish: Factory primer (USP).

B. Weatherstripping: Jacketed thermoset closed-cell foam or magnetic type, press-fit in kerfs at jamb in frame.

C. Thresholds: Extruded aluminum, mill finish with safety ribs, complying with requirements of ADA; ribbed extruded vinyl sweep across door bottom; provide threshold for each frame.

2.05 FABRICATION

A. Rabbet and cope frames and mechanically join at corners.

B. Mortise jambs for hinges and lock strikes. Mortise door for scheduled hardware.

C. Reinforce lock strike with steel security plate.

2.06 FINISHING

A. Steel:
   1. Treat steel surfaces with chemical treatment to promote paint adhesion.
   2. Factory Primer Finish: Meet requirements of ANSI A250.10 and ISDI 106.
   3. Factory treat wood components with toxic and preservative treatment.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are acceptable before beginning installation of frames; verify that completed openings to receive frames are of correct size and thickness.

B. Correct unacceptable conditions before preceding with installation.

3.02 INSTALLATION

A. Install frames in accordance with manufacturer's instructions, approved shop drawings, and requirements of ISDI 102; in addition, install frames for fire-rated openings in accordance with requirements of NFPA 80.

B. Achieve weather tight and freely operating installation.

C. Maintain alignment with adjacent work. Secure assembly to framed openings, plumb, square, without distortion.

D. Set the threshold in a bed of sealant, tightly and continuously.

E. Installation of wood casings is specified in Section 06 20 00.

F. Installation of door hardware is specified in Section 08 71 00.

G. Field finishing of factory-primed doors and frames is specified in Section 09 90 00.

END OF SECTION

SECTION 08 14 16
WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood doors; flush and recessed panel configuration; fire rated and non-rated.

B. Bifold door hardware.

C. Wood door frames.

1.02 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

C. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

D. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

F. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.

G. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, fire ratings, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.

E. Certificate: Submit manufacturer's certification that doors are formaldehyde free.

F. Samples: Submit two samples of door veneer, 4 x 4 inch in size illustrating wood grain, stain color, and sheen.

G. Warranty, executed in Owner's name.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

B. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.

C. Interior Doors Providing Opening Protection at Stair Enclosures, Exit Passageways, and Horizontal Exits (i.e. Door Openings in Fire Walls): Rate of temperature rise of 450 F degrees across door thickness.

D. Smoke and Draft Control Door Opening Assemblies Forming Part of a Corridor Enclosure: In addition to required fire rating, comply with air leakage requirements of UBC Std 7-2, Part II; with "S" label; if necessary, provide additional gasketing or edge sealing.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.06 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Interior Wood Doors: Provide "CD" Grade with 5 year manufacturer's warranty.

C. Hardboard Doors: Provide 1 year manufacturer's warranty

D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Algoma Hardwoods, Inc: www.algomahardwoods.com.
   2. American Door, Inc.
   3. Eggers Industries; ____: www.eggersindustries.com/#sle.
   4. Mohawk Flush Doors, Inc.
   5. Masonite Architectural; Aspiro Select Wood Veneer Doors: www.architectural.masonite.com/#sle.
   6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Hardboard Doors:
   1. Lynden Door: www.Lyndendoor.com
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Level: Economy Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
   2. Wood Veneer Faced Doors: 2-ply, hot press glued, unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick; solid core construction; fire rated as indicated, and 1-3/8 inches thick; hollow core construction.
   1. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   2. Smoke and Draft Control Doors: Tested to ratings indicated on drawings in accordance with UBC Standard 7-2-97 Part II; UL or ITS (WH) labeled if required by applicable code; provide gasketing as specified by listing.
   3. Attach fire rating label to door, include letter S in label for smoke and draft control doors.
      a. Coordinate requirements for S-suffix labeled wood doors with steel frame, drywall steel frame, and door hardware manufacturers and suppliers.
      b. For raised panel doors scheduled as 20 minute labels, provide the specified raised panel faces with appropriate fire label.
      c. For raised panel doors scheduled as 60 and 90 minutes, provide flush face doors with adhesively applied hardwood molding to simulate raised panels.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

C. Hollow Core Doors: Type - Standard (FSHC); plies and faces as indicated above.

2.04 DOOR FACINGS

A. Wood Veneer Facing for Transparent Finish (Common areas doors): See Schedule for species, CD Series, veneer grade as specified by quality standard, plain sliced, slip veneer match, running assembly match.
   1. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
   2. With applied moldings to match Masonite Heritage Series Winslow panel design.

B. Flush Interior Doors - Hardboard: Prefinished smooth, 1/8 inch thick; as manufactured by Lynden Door, or approved equivalent; custom color to match Architect or Interior Designer's sample.

C. Recessed Panel Interior Doors - Hardboard: Prefinished smooth face, three panel design:
   1. Interior Unit Doors: Masonite Heritage Series Winslow series or approved equivalent; color to be selected from manufacturer's full range. Unit Entry doors are 2 color - Custom color to match Interior Designer's sample at corridor side only.

2.05 ACCESSORIES

A. Prehung Wood Door Frames: Prefinished with casings and stops.

B. Butt Hinges for Prehung Doors: Standard weight, plain bearing butt hinges; 3-1/2 x 3-1/2 inch size; 1-1/2 pair per door. Match door hardware finish specified in Section 08710.

C. Glazing Stops: Wood with metal clips for rated doors, butted corners; prepared for nails.

2.06 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Manufacture doors without the use of urea formaldehyde or treat and seal in a manner preventing emission of formaldehyde.

D. Provide solid blocks at lock edge for hardware reinforcement.
   1. Provide solid blocking for other throughbolted hardware.

E. Fit door edge trim to edge of stiles after applying veneer facing.

F. Vertical Exposed Edge of Stiles - Veneer Faces: Softwood for transparent finish compatible with door faces.

G. Provide Ferche #302 moulding for applied panel doors.

H. Provide wood doors in wood frames where indicated in Door Schedule.

I. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

J. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

K. Provide edge clearances in accordance with AWI 1600.

2.07 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent Finish: TR-6, transparent catalyzed polyurethane, Custom quality, satin sheen; color as selected from manufacturer's full range.

B. Seal tops and bottoms of doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).
   1. Trim fire door height at bottom edge only, in accordance with fire rating requirements.

D. Use machine tools to cut or drill for hardware.

E. Coordinate installation of doors with installation of frames specified in Section 08110 and 08115 and hardware specified in Section 08710.

F. Coordinate installation of glazing.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for maximum diagonal distortion, telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE

A. Interior Wood Doors for stain finish in Public Spaces: Species: maple.

B. Interior Wood Doors for paint finish at corridor Unit Entries.

END OF SECTION

SECTION 08 14 33
STILE AND RAIL WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood doors, stile and rail design; non-fire rated at unit sunroom/den doors.

B. Panels of glass.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

1.03 REFERENCE STANDARDS

A. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate stile and rail core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, cutouts for glazing, cutouts for louvers, cutouts for _____, and _____.

E. Samples: Submit two samples of door veneer, ___ by ___ inches in size illustrating wood grain, stain color, and sheen.

F. Warranty, executed in Owner's name.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver, and store doors in accordance with quality standard specified.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, telegraphing core construction, and _____.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stile and Rail Wood Doors:
   1. Simpson Door Company; Product; 1308 Interor French to match Phase 1.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS

A. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless otherwise indicated.

B. Interior Doors: 1-3/8 inches thickunless otherwise indicated; veneer and lumber stile and rail construction; dowel joints, 4-1/2 inch stile width. Opaque finish as indicated on drawingswhere indicated on drawings.

2.03 ACCESSORIES

A. Glazed Openings:
   1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.

B. Glass Retention Molding: Wood of same species as door facing, dowel pinned stile/rail joinery.,mitered corners; Profile: Ovolo Sticking .

C. Door Hardware: As specified in Section 08 71 00.

2.04 DOOR CONSTRUCTION

A. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.

B. Factory install glazing in doors in compliance with quality standards specified, using manufacturer's standard elastomeric glazing sealant.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standards.

B. Adjust width of non-rated doors by cutting equally on both jamb edges.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

D. Machine cut for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

3.02 TOLERANCES

A. Comply with specified quality standard for fit, clearance, and joinery tolerances.

3.03 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

3.04 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling mounted access units.

B. Access door and frame units, fire-rated and non-fire-rated, in wall and ceiling locations.

1.02 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; current edition.

B. UL (FRD) - Fire Resistance Directory; current edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Project Record Documents: Record actual locations of each access unit.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated access doors.
   1. Provide access doors of fire rating equivalent to the fire rated assembly in which they are to be installed.
   2. Use fire rated access doors where the applicable code requires "opening protection" (e.g. corridor walls, dwelling unit perimeter walls, shaft walls, floor/ceiling assemblies, roof/ceiling assembly, etc.). Use non-fire rated doors elsewhere.
   3. Access doors installed in the ceiling require a 1 hour fire resistive rating; access doors installed in corridor walls require a 1 hour fire resistive rating. See the drawings for other fire resistive wall assemblies.

B. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

1.05 PROJECT CONDITIONS

A. Coordinate the work with other work requiring access doors.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

2.02 MANUFACTURERS

A. Access Doors:
   1. Acudor Products Inc.
   2. Babcock-Davis Hatchways, Inc: www.babcock-davis.com.
   3. Cierra Products : www.cierraproducts.com.
   4. JL Industries, Inc: www.jlindustries.com.
   5. Karp Associates, Inc: www.karpinc.com.
   6. Milcor Inc.
   7. Nystrom, Inc: www.nystrom.com.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESS DOORS AND PANELS

A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

2.04 WALL AND CEILING MOUNTED ACCESS UNITS

2.05 ACCESS DOOR UNITS - WALLS AND CEILINGS

A. Door and Frame Units - Typical Use: Formed steel.
   1. Frames and flanges: 0.058 inch steel.
   2. Door Panels:
      a. Non-Fire Rated Doors: 0.070 inch single thickness steel sheet.
      b. Fire Rated Doors: 0.070 inch double sheet with integral non-combustible insulation filler.
   3. Size:
      a. Attic access panels: 22 x 36 inch size.
      b. Other Uses: As indicated, and if not indicated, as required by the use.
   4. Hardware:
      a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
      b. Hinge:
         1) Non-Fire Rated Doors: 175 degree stainless steel piano hinge with removable pin.
         2) Fire Rated Doors: Concealed constant force closure spring type.
      c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
   5. Prime coat with alkyd primer.

B. Non-Fire Rated Door and Frame Units in Dwelling Unit Walls and Ceilings:
   1. Model PA-3000 Plastic Access Door manufactured by Acudor Products, Inc. or approved equivalent.

2.06 FABRICATION

A. Weld, fill, and grind joints to ensure flush and square unit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 33 26
OVERHEAD COILING GRILLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead coiling metal grilles and operating hardware, electric

B. Wiring from electric circuit disconnect to operator and to control station.

1.02 RELATED REQUIREMENTS

A. Section 08 33 23 - Overhead Coiling Doors.

B. Division 16 - Electrical: Power to disconnect.

C. Division 16 - Electrical: Conduit from electric circuit to operator and from operator to control station.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

D. ITS (DIR) - Directory of Listed Products; current edition.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

F. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata, 2008.

G. NEMA MG 1 - Motors and Generators; 2014.

H. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

I. UL (EAUED) - Electrical Appliance and Utilization Equipment Directory; Underwriters Laboratories Inc.; current edition.

J. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide, _____, general construction component connections and details, and electrical equipment.

C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Overhead Coiling Grilles:
   1. Cornell Iron Works; Product Extreme 324 Performance Grilles: EPG324B: www.cornelliron.com.
   2. Overhead Door Corp; Product RapidGrille AP Model 676: www.overheaddoor.com.

2.02 GRILLES AND COMPONENTS

A. Grille: Aluminum; horizontal bar curtain, coiling on overhead counterbalanced shaft.
   1. Finish: Powdercoat Finish, clear color, to match Phase 1.
   2. Lock Devices: Lock and latch handle on outside.
   3. Electric operation.
   4. Mounting: Within framed opening.

B. Curtain: Round horizontal bars connected with vertical links.
   1. Horizontal bars: 5/16 inch diameter.
   2. Pattern: Brick pattern; horizontal spacing 4 1/2 inches on center.
   3. Bar spacing: 1-1/2 inch on center.
   4. Vertical links: 5/8 by 1/8 inch flat bar.
   5. Link spacing: 6 inch on center.
   6. Bar Ends: Provide with nylon runners for quiet operation.
   7. Bottom Bar: Extruded tubular shape with tubular resilient cushion.

C. Guides: Galvanized steel angles, of profile to retain grille in place , mounting brackets of same metal.
   1. Finish: PowderGuard Premium: Weather resistant polyester powdercoat color as selected by Architect.

D. Hood Enclosure and Trim: Sheet metal; completely covering operating mechanisms; internally reinforced to maintain rigidity and shape.
   1. Sheet Metal Thickness: 24 gage, ___ inch.
   2. Finish: Powder coated, color as selected.

E. Lock Hardware:
   1. Lock Cylinders: Rim type; keyed differently for each space; master key to building system; US 26D finish.
   2. For motor operated units, additional lock or latching mechanisms are not required.
   3. Latch Handle: Manufacturer's standard.

F. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.03 MATERIALS

A. Aluminum: ASTM B221 (ASTM B221M).

B. Galvanized Steel Sheet: ASTM A653/A653M, galvanized to minimum G90/Z275 coating.

2.04 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
   1. Provide interlock switches on motor operated units.

B. Electric Operators:
   1. Mounting: Side mounted.
   2. Motor Enclosure:
      a. Interior Coiling Grilles: NEMA MG 1, Type 1; open drip proof.
   3. Motor Rating: 1/2 hp; continuous duty.
   4. Motor Voltage: 120 volts, single phase, 60 Hz.
   5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   6. Controller Enclosure: NEMA 250 Type 1.
   7. Opening Speed: 12 inches per second.
   8. Brake: Adjustable friction clutch type, activated by motor controller.
   9. Manual override in case of power failure.
   10. Refer to Section 26 05 83 for electrical connections.

C. Control Station: Key operated three position (OPEN-STOP-CLOSE) constant pressure control for each operator.
   1. 24 volt circuit.
   2. Surface mounted, at interior door jamb.
   3. Locate within visual eyesight of grille being operated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that adjacent construction is suitable for door installation.

B. Verify that electrical services have been installed and are accessible.

C. Verify that door opening is plumb, header is level, and dimensions are correct.

D. Notify Architect of any unacceptable conditions or varying dimensions.

E. Commencement of installation indicates acceptance of substrate and door opening conditions.

F. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install grille unit assembly in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of electrical service.

F. Complete wiring from disconnect to unit components.

G. Install enclosure and perimeter trim.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING

A. Adjust grille, hardware and operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean grille and components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - VAPOR RETARDER MEMBRANE: Sealing framing to vapor retarder installed on adjacent construction.

B. Section 07 25 01 - Weather Barrier: Sealing framing to weather barrier installed on adjacent construction.

C. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

D. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.
   1. Design Wind Loads: Comply with requirements of ASCE 7 and applicable code.
   2. Member deflection: Limit member deflection to flexure limit of glass, L/175, or 3/4 inch, whichever is less, in any direction, with full recovery of glazing materials.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, and electrical characteristics and connection requirements .

D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass, glazing materials.

E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

B. Installer: Company specializing in installing aluminum glazing systems with minimum 5 years of experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Kawneer Company, Inc.; Product 451Twith screw spline assembly: www.kawneer.com.

B. Kawneer Company, Inc; Product: Thermal Entrance Doors: 500T

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished thermally broken aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Position: Centered (front to back).
   2. Finish Color: As selected by Architect from manufacturer's standard line.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   8. Perimeter Clearance: Minimize space between framing members and adjacent construction to 3/8 inch - 1/2 inch to allow for expected movement and to accommodate interior air seals.

9. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
10. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.

B. Performance Requirements:
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Uniform Load: A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
3. Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.
4. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
5. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.2 psf pressure differential across assembly.
6. Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.
7. Overall U-value Including Glazing:.30 Btu/(hr sq ft deg F), maximum per Washington State Energy Code (WSREC) Table R402.1.1.
8. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

2.03 THERMAL ENTRANCES

A. Aluminum-framed entrance doors shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Major portions of the door members to be 0.125" (3.2 mm) nominal in thickness and glazing molding to be 0.05" (1.3 mm) thick
2. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
3. Provide adjustable glass jacks to help center the glass in the door opening.
4. Fabricate thermally broken aluminum-framed entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
5. Fabricate thermally broken aluminum-framed doors that are reglazable without dismantling perimeter framing.
   a. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1" (25.4 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
   b. Accurately fit and secure joints and corners. Make joints hairline in appearance.
   c. Prepare components with internal reinforcement for door hardware.
   d. Arrange fasteners and attachments to conceal from view.
6. Weather-stripping: Provide weather-stripping locked into extruded grooves in door panels or frames as indicated on manufactures drawings and details.

B. Performance Requirements
1. Wind loads: Provide entrance system; include anchorage, capable of withstanding wind load design pressures of (110) lbs./sq. ft. The design pressures are based on the Washington State Building Code; 2015 Edition.

2. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 1.57 psf (75 Pa) for pairs of doors. A single 3'0" x 7'0" (915 mm x 2134 mm) entrance door and frame shall not exceed 1.0 cfm/ft2. A pair of 6'0" x 7'0" (1830 mm x 2134 mm) entrance doors and frame shall not exceed 1.0 cfm per square foot.
3. Uniform Load Deflection (500T): A static air design load of 70.19 psf (3360 Pa) for single doors and 60.15 psf (2880 Pa) for pairs of doors shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 for typical application or L/180 for Small-Missile and Large-Missile impact, of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
4. Overall U-value Including Glazing: [.65] Btu/(hr sq ft deg F), maximum per 2018 Washington State Energy Code (WSREC) Table R303.1.3(1).
5. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

2.04 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing Stops: Flush.
   3. Glazing Position: Center of framing.
   4. Cross-Section: ___ by ___ inch nominal dimension.
   5. Finish: To be selected from manufacturer's full range of anodized finishes.
   6. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member; provide when required by design loads, spans, and/or otherwise specified.

B. Glazing: As specified in Section 08 80 00.

C. Sill Receptor: Extruded aluminum, thermally broken, full depth of framing with weatherstripped upturned inside leg; finish to match framing.

D. Infill Panels: Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
   1. Exterior Finish: High performance organic coatings.
   2. Interior Finish: High performance organic coatings.

E. Swing Doors: Glazed aluminum. Kawneer 500T
   1. Thickness: 2 1/4" inches.
   2. Top Rail: 5" inches wide.
   3. Vertical Stiles: 5" inches wide.
   4. Bottom Rail: 12 inches wide.
   5. Glazing Stops: Square.
   6. Finish: Same as storefront.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209 (ASTM B209M).
   1. Major portions of the door members to be 0.125" (3.2mm) nominal in thickness and glazing molding to be 0.05" (1.3mm) thick.

C. Structural Steel Sections: ASTM A36/A36M; shop primed.

D. Fasteners: Stainless steel at exposed. Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.

E. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

F. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.

G. Concealed Flashings: 0.018 inch thick stainless steel.

H. Glass: As specified in Section 08 8000.

I. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

J. Glazing Gaskets at doors: Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

2.06 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.
   1. Color to match Phase 1: #40 Dark Bronze, field verify.

2.07 HARDWARE

A. Other Door Hardware: As specified in Section 08 71 00.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

D. Threshold: Extruded aluminum, 5 inch saddle, one piece per door opening, ribbed surface; provide on all exterior doors.

E. Automatic Door Operators and Actuators: As specified in Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill receptor in bed of butyl sealant and secure. Build up ends with heavy sealant bead; seal to adjacent work and seal butt end joints to form water tight installation and dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of butyl sealant and secure.

J. Install hardware using templates provided.
   1. See Section 08 71 00 for hardware installation requirements.

K. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

3.06 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 53 13
PLASTIC EXTRUDED WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vinyl-framed, factory-glazed windows.

B. Factory fabricated tubular extruded plastic windows and sliding doors with fixed and operating sash.

C. Factory glazed including infill panels.

D. Operating hardware.

E. Insect screens.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - VAPOR RETARDER MEMBRANE: Sealing frames to weather barrier installed on adjacent construction.

B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

C. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2011.

B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

C. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

D. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).

E. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

F. FS L-S-125 - Screening, Insect, Nonmetallic; Federal Specifications and Standards; Revision B, 1972.

1.04 PERFORMANCE REQUIREMENTS

A. Performance Requirements: As specified in PART 2, with the following additional requirements:
   1. Calculate design pressures in accordance with applicable code

B. Deflection: Limit member deflection to 1/200 of the longer dimension with full recovery of glazing materials.

C. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.

D. Thermal Resistance of Assembly: U-values as shown on drawings.

E. NFRC: Air Leakage Resistance Test: 0.05 cfm/sq ft.

F. Air Infiltration: Limit air infiltration through assembly to.05 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283.

G. Vapor Seal: No vapor seal failure at interior static pressure of 1 inch, 72 degrees F, and 40 percent relative humidity.

H. Water Leakage: None at 5.0 psf, when measured in accordance with ASTM E 331.

I. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

J. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapor retarder.

K. Thermal Movement: Design sections to permit movement caused by thermal expansion and contraction of plastic to suit glass, infill, and perimeter opening construction.

L. Design Temperature Range: 120 F degrees.

M. STC rating: 33-36

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week week before starting work of this section.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage.

C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.

D. Manufacturer's Certificate: Certify that products of this section meet or exceed specified requirements.

E. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
1. Evidence of AAMA Certification.
2. Evidence of WDMA Certification.
3. Evidence of CSA Certification.
4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

F. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing of type specified and with at least three years documented experience.

1.08 PRE-INSTALLATION MEETING

A. Convene one weekone week before starting work of this section.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.10 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 10 degrees F or as recommended by sealant manufacturer.

B. Maintain this minimum temperature during and after installation of sealants.

1.11 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a ten year period after Date of Substantial Completion.

C. Provide ten year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Tubular Plastic Windows:
   1. VPI Windows; Product Endurance Series; Product Endurance Series.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DESCRIPTION

A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
   1. Configuration: As indicated on drawings.
      a. Product Type: AP - Awning projected window, C - Casement window, FW - Fixed window, and HS - Horizontal sliding window.
   2. Sliding Glass Doors: Match window frame style and color.
   3. Color: White.
   4. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
   5. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
   6. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
   7. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.
   8. Mounting Flange: Integral to frame assembly, providing weather stop at entire perimeter of frame.
   9. Insect Screens: Tight fitting for entire window, not just operating sash location.

B. Performance Requirements: Provide products that comply with the following:
   1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
      a. Performance Class (PC): LC30.
      b. Performance Grade (PG): Equivalent to or greater than specified design pressure.
   2. Design Pressure: In accordance with applicable codes.

2.03 COMPONENTS

A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.

B. Windows: Extruded, hollow, tubular, ultra-violet resistant polyvinyl chloride (PVC) with integral color; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
   1. Configuration: Fixed and horizontal sliding sash
   2. Color: White.

C. Insect Screens: Aluminum, extruded or roll-formed frame with mitered and reinforced corners; apply screen mesh taut to frame; secure to window with hardware to allow easy removal.
   1. Hardware: Manufacturer's standard; quantity as required per screen.
   2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's 18 x 16 mesh.
   3. Frame Finish: Manufacturer's standard, color to match window frame and sash color.

D. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit. Color to match window exterior.

E. Insect Screens: Woven fiberglass mesh; 14/18 mesh size.
   1. Color: Black.

2.04 GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: As specified in Section 08 8000 of Types described below:
   1. Glass in Exterior Lights: Low-E with Argon, insulating Type.

2.05 GRILLES

A. Profile: 3/4" contoured.

B. Type: Aluminum grilles between-the-glass.

C. Finish: Factory finished to match window frame color.

2.06 HARDWARE

A. Horizontal Sliding Sash: Rigid PVC interfacing tracks with dual brass wheel and stainless steel axle assembly housing, provide two sets for each operating sash and opening stops in head and sill track as required.

B. Sash lock: Lever handle and keeper with cam lock, provide at least one for each operating sash.

C. Finish of Exposed Hardware: Baked enamel, match interior sash and frame color.

D. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

   1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
   2. Window Opening Control Device: Provide device to restrict operable sash to less than 4 inches maximum clear opening and releasable, in compliance with ASTM F2090.
   3. Limit Devices: Concealed friction adjustor, adjustable stay bar; or concealed support arms with adjustable, limited, hold-open limit devices designed to restrict sash opening.
      a. Acceptable Products: One of the following:
         1) Angel Ventlock.
         2) Comparable product.
   4. Limit clear opening to 4 inches for ventilation; with custodial key release.

PART 3 EXECUTION

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 CONDITIONS

A. Conditions of the contract (General and Supplementary Conditions) and Division 01 - General Requirements, govern the work of this section.

B. This section includes all material and related service necessary to furnish all finish hardware indicated on the drawings or specified herein.

C. Furnish UL listed hardware for all labeled and 20 min. openings in conformance with the requirements for the class of opening scheduled. Underwriters' requirements shall have precedence over specification where conflicts exist.

D. All work shall be in accordance with all applicable state and local building codes. Code requirements shall have precedence over this specification where conflicts exist.

1.2 WORK INCLUDED

A. This section includes the following:

1. Furnish door hardware specified herein, listed in the hardware schedule, and/or required by the drawings.
2. Cylinders for Aluminum Doors
3. Thresholds and Weather-stripping (Aluminum frame seals to be provided by aluminum door supplier)
4. Electro-Mechanical Devices

B. Where items of hardware are not definitely or correctly specified and is required for the intended service, such omission, error or other discrepancy should be directed to the Architect prior to the bid date for clarification by addendum. Otherwise furnish such items in the type and quantity established by this specification for the appropriate service intended.

1.3 RELATED WORK IN OTHER SECTIONS

A. This section includes coordination with related work in the following sections:

1. Division 06 Section "Finish Carpentry".
2. Division 08 Section "Hollow Metal Doors and Frames".
3. Division 08 Section "Wood Doors"
4. Division 08 Section "Aluminum Entrances and Storefronts"
5. Division 26 Section “Electrical”
6. Division 28 Section "Electronic Safety and Security".

1.4 REFERENCES

A. Publications of agencies and organizations listed below form a part of this specification section to the extent referenced.

1. DHI - Recommended Locations for Builders' Hardware.
2. NFPA 80 - Standards for Fire Doors and Windows.
3. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
4. UL - Building Material Directory.
5. DHI - Door and Hardware Institute
6. WHI - Warnock Hersey
7. BHMA - Builders Hardware Manufacturers Association
8. ANSI – American National Standards Institute
9. IBC- International Building Code (as adopted and amended by local building code)

1.5 SUBMITTALS

A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 01 - General Requirements.

B. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:

1. Door number, location, size, handing, and rating.
2. Door and frame material, handing.
3. Degree of swing.
4. Manufacturer
5. Product name and catalog number
6. Function, type and style
7. Size and finish of each item
8. Mounting heights
9. Explanation of abbreviations, symbols, etc.
10. Numerical door index, indicating the hardware set/ group number for each door.

C. When universal type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).

D. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC), or certified Door Hardware Consultant (DHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed or stamped with the DHI certification seal of the supervising AHC or DHC. The supervising AHC or DHC shall attend any meetings related to the project when requested by the architect.

E. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.

F. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or in compatible items, and proposed substitutions in the hardware schedule.

G. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.

H. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 01 - General Requirements.

I. Submit a sample of each type of hardware requested by the architect. Samples shall be of the same finish, style, and function as specified herein. Tag each sample with its permanent location so that it may be used in the final work.

J. Furnish with first submittal, a list of required lead times for all hardware items.

K. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 01 - General Requirements.

L. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.

M. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

N. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner’s representative to determine keying requirements. Upon completion of initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute’s publication “Keying Procedures, Systems, and Nomenclature”. Submit copies of owner approved key schedule for review and field use in quantities as required by Division 01 - General Requirements. Wiring diagrams shall be included in final submittals transmitted for distribution of field use.

1.6 QUALITY ASSURANCE

A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function, and quality, may be considered for prior approval of the architect, provided the required data and physical samples are submitted for approval as set forth in Division 01 - General Requirements.

B. Where indicated in this specification, products shall be independently certified by ANSI for compliance with relevant ANSI/BHMA standards A156.1 - A156.36 – Standards for Hardware and Specialties. All products shall meet or exceed certification requirements for the respective grade indicated within this specification. Supplier shall provide evidence of certification when requested by the architect.

C. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. Electrical drawings and electrical specifications are based on the specific electrified hardware components specified in hardware sets. When electronic hardware components other than those indicated in hardware sets are provided, the supplier shall be responsible for all costs incurred by the design team and their consultants to review and revise electrical drawings and electrical specifications. Supplier shall also be responsible for any additional costs associated with required changes in related equipment, materials, installation, or final hook up to ensure the system will operate and function as indicated in the construction documents, including hardware set operational / functional descriptions.

E. All hardware items shall be manufactured no earlier than 6 months prior to delivery to site.

F. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.

G. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.

H. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.

I. Hardware supplier shall participate when reasonably requested to meet with the contractor and or architect to inspect any claim for incorrect or non-functioning materials; following such inspection, the hardware supplier shall provide a written statement documenting the cause and proposed remedy of any unresolved items.

1.7 DELIVERY, STORAGE AND HANDLING

A. Hardware supplier shall deliver hardware to the job site unless otherwise specified.

B. All hardware shall be delivered in manufacturers' original cartons and shall be clearly marked with set and door number.

C. Contractor shall receive all hardware and provide secure and proper protection of all hardware items to avoid delays caused by lost or damaged hardware. Contractor shall report shortages to the Architect and hardware supplier immediately after receipt of material at the job site.

D. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

1.8 PRE-INSTALLATION MEETING

A. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.

B. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturer's representatives for above hardware items, and any other effected subcontractors or suppliers.

C. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

1.9 WARRANTY

A. All hardware items shall be warranted against defects in material and workmanship as set forth in Division 01 - General Requirements.

B. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner.

PART 2 - PRODUCTS

2.1 FASTENERS

A. All exposed fasteners shall be Phillips head or as otherwise specified and shall match the finish of the adjacent hardware. All fasteners ex-posed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.

B. Coordinate required reinforcements for doors and frames. Seek approval of the architect prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

2.2 BUTT HINGES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Stanley	Hager	McKinney
1. Standard Weight, Plain Bearing	5PB1	F179	****	T2714
2. Standard Weight, Ball Bearing	5BB1	BB179	BB1279	TB2714
3. Standard Weight, Ball Bearing, Non-Ferrous	5BB1	FBB191	BB1191	TB2314
4. Heavy Weight, Ball Bearing	5BB1HW	FBB168	BB1168	T4B3786
5. Heavy Weight, Ball Bearing, Non-Ferrous	5BB1HW	FBB199	BB1199	T4B3386

B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.1 (2006). Hinges shall meet or exceed the following ANSI grade requirements as indicated below:

1. Standard Weight, Plain Bearing Hinges: Grade 3
2. Standard Weight, 2 Ball Bearing Hinges: Grade 2
3. Heavy Weight, 4 Ball Bearing Hinges: Grade 1

C. Unless otherwise specified, furnish the following hinge quantities for each door leaf.

1. 3 hinges for doors up to 90 inches.
2. 1 additional hinge for every 30 inches on doors over 90 inches.
3. 4 hinges for Dutch door applications.

D. Unless otherwise specified, top and bottom hinges shall be located as specified in Division 08 Section "Hollow Metal Doors and Frames". Intermediate hinges shall be located equidistant from others.

E. Unless otherwise specified, furnish hinge weight and type as follows:

1. Standard weight: plain bearing hinge 5PB1 or ball bearing hinge 5BB1 for interior openings through 36 inches wide without a door closer.
2. Standard weight: ball bearing hinge 5BB1 for interior opening over 36 through 40 inches wide without a door closer, and for interior openings through 40 inches wide with a door closer.
3. Heavyweight: 4 ball bearing hinge 5BB1HW for interior openings over 40 inches wide, and for all vestibule doors.
4. Heavyweight: 4 ball bearing hinge 5BB1HWSS for exterior openings unless otherwise listed in groups.

5. Heavyweight: 4 ball bearing hinge 5BB1HWSS 5” for all exterior doors or 4 ball bearing hinge 5BB1HW 5” for interior doors, that have an automatic operator.

F. Unless otherwise specified, furnish hinges for exterior doors, fabricated from brass, bronze, or stainless steel. Unless otherwise specified, hinges for interior doors may be fabricated from steel.

G. Unless otherwise specified, furnish hinges in the following sizes:

1. 5" x 5" 2-1/4" thick doors
2. 4-1/2" x 4-1/2" 1-3/4" thick doors
3. 3-1/2" x 3-1/2" 1-3/8" thick doors

H. Furnish hinges with width to accommodate trim and allow for 180-degree swing.

I. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins. Furnish non-removable pin (NRP) hinges at all reverse-handed doors that are furnished with lockable hardware.

J. Unless otherwise specified, furnish all hinges to template standards.

2.3 CONTINUOUS GEARED HINGES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Hager	Pemko	Stanley
1. Full Mortise	112HD	780-112HD	FMSLFHD	661HD

B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.26, Grade 1 (2012).

C. Continuous hinges shall be geared type hinge providing full height door support up to 600 lbs.

D. Hinge shall be non-handed with symmetrical template hole pattern and factory drilled.

E. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 90 minutes.

F. Provide machine screws for doors which have been reinforced to accept machine screws.

G. Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

2.4 POWER TRANSFERS

A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin	ASSA
1. Concealed Two Wire	EPT-2	CEPT-10
2. Concealed Ten Wire	EPT-10	CEPT-10

B. Door cords shall be armored cable with screw on caps.

C. Concealed power transfers shall be concealed in the door and frame when the door is closed.

D. Concealed power transfers shall have a steel tube to protect wires from being cut.

E. Concealed power transfers with spring tubes shall be rejected.

F. Concealed power transfers shall be supplied with a mud box to house all terminations.

2.5 FLUSH BOLTS AND DUST PROOF STRIKES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Trimco	Hager
1. Dust Proof Strike	DP2	3910	280X
2. Auto Flush Bolt (Metal Door)	FB31P	3810	292D
3. Auto Flush Bolt (Wood Door)	FB41P	3815L	291D
4. Constant Latching Bolt (Metal Door)	FB51P	3820	293D

5.	Constant Latching Bolt (Wood Door)	FB61P	3825L	294D
6.	Manual Flush Bolt	FB458	3915	282D

B. Unless otherwise specified, provide 12" rods for manual flush bolts for door 7'6" or less, 24" top rods for doors over 7'6" to 8'6".

C. Unless otherwise specified, provide doors over 8'6" with automatic top bolts.

D. Provide automatic flush bolts where required to maintain fire door listing and or egress requirements on pairs of doors.

E. All flush-bolt applications shall be UL listed to be installed with top flush-bolt only. Provide auxiliary fire bolt as required for fire rated openings where less bottom bolt has been specified.

F. Provide all bottom flush bolts with non-locking dust proof strikes.

2.6 EXIT DEVICES

A. Acceptable manufacturers and respective catalog numbers:

		Von Duprin	Falcon	Corbin
1.	Wide Stile, Push Pad	98 Series	25 Series	ED5000-M110 Series
2.	Wide Stile, Electric Latch Retraction	QEL 98 Series	MEL 25 Series	ED5000S-MELR-M110 Series
3.	Lever Trim	996 Series	510L / 511L Series	900 Series
4.	Pull Trim	990 Series	512 Series	1300 Series

A. Exit devices shall be independently certified by ANSI for compliance with ANSI A156.3, Grade 1 (2008).

B. Obtain exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. All exit devices shall be equipped with a sound-dampening feature to reduce touch pad return noise.

D. Quiet Electric Latch Retraction shall be accomplished using a motor driven assembly, and shall incorporate the following features:

1. Motor shall retract both the push pad assembly and latchbolt.
2. Automatic calibration of latch throw and pull.
3. Built-in time delay.
4. On-board installation and troubleshooting diagnostics built into power supply and device.
5. Retry mode if device does not pull on the first try.

E. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.

F. All exit devices shall be provided with flush end caps to reduce potential damage from impact.

G. All exit devices shall be provided with dead-locking latch bolts to ensure security.

H. All exit devices shall be U.L. listed for accident hazard. Exit device for use on fire doors shall also be U.L. listed for fire exit hardware.

I. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series devices where optional strikes will not accommodate door and frame conditions.

J. Coordinate with related trades to ensure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.

K. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR)

L. All exit devices shall be provided with trim designs to match other lever and pull designs used on the project.

M. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.

N. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.

O. Provide Von Duprin #154 or equivalent mullion stabilizers at all doors with removable mullions.

P. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36" wide.

2.7 LOCKS AND LATCHES

A. Acceptable manufacturers and respective catalog numbers:

	Schlage	No Substitution
1. Grade 1 Mortise	L Series 07A	
2. Grade 1 Cylindrical	ND Series ATH	
3. Grade 2 Tubular	F Series MER	

B. Bored locks shall be independently certified by ANSI for compliance with ANSI A156.2 (2011).

C. Interconnected locks shall be independently certified by ANSI for compliance with ANSI A156.12 (2013).

D. Interconnected locks shall accommodate center to center dimensions of 4” or 5-1/2” between deadbolt and latch.

E. Mortise locks shall be independently certified by ANSI for compliance with ANSI A156.13 (2012).

F. Provide full narrow escutcheon at mortise locks with indicators.

G. Unless otherwise specified, all locks and latches to have:

1. 2-3/4" Backset
2. 1/2" minimum throw latchbolt
3. 1" throw deadbolt
4. ANSI A115.2 strikes

H. Provide guarded latch bolts for all locksets, and latch bolts with throw to maintain fire rating of both single and paired door assemblies.

I. Provide strike with lip length adequate to clear surrounding trim.

J. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.

K. Provide temperature control modules for electrified locks to limit transfer of heat to door lever.

2.8 PULLS, PUSH BARS, PUSH/PULL PLATES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Burns	Hager
1. Straight Pull (1" dia., 10" CTC)	8103-0	26C	4J
2. Pull / Push-Bar (1" dia., 10" CTC Pull)	9103-0	422 x 26C	153
3. Push Plate (.050 6"X 16")	8200 6" X 16"	56	30S 6 x 16
4. Pull Plate (1" dia., 10" CTC - .050" X 4" X 16")	8303-0 4" X 16"	5426C	34J 4 x 16

A. Adjust dimensions of push plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, push plates shall be factory drilled for cylinders or other mortised hardware. All push plates shall be beveled 4 sides and counter sunk.

B. When mounting straight pull on a wide stile door will prevent access to key cylinder, mount pull offset from cylinder location to allow access to cylinder.

C. Where possible, provide back-to-back, and concealed mounting for pulls and push bars. Push bar length shall be 3" less door width, or center of stile to center of stile for stile & rail or full glass doors.

2.9 COORDINATORS

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Trimco	Hager
1. Bar Coordinator	COR x FL	3094	297D x 297F
2. Mounting Bracket	MB Series	3095/3096	297 Series

B. Provide coordinators at all pairs of doors having automatic flush bolts and closers on the inactive leaf, and for pairs of doors having vertical rod/mortise exit device combinations with overlapping astragals.

C. Provide appropriate filler bars, closer mounting brackets, carry bars, and special top latch preparations as required by adjacent hardware.

2.10 CLOSERS

A. Acceptable manufacturers and respective catalog numbers:

	LCN	Yale	Norton
1.	4050A / 4050A EDA	R4400 / PR4400	R7500 / PR7500
2.	1450A / 1450A EDA FC	3501 FC	8501 FC

B. Door closers shall be independently certified by ANSI for compliance with ANSI A156.4, Grade 1 (2013).

C. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. Provide extra heavy-duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.

E. Hardware supplier shall coordinate with related trades to ensure aluminum frame profiles will accommodate specified door closers.

F. Closers shall use aluminum cylinders.

G. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.

H. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.

I. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.

J. Provide closers with adjustable spring power. Size closers to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.

K. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.

L. Closers shall be furnished complete with all mounting brackets and cover plates as required by door and frame conditions, and by adjacent hardware.

M. Door closers shall be provided with a powder coat finish to provide superior protection against the effects of weathering. Powder coat finish shall successfully pass a 100-hour salt spray test.

2.11 LOW ENERGY ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Acceptable manufacturers and respective catalog numbers:

LCN

1. Electro-Hydraulic Operator 4640

B. Low energy operators shall be independently certified by ANSI for compliance with ANSI A156.19 (2002).

C. Where low kinetic energy, as defined by ANSI/BHMA Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered operators complying with the ADA for opening force and time to close standards.

D. The closing action shall be controlled by modern type cast iron door closer cylinder filled with a flat viscosity fluid, stable from +120F to -30F that would require no seasonal adjustments. The closer shall have field adjustable spring power; have two independent closing speed adjustment valves, and hydraulic back-check.

E. Full closing force shall be provided when the power or assist cycle ends.

F. All power operator systems shall include the following features and functions:
   1. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, section 725-31.
   2. The operator will be designed with an electronically controlled mechanical clutching mechanism to prevent damage to the operator if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
   3. All covers, mounting plates and arm systems shall be powder coated and successfully pass a minimum of 100 hours testing as outlined in ANSI/BHMA Standard A156.18.
   4. UL listed for use on labeled doors.
   5. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
   6. The power operator shall incorporate microprocessor controlled digital controls including factory default memory settings, on-board diagnostics, non-volatile memory, and integrated delay and relay for controlling door release devices.
   7. Provisions in the control box or module shall provide control {inputs and outputs) for; electric strike delay, auxiliary contacts, sequential operation, fire alarms systems, actuators, swing side sensors, and stop side sensors.
   8. Exterior actuator switches shall be weather resistant and mount on a single gang electrical box furnished by Division 26.

G. All electrically powered operators shall include the following features or functions:
   1. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
   2. Easily accessible main power and maintain hold open switches will be provided on the operator.
   3. An electronically controlled clutch to provide adjustable opening force.
   4. A microprocessor to control all motor and clutch functions.
   5. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
   6. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.
   7. If electrical failure occurs, the unit shall operate as a standard door closer.

H. Power Operators shall be warranted by the manufacture to be free from defects in material and workmanship for a period of two years.

2.12 KICK PLATES AND MOP PLATES

A. Furnish protective plates as specified in hardware groups.

B. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk.

D. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing. When protection plates over 16” are provided for labeled doors, the plate shall be labeled.

E. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.

F. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

2.13 OVERHEAD STOPS

A. Acceptable manufacturers and respective catalog numbers:

	Glynn-Johnson	Rixson	Sargent
1. Heavy Duty Surface Mount	GJ900 Series	9 Series	590
2. Heavy Duty Concealed Mount	GJ100 Series	1 Series	690

B. Unless otherwise specified, furnish GJ900 series overhead stop for hollow metal or 1-3/4” solid core doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for hollow metal or 1-3/4” solid core doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.

C. Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.

D. Provide special stop only (“SE” suffix) overhead stops when used in conjunction with electronic hold open closers.

E. Do not provide holder function for labeled doors.

2.14 WALL STOPS AND HOLDERS

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Hager	Burns
1. Wrought Convex Wall Stop	WS406CVX	232W	570
2. Wrought Concave Wall Stop	WS406CCV	236W	575
3. Automatic Wall Holder	WS40	326W	533

B. Furnish a stop or holder for all doors.

C. Provide concave style wall stop at all adjacent integral push button locks; provide convex style wall stop at all other locations.

D. Where wall stops are not applicable, furnish overhead stops.

E. Furnish floor stops only where specified in hardware sets.

F. Do not provide holder function for labeled doors.

2.15 MAGNETIC HOLD OPENS

A. Acceptable manufacturers and respective catalog numbers:

	LCN	ABH	Edwards
1. Wall Holder	SEM 7800	2000	1500

B. Magnetic hold opens shall be independently certified by ANSI for compliance with ANSI A156.15, Grade 1 (2006).

C. Magnetic holder housing and armature shall be constructed of die-cast zinc.

D. Where wall conditions do not permit the armature to reach the magnet, provide extensions.

E. Provide proper voltage and power consumption as required by Division 16.

F. Coordinate electrical requirements and mounting locations with related trades.

2.16 WEATHERSTRIP, GASKETING

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Weatherstrip	429	2891_PK	700NA	755
2. Adhesive Gasket	188	S88	5050	797
3. Mullion Seal/Silencer	8780	5110	5100N	***
4. Meeting Edge Seals	8193	18041	9605	959
5. Automatic Door Bottom	360	434_RL	423N	430
6. Sweep (Brush)	8192	18061_NB	B606	964
7. Sweep (Neoprene)	39	315_N	200N	323
8. Door Shoe	111	217_PK	36N	DB594
9. Sweep w/ drip	8198	345_N	C627	354
10. Drip Cap	142	346	16	R201

B. Weatherstrip and gasketing shall be independently certified by ANSI for compliance with ANSI A156.22 (2005).

C. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

D. Provide weatherstripping all exterior doors and where specified in hardware sets.

E. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

F. Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.

G. Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

2.17 THRESHOLDS

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Saddle Threshold	8655	171	425	S205
2. Half Saddle Threshold	1675	****	325	S245
3. Saddle Threshold (Inswing)	653	169	****	****
4. Saddle Threshold (Interior)	63	151	411	S263

A. Thresholds shall be independently certified by ANSI for compliance with ANSI A156.21 (2001).

B. Hardware supplier shall verify finish floor conditions and provide proper threshold as required to provide a smooth transition between finished floor surfaces.

C. Unless otherwise specified or detailed, provide threshold as follows:

1. Provide Zero 8655 or similar saddle threshold for exterior openings with finished floor height transition of ¼" or less.
2. Provide Zero 1675 or similar half-saddle threshold for exterior openings with finished floor height transition of ¼" to ½".
3. Provide Zero 653 or similar narrow saddle threshold for exterior doors that swing into the building.
4. Provide Zero 63 or similar low-rise saddle threshold for interior openings when specified with a door sweep or automatic door bottom.

2.18 ELECTRIC STRIKES

A. Acceptable manufacturers and respective catalog numbers:

Von Duprin HES

1. Type 1 6200 Series 4500 Series
2. Type 2 6300 Series 9500 Series

B. Provide electric strikes compatible with the type of locks shown at each opening where specified.

C. Electric strikes shall be UL listed as Burglary-Resistant Electric Door Strikes and where required shall be UL listed as Electric Strike for Fire Doors.

D. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.19 MAGNETIC LOCKS

A. Acceptable manufacturers and respective catalog numbers:

	Schlage Electronics	Securitron
1. Direct Hold	M490 Series	82B

B. Provide magnetic locks as specified, complete with mounting brackets and fasteners appropriate to the application. Direct Hold magnetic locks shall have a minimum of 1500 lbs. holding force. Shear Locks shall have a minimum of 2700 lbs. holding force.

C. Provide magnetic locks with integral magnetic bond sensor, time delay (1-90 Seconds) for re-locking, and LED status indicator as noted in hardware groups.

D. Provide regulated and filtered power supplies for magnetic locks by the same manufacturer.

2.20 POWER SUPPLIES

A. Provide quantities and types as specified in hardware sets. Shared power supplies will not be accepted without prior approval from the owner.

B. All power supplies shall have the following features:

1. 12/24 VDC Output, field selectable.
2. Class 2 Rated power limited output.
3. Universal 120-240 VAC input.
4. Low voltage DC regulated and filtered.
5. Polarized connector for distribution boards.
6. Fused primary input.
7. AC input and DC output monitoring circuit w/LED indicators.
8. Cover mounted AC Input indication.
9. Tested and certified to meet UL294.
10. NEMA 1 enclosure.
11. Hinged cover w/lock down screws.
12. High voltage protective cover.

C. All power supplies shall incorporate fused distribution boards.

D. All electro-mechanical systems requiring fail safe circuits shall be capable of interfacing with the fire alarm system to cut power to appropriate system components. Unless already provided in another system component, all power supplies utilized in fail safe circuits shall include an integral relay which when connected to the N/C fire alarm contact will cut power to all openings connected to the individual power supply. Power supply, unless otherwise specified, will automatically reset itself when fire alarm relay returns to normal state following a fire alarm.

2.21 DOOR POSITION SWITCHES

A. Acceptable manufacturers and respective catalog numbers:

	Schlage Electronics	GEI	Sargent
1. Concealed	679 Series	1076W	3287

2.22 SLIDING DOOR HARDWARE

A. Acceptable Manufacturers and respective catalog numbers:

K.N. Crowder

1. Barn Door Kit As specified

B. Provide complete hardware sets for each opening specified with sliding door hardware. Include track, ball-bearing hangers, door stops, fasteners, guides, and all hardware required for a complete installation.

C. Hardware supplier shall coordinate with related trades to ensure that wall pocket framing will accommodate specified hardware.

2.23 FINISHES AND BASE MATERIALS

A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

	HARDWARE ITEM	BHMA FINISH
1.	Butt Hinges: Exterior, or Non-Ferrous	614 (Oxidized Bronze)
2.	Butt Hinges: Interior	641 (Oxidized Bronze)
3.	Continuous Hinges	710 (Dark Bronze Anodized)
4.	Flush Bolts	643e (Aged Bronze)
5.	Exit Devices	313AN (Anodized Duranodic)
6.	Locks and Latches	643e (Dark Bronze)
7.	Pulls and Push Plates/Bars	695 (Dark Bronze)
8.	Coordinators	711 (Black Anodized)
9.	Closers	695 (Powder Coat Dark Bronze)
10.	Protective Plates	695 (Dark Bronze)
11.	Overhead Stops	SP313 (Powder coat dark bronze)
12.	Wall Stops and Holders	643e (Aged Bronze)
13.	Thresholds	719 (Mill Aluminum)
14.	Weather-strip, Sweeps Drip Caps	710 (Dark Bronze Anodized)
15.	Magnetic Holders	695 (Powder Coat Dark Bronze)
16.	Magnetic Locks	628 (US28)
17.	Miscellaneous	613 (US10B - Oil Rubbed Bronze)

2.24 KEYING

A. Provide all cylinders in keyways as required to accommodate owners existing Schlage key system.

B. All locks under this section shall be keyed as directed by the owner to an existing Master Key System.

C. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.

D. Master keys, control keys, and change keys shall be delivered by registered mail to the owner. Construction keys shall be delivered to the contractor.

2.25 KEY CABINETS

A. Acceptable manufacturers and respective catalog numbers:

	Lund	Key Control	Telkee
1.	1200-1205 AA	M228-2480	RWC-AWC

B. Furnish 1 each model 1200 or 1205 AA key cabinet with a capacity 1.5 times the number of key sets.

C. Provide one key cabinet with at least one hook for each key set, plus additional hooks for 50% expansion.

D. Furnish key cabinet complete with cam lock, permanent key tags, and change key cards.

E. Hardware supplier shall prepare all key change index records, tag all keys and place permanent file keys in cabinet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, installer shall examine door frame installation to ensure frames have been set square and plumb. Installer shall examine doors, door frames, and adjacent wall, floor, and ceiling for conditions, which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

3.2 INSTALLATION

A. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar with a 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices, continuous hinges and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical products samples.

B. Provide blocking or reinforcement for all hardware mounted to drywall construction, including wall mounted door stops and holders.

C. Shim doors as required to maintain proper operating clearance between door and frame.

D. Install all hardware in accordance with the approved hardware schedule and manufacturer’s instructions for installation and adjustment.

E. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.

G. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.

H. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute.

I. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.

J. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.

K. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the label.

L. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.

M. Install hardware in accordance with supplemental "S" label instructions on all fire rated openings.

N. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework, or equipment.

O. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.

P. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.

Q. Install door closers on corridor side of lobby doors, room side of corridor doors, and stair side of stairways.

R. Adjust spring power of door closers to the minimum force required to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to ensure opening force does not to exceed 5 lbs.

S. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door throughout the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building codes.

T. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel arm door closers, exit devices, etc., as required to accommodate weatherstripping.

U. Unless otherwise specified or detailed, install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.

V. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water-resistant seal.

W. Deliver to the owner one complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.3 FIELD QUALITY CONTROL

A. After installation has been completed, the hardware supplier for locksets, door closers, exit devices, and overhead stops shall check the project and verify compliance with installation instructions, adjustment of all hardware items, and proper application according to the approved hardware schedule. Hardware supplier shall submit a list of all hardware that has not been installed correctly.

B. After installation has been completed, the hardware supplier and manufacturer's representative shall meet with the owner to explain the functions, uses, adjustment, and maintenance of each item of hardware. Hardware supplier shall provide the owner with a copy of all wiring diagrams. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

3.4 ADJUSTMENT AND CLEANING

A. At final completion, and when H.V.A.C. equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. Lubricate moving parts with type lubrication recommended by the manufacturer.

B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective, or inoperative shall be repaired or replaced.

3.5 HARDWARE SCHEDULE

A. The following schedule of hardware groups are intended to describe opening function. The hardware supplier is cautioned to refer to the preamble of this specification for a complete description of all materials and services to be furnished under this section.

121699 OPT0393239 VERSION 3

HW SET: 001

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	ALL HARDWARE BY	DOOR SUPPLIER	B/O

HW SET: 005A

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	BI-FOLD HARDWARE SET	1260 4 DR	GRA
	EA	HINGE	AS REQUIRED	IVE
2	EA	DOOR PULL	38	IVE

PROVIDE COMPLETE HARDWARE SETS FOR EACH OPENING SPECIFIED WITH BI-FOLDING DOOR HARDWARE. INCLUDE TRACK, PIVOTS, BALL-BEARING HANGERS, HINGES, FASTENERS, GUIDES AND ALL HARDWARE REQUIRED TO COMPLETE THE INSTALLATION.

HW SET: 009BN1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	BARN DOOR HW KIT	RUSTICA CLASSIC BARN DOOR HARDWARE	RUS
1	EA	DOOR PULL	RUSTICA INDUSTRIC 30"	RUS
1	EA	FLUSH PULL	RUSTICA MODERN FLUSH BARN DOOR PULL 12"	

FUNCTION: SLIDING BARN DOOR. NON-LOCKING.

HW SET: 009BN2

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	BARN DOOR HW KIT	RUSTICA CLASSIC BARN DOOR HARDWARE	RUS
2	EA	BACK-TO-BACK DOOR PULL	RUSTICA INDUSTRIC 30"	RUS

FUNCTION: SLIDING BARN DOOR. NON-LOCKING.

HW SET: 012HK

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50	SCH
1	EA	WALL STOP	WS406	IVE
1	EA	COAT AND HAT HOOK	572	IVE

FUNCTION: ND50 (F82) ENTRANCE/OFFICE LOCK
PUSH-BUTTON LOCKING. PUSH-BUTTON LOCKS OUTSIDE LEVER UNTIL UNLOCKED WITH KEY OR BY TURNING INSIDE LEVER.

HW SET: 013

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	WALL STOP	WS406	IVE

FUNCTION: ND70 (F84) CLASSROOM LOCK OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 013F

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	OH STOP	90S	GLY

FUNCTION: ND70 (F84) CLASSROOM LOCK OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 014

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	WALL STOP	WS406	IVE

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 014F

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	OH STOP	90S	GLY

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 024F

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	MANUAL FLUSH BOLT	MANUAL	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	STOREROOM LOCK	ND80	SCH
2	EA	OH STOP	90S	GLY

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 025F

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	ROLLER LATCH	RL32	IVE
1	EA	SINGLE DUMMY TRIM	ND170	SCH
2	EA	OH STOP	90S	GLY

FUNCTION: ND170 SINGLE DUMMY TRIM
DUMMY TRIM FOR ONE SIDE OF DOOR. USED FOR DOOR PULL OR AS MATCHING INACTIVE TRIM.

HW SET: 030A

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND10 (F75) PASSAGE LATCH
BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 030A01

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	GASKETING	188S	ZER
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: ND10 (F75) PASSAGE LATCH
BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 030A02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10	SCH
1	EA	SURFACE CLOSER	1450 DEL REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: ND10 (F75) PASSAGE LATCH
BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 031I01

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CORRIDOR LOCK	L9456 L583-363 L283-722	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S	ZER

FUNCTION: L9456 PRIVACY WITH “OCCUPIED” INDICATOR
LEVER RETRACTS LATCHBOLT FROM EITHER SIDE. DEADBOLT THROWN OR RETRACTED BY KEY OUTSIDE (RETRACTION BY KEY REQUIRED IN THE EVENT OF AN EMERGENCY) OR INSIDE THUMBTURN. THROWING DEADBOLT LOCKS OUTSIDE LEVER AND DISPLAYS “OCCUPIED” PLATE. ROTATING INSIDE LEVER SIMULTANEOUSLY RETRACTS BOTH DEADBOLT AND LATCHBOLT AND UNLOCKS OUTSIDE LEVER.

HW SET: 031SST

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED STAINLESS STEEL	IVE
1	EA	CORRIDOR LOCK	L9456 L583-363 L283-722	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: L9456 PRIVACY WITH “OCCUPIED” INDICATOR
LEVER RETRACTS LATCHBOLT FROM EITHER SIDE. DEADBOLT THROWN OR RETRACTED BY KEY OUTSIDE (RETRACTION BY KEY REQUIRED IN THE EVENT OF AN EMERGENCY) OR INSIDE THUMBTURN. THROWING DEADBOLT LOCKS OUTSIDE LEVER AND DISPLAYS “OCCUPIED” PLATE. ROTATING INSIDE LEVER SIMULTANEOUSLY RETRACTS BOTH DEADBOLT AND LATCHBOLT AND UNLOCKS OUTSIDE LEVER.

HW SET: 032A

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER
1	EA	COAT AND HAT HOOK	572	IVE

FUNCTION: ND50 (F82) ENTRANCE/OFFICE LOCK
PUSH-BUTTON LOCKING. PUSH-BUTTON LOCKS OUTSIDE LEVER UNTIL UNLOCKED WITH KEY OR BY TURNING INSIDE LEVER.

HW SET: 032TGP

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	PIVOTS	BY DOOR SUPPLIER	
1	EA	NARROW STILE OFFICE LOCK	BY DOOR SUPPLIER	TGP
1	EA	SURFACE CLOSER	4040XP PULL SIDE	LCN
1	EA	WALL STOP	WS406	IVE
1	SET	GASKET	302250	

FUNCTION: (F04) OFFICE LOCK. OUTSIDE LEVER LOCKED/UNLOCKED BY OUTSIDE KEY OR INSIDE THUMB TURN. WHILE LOCKED, LATCHBOLT RETRACTED BY OUTSIDE KEY OR INSIDE LEVER. OUTSIDE LEVER REMAINS LOCKED UNTIL UNLOCKED BY OUTSIDE KEY OR INSIDE THUMB TURN. INSIDE LEVER ALWAYS UNLOCKED FOR FREE EGRESS. AUXILIARY LATCH DEADLOCKS LATCH BOLT WHEN DOOR IS CLOSED.

HW SET: 033

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 033D

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034B

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	1450 SCUSH FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034B99

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	1450 SCUSH FC	LCN
1	EA	GASKETING	188S (4 SIDES)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034D

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034DSST

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED STAINLESS STEEL	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	1450 SCUSH FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034SST

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED STAINLESS STEEL	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 034X

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	4050 SCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	RAIN DRIP	142AA	ZER
1	EA	GASKETING	429AA-S	ZER
1	EA	DOOR SWEEP	8198AA	ZER
1	EA	THRESHOLD	8655	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

NOTE: MOUNT WEATHERSTRIPPING PRIOR TO CLOSER.

HW SET: 040A03

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	SET	AUTO FLUSH BOLT	AUTOMATIC LBB	IVE
1	EA	PASSAGE SET	ND10S	SCH
1	EA	COORDINATOR	COR X FL	IVE
2	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	SET	SEALS	188S	ZER
1	EA	MEETING STILE SEAL	S771	PEM
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: ND10 (F75) PASSAGE LATCH
BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 044A02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	SET	CONST LATCHING BOLT	CONSTANT	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	STOREROOM LOCK	ND80	SCH
2	EA	SURFACE CLOSER	4050/4050 EDA DEL	LCN
2	EA	ARMOR PLATE	8400/8402 34" X 1" LDW B-CS	IVE
2	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S	ZER
1	EA	MEETING STILE SEAL	S771	PEM

HW SET: 050AMAG

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F	VON
1	EA	MAGNETIC LOCK	M490P	SCE
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER
1	EA	WANDER MANAGEMENT SYSTEM	BY SECURITY SUPPLIER	B/O
2	EA	CARD READER	BY SECURITY SUPPLIER	
1	EA	DOOR CONTACT	679	SCE
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: PASSAGE LEVER PANIC HARDWARE. OUTSIDE LEVER ALWAYS UNLOCKED. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.
WANDER MANAGEMENT SYSTEM (BY OTHERS) LOCKS DOOR WHEN ELOPEMENT RISK DETECTED.

HW SET: 053

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	PANIC HARDWARE	LD-98-L	VON
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: CLASSROOM LEVER PANIC HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY OUTSIDE KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 054A

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	FIRE EXIT HARDWARE	98-NL-F	VON
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	SET	SEALS	188S	ZER

FUNCTION: (ANSI/BHMA 03) LATCHBOLT RETRACTED BY DEPRESSING THE ACTUATION BAR. ENTRANCE BY TRIM WHEN LATCH IS RELEASED BY KEY. KEY ONLY REMOVABLE WHEN LOCKED.

HW SET: 054A02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-98-L-NL-F	VON
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	SET	SEALS	188S	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.
THIS DOOR HAS A POWER OPERATOR. INTERIOR ACTUATOR ALWAYS ACTIVE TO UNLOCK AND OPEN THE DOOR. A VALID CREDENTIAL WILL UNLOCK THE DOOR AND MAKE THE EXTERIOR ACTUATOR ACTIVE.
UPON ACTUATION OF FIRE ALARM SYSTEM, ELECTRIC LATCH RETRACTION TO RELEASE TO LATCH DOOR.

HW SET: 054X

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-98-NL-F	VON
1	EA	SURFACE CLOSER	4050 SCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIPPING	429	ZER
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	DOOR CONTACT	679	SCE
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

HW SET: 064E02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CONT. HINGE	224HD EPT	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC PANIC HARDWARE	RX-QEL-9827-L-NL-F-LBR-RGO	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9827-L-DT-F-LBR-RGO	VON
1	EA	MAGNETIC LOCK	M492P	SCE
1	EA	SURFACE CLOSER	4050 SCUSH	LCN
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
2	EA	ARMOR PLATE	8400/8402 34" X 1" LDW B-CS	IVE
1	EA	GASKETING	188S	ZER
1	SET	MEETING STILE SEAL	8193 X 8193	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.
THIS DOOR HAS A POWER OPERATOR. INTERIOR ACTUATOR ALWAYS ACTIVE TO UNLOCK AND OPEN THE DOOR. A VALID CREDENTIAL WILL UNLOCK THE DOOR AND MAKE THE EXTERIOR ACTUATOR ACTIVE.
WANDER MANAGEMENT SYSTEM (BY OTHERS) LOCKS DOOR WHEN ELOPEMENT RISK DETECTED.

HW SET: 110A01

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR	VON
2	EA	SURFACE CLOSER	4050 EDA	LCN
2	EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	GASKETING	188S	ZER
1	EA	MEETING STILE SEAL	S771	PEM
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD, EXTERIOR BY LEVER. LEVER DOES NOT LOCK.

HW SET: 111A02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR	VON
2	EA	SURFACE CLOSER	4000T ST-2457	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	SET	SEALS	188S	ZER
1	EA	MEETING STILE SEAL	S771	PEM
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD. NO EXTERIOR TRIM.

HW SET: 182XL

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CONT. HINGE	112HD	IVE
2	EA	PUSH/PULL BAR	9103EZ	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	B/O
2	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER

PUSH/PULL. INSIDE OR OUTSIDE PUSH PLATE ACTUATOR AUTOMATICALLY OPENS BOTH DOORS.

HW SET: 251X

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	CONT. HINGE	112HD	IVE
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	PANIC HARDWARE	LD-98-EO	VON
1	EA	MAGNETIC LOCK	M490P	SCE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050 EDA	LCN
1	EA	RAIN DRIP	142AA	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	DOOR SWEEP	8198AA	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	WANDER MANAGEMENT SYSTEM	BY SECURITY SUPPLIER	B/O
1	EA	DOOR CONTACT	679	SCE

FUNCTION: EXIT-ONLY PANIC HARDWARE - NO OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.
WANDER MANAGEMENT SYSTEM (BY OTHERS) LOCKS DOOR WHEN ELOPEMENT RISK DETECTED.

HW SET: 254E99

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	PIVOTS	BY DOOR SUPPLIER	
1	EA	POWER TRANSFER	EPTL	SEC
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC FIRE EXIT HARDWARE	QEL-33A-L-NL-F	VON
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP EDA	LCN
1	SET	GASKET	302250	
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	WIRE DIAGRAM	POINT TO POINT	
	EA	N/C FIRE ALARM CONTACT	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.
LATCH RETRACTION TO RELEASE UPON ACTUATION OF FIRE/LIFE SAFETY ALARM SYSTEM FOR POSITIVE LATCHING AT FIRE DOORS.
NOTE: HARDWARE SUPPLIED AS PART OF COMPLETE FIRE DOOR ASSEMBLY BY TGP.

HW SET: 254X42

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	CONT. HINGE	112HD EPT	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP	VON
1	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050 EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCH-BOLT RETRACTED INSIDE BY DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR. DOOR RE-LOCKS WHEN CARD READER TIMES OUT.

HW SET: 254X44

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	CONT. HINGE	112HD EPT	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP	VON
1	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
1	EA	RAIN DRIP	142A	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCH-BOLT RETRACTED INSIDE BY DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR. DOOR RE-LOCKS WHEN CARD READER TIMES OUT. INTERIOR ACTUATOR ALWAYS ACTIVE TO RETRACT LATCH AND OPEN DOOR. EXTERIOR ACTUATOR ONLY ACTIVE WHEN THE DOOR IS UNLOCKED BY CARD READER.

HW SET: 254X44.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	CONT. HINGE	112HD EPT	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP	VON
1	EA	MAGNETIC LOCK	M490P	SCE
1	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
1	EA	RAIN DRIP	142A	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	WANDER MANAGEMENT SYSTEM	BY SECURITY SUPPLIER	B/O
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCH-BOLT RETRACTED INSIDE BY DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR. DOOR RE-LOCKS WHEN CARD READER TIMES OUT. INTERIOR ACTUATOR ALWAYS ACTIVE TO RETRACT LATCH AND OPEN DOOR. EXTERIOR ACTUATOR ONLY ACTIVE WHEN THE DOOR IS UNLOCKED BY CARD READER.
WANDER MANAGEMENT SYSTEM (BY OTHERS) LOCKS MAGNETIC LOCK WHEN ELOPEMENT RISK DETECTED.

HW SET: 264E44

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CONT. HINGE	112HD EPT	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-EO	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-NL-OP	VON
1	EA	INTERFACE BOX	JB7-R2	VON
2	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED. THIS DOOR HAS A POWER OPERATOR. INTERIOR ACTUATOR ALWAYS ACTIVE TO UNLOCK AND OPEN BOTH DOORS. A VALID CREDENTIAL UNLOCKS BOTH DOORS AND MAKE THE EXTERIOR ACTUATOR ACTIVE.

HW SET: 634E01

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER HINGE	TW4 AS REQUIRED	IVE
1	EA	STOREROOM LOCK	RX-ND80	SCH
1	EA	ELECTRIC STRIKE	6211 FSE	VON
1	EA	SURFACE CLOSER	1450 REG OR PA AS REQ FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	BY SECURITY SUPPLIER	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass, insulated glass units, fire-resistance rated glass.

B. Glazing compounds and accessories.

1.02 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM C1036 - Standard Specification for Flat Glass; 2011.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

F. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units; 2001.

G. ASTM E 774 - Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units; 1997.

H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

I. GANA (GM) - GANA Glazing Manual; 2009.

J. GANA (SM) - GANA Sealant Manual; 2008.

1.03 PERFORMANCE REQUIREMENTS

A. Select type and thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with applicable code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200, flexure limit of glass, or 3/4 inch whichever is less, with full recovery of glazing materials.
   3. Thicknesses listed are minimum.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Certificates: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 INSULATING GLASS UNITS

A. Type IN - Sealed Insulating Glass Units: Vision glass, double glazed.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
      b. Coating: Low-E (passive type), on #2 surface.
   3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
   4. Total Thickness: 1 inch.

2.02 GLAZING UNITS

A. Type IT - Sealed Insulating Glass Units: Safety glazing.
   1. Application: Provide this type of glazing in the following locations:
      a. Glazed lites in exterior doors.
      b. Glazed sidelights and panels next to doors.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on the drawings.
   2. Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.
   3. Tint: Clear.

2.03 EXTERIOR GLAZING ASSEMBLIES

A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Glass thicknesses listed are minimum.

2.04 GLASS MATERIALS

A. Fabricators:
   1. Viracon, Inc: www.viracon.com/#sle.
   2. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Float Glass: All glazing is to be float glass unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
   3. Tinted Types: Color and performance characteristics as indicated.
   4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

C. Fire Resistance-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings at doors in firewall.
   1. IBC Fire Resistance Rating: W-90, minimum.
   2. Provide products listed by Underwriters Laboratories or Intertek Warnock Hersey.
   3. Safety Certification: 16 CFR 1201 Category II.
   4. Products:
      a. Technical Glass Products; Pilkington Pyrostop: www.fireglass.com/#sle.
      b. Substitutions: Refer to Section 01 60 00 - Product Requirements.

D. Clear Float Glass : Clear, annealed.
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).

2. 6 mm minimum thick; except 3 mm when used in 16 mm thick insulating glass assemblies.

E. Safety Glass : Clear; fully tempered.
1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C 1048.
2. Comply with 16 CFR 1201 test requirements for Category II.
3. Comply with ANSI Z97.1.
4. 6 mm minimum thick; except 3 mm when used in 16 mm thick insulating glass assemblies.

F. Low E Glass : Float type, heat strengthened, except tempered when otherwise indicated, clear.
1. Coating on inner surface.
2. Comply with ASTM C 1036, Type I, transparent flat, Quality Q3 (glazing select).
3. 6 mm minimum thick; except 3 mm when used in 16 mm thick insulating glass assemblies.

2.05 SEALED INSULATING GLASS UNITS

A. Sealed Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Edge Spacers: Aluminum, bent and soldered corners.
3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
4. Purge interpane space with dry hermetic air.

B. Insulated Glass Units : Double pane with glass to elastomer edge seal.
1. Outer pane of clear, Low E glass, inner pane of clear, float glass; except when applicable code or regulation requires use of safety glass, provide outer and inner panes of safety glass. Float glass, safety glass, and Low E glass conforming to Products previously specified in this Section.
2. Place low E coating on No.2 surface within the unit.
3. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
4. Comply with ASTM E 774 and E 773, Class CBA.
5. Fill interpane space with argon gas.
6. Total unit thickness of 1 inch , except when otherwise indicated.

C. Edge Seal Construction: Aluminum, bent and soldered corners.

2.06 GLAZING COMPOUNDS

A. Glazing Putty, Type ___: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; grey color.

B. Butyl Sealant, Type ___: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

C. Silicone Sealant, Type ___: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; _____ color.

2.07 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; size appropriate to use; black color.

D. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; hardness range of 5 to 30 cured Shore A durometer; coiled on release paper; black color.

E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; _____ color.

F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

E. Install sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
   1. Place glazing tape on glazing pane of unit with tape flush with sight line.

F. Place glazing tape on glazing pane or unit with tape 1/4 inch below sight line. Install removable stops.

G. Apply cap bead of butyl type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.06 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)

A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.

B. Locate and secure glazing pane using glazers' clips.

C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.07 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.08 SCHEDULE - SETTING METHOD

A. Metal-Framed Storefronts : Exterior/interior dry method.

B. Exterior Steel Doors and Frames: Exterior wet/dry method.

C. Interior Steel Doors and Frames: Interior dry method.

D. Wood Doors : Interior wet method.

END OF SECTION

SECTION 08 83 00
MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors; frameless.

1.02 REFERENCE STANDARDS

A. ASTM C1036 - Standard Specification for Flat Glass; 2011.

B. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

C. GANA (TIPS) - Mirrors: Handle with Extreme Care (Tips for the Professional on the Care and Handling of Mirrors); 2011.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

B. Mirror Glass; Type ____: ASTM C1036, Type 1 - Transparent Flat, Class 1 - Clear, Quality - Q1 (high-quality mirrors); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
   1. Sizes noted on Drawings.

2.02 ACCESSORIES

A. Mirror Attachment Accessories: Stainless steel clips.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install mirrors in accordance with manufacturer's recommendations.

B. Set mirrors plumb and level, and free of optical distortion.

C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes. Install 2 inches above the backsplash unless noted otherwise.

D. Frameless Mirrors: Set mirrors with clips, and anchor rigidly to wall construction.

3.02 CLEANING

A. Remove labels after work is complete.

B. Clean mirrors and adjacent surfaces.

END OF SECTION

SECTION 08 91 00
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.

D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.04 PROJECT CONDITIONS

A. Mechanical louvers to be provided by mechanical contractor .

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide twenty year manufacturer warranty on finish.
   1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Airline Louvers: www.airlinelouvers.com.

B. Airolite Company, LLC; _____: www.airolite.com/#sle.

C. Construction Specialties, Inc; Acoustical Louver: www.c-sgroup.com/#sle.

D. Industrial Louvers, Inc.: www.industriallouvers.com.

E. Ruskin Manufacturing Co.: www.ruskin.com.

F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load as required by code without damage or permanent deformation.
   2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
   3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
   4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

B. Stationary Louvers, Type ___: Horizontal blade, formed galvanized steel sheet construction, with intermediate mullions matching frame.

1. Free Area: 50 percent, minimum.
2. Pressure Drop: ____ inches of water gauge maximum per square foot of free area at velocity of ____ fpm, when tested in accordance with AMCA 500-L, test unit size 48 inch by 48 inch.
3. Blades: Drainable.
4. Frame: 4 inches deep, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
5. Steel Thickness, Galvanized: Frame 16 gauge, 0.0598 inch minimum base metal; blades 16 gauge, 0.0598 inch minimum base metal.
6. Steel Finish: Superior performing organic coating, finished after fabrication.

2.03 MATERIALS

A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

B. Bird Screen: Interwoven wire mesh of aluminum, 0.063 inch diameter wire, 1/2 inch open weave, square design.

C. Insect Screen: 18 x 16 size aluminum mesh.

2.04 ACCESSORIES

A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

B. Fasteners and Anchors: Stainless steel.

C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

E. Sealant: Multi-component polyurethane type, as specified in Section 07 90 05.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

E. Install perimeter sealant and backing rod in accordance with Section 07 90 05.

3.03 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Shaft wall system.

C. Gypsum sheathing board.

D. Exterior wall sheathing at walls required to be fire rated from the exterior as noted on the drawings.

E. Cementitious backer board.

F. Gypsum wallboard.

G. Joint treatment and accessories.

H. Textured finish system.

I. Acoustic (sound-dampening) wall and ceiling board at Gameroom demising walls.

1.02 REFERENCE STANDARDS

A. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members; 2015.

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.

C. ANSI A108.11-SystemDeleted - American National Standard for Interior Installation of Cementitious Backer Units; 2010 (Revised).

D. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

E. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

F. ASTM C 630/C 630M - Standard Specification for Water-Resistant Gypsum Backing Board; 2000.

G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.

H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.

I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

J. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.

K. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

M. ASTM E413 - Classification for Rating Sound Insulation; 2010.

N. GA-216 - Application and Finishing of Gypsum Board; 2013.

O. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2008.

P. GA-600 - Fire Resistance Design Manual; 2015.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on metal framing.

C. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, illustrating finish color and texture.

1.04 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum __ years of experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Protection: When ambient outdoor temperatures are below 55 degree F, maintain continuous, uniform, working temperature of not less than 55 degree F for a minimum period of 48 hours prior to, during, and following application of gypsum board and joint treatment materials or bonding adhesives.

B. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Shaft Walls at HVAC and Chutes Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 50-54 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 50-54 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

2.02 MANUFACTURERS

A. Gypsum Board:
   1. G-P Gypsum Corporation: www.gp.com.
   2. National Gypsum Company: www.nationalgypsum.com.
   3. USG Corporation: www.usg.com.

B. Substitutions: See Section 01600 - Product Requirements.

2.03 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.

B. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. ClarkDietrich; ____: www.clarkdietrich.com/#sle.
   2. Dietrich Metal Framing: www.dietrichindustries.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

C. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
   1. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
      a. Products:

1) ClarkDietrich; RC Deluxe Resilient Channel: www.clarkdietrich.com/#sle.

D. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
   1. Shaft Wall Studs and Accessories: C-H, C-T, or I studs; manufactured by any manufacturer approved for gypsum board systems.

2.04 BOARD MATERIALS

A. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
   1. Thickness: 1/2 inch.
   2. Long Edges: Tapered.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

B. Gypsum Board - All Types: Complying with applicable requirements of ASTM C 1396/C 1396M.

C. Fire Rated Gypsum Wallboard: Type X, except where another Type is required by a referenced fire resistive assembly, UL or WH rated; sizes to minimize joints in place; ends square cut.
   1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
   2. Application: Where required for fire-rated assemblies, unless otherwise indicated.
   3. Thickness: As indicated.
   4. Edges: Tapered.

D. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M; ends square cut.
   1. Application: Vertical surfaces behind thinset tile, except in wet areas.
   2. Thickness: As indicated.
   3. Edges: Tapered.

E. Gypsum Backing Board: Sizes to minimize joints in place; ends square cut.
   1. Type: Fire rated.
   2. Thickness: As indicated.
   3. Edges: Square.

F. Gypsum Shaftliner and Coreboard Board: Moisture- and Mold-Resistant Type X: ASTM C 1658/C 1658M; fire-resistive 1 inch thick by 24 inch wide liner panels with double bevel long edges with moisture- and mold-resistant core and surfaces; Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274; "DensGlass Shaftliner" as manufactured by Georgia-Pacific Gypsum. (Paperless panels).
   1. Other Manufacturer's:
      a. CertainTeed Corp.
      b. National Gypsum Company.
      c. USG Corporation.

G. Gypsum Sheathing Board:
   1. Gypsum Sheathing: ASTM C 1177, glass mats both faces and long edges, treated water resistant core, Type X fire resistant, 5/8 inch thick; DENS-GLASS GOLD FIREGUARD as manufactured by G-P Gypsum Corp.

2.05 FIBERGLASS REINFORCED BOARD MATERIALS

A. Cementitious Backer Board: ANSI A118.9, aggregated portland cement panels with glass fiber mesh embedded in front and back surfaces, 1/2 inch thick. Provide at all shower and tub walls.

2.06 GYPSUM WALLBOARD ACCESSORIES

A. Corner Beads: Galvanized steel, paper faced for "taping-on".

B. Trim: ASTM C 840; Bead type L or LC, galvanized steel typically, but vinyl when subject to condensation moisture.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Use water resistant type for finishing joints of water resistant panels.
   2. Use type recommended by manufacturer for finishing joints of cementitious backer board.

D. Textured Finish Materials: Latex-based compound; plain.

E. Screws: ASTM C 1002; self-piercing tapping type.

F. Sheathing Tape: Self-adhesive type, recommended by wall sheathing manufacturer, 2 inch wide.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions, including installation of acoustic and thermal insulation, are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
   1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
   2. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.
   1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
   2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.03 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/600.
   2. Laterally brace entire suspension system.

C. Acoustic Furring: Install resilient channels at maximum 24 inches on center, unless otherwise indicated. Locate joints over framing members.

3.04 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Sealant: Install in accordance with manufacturer's instructions. Install at all unit demising walls.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.05 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing. When board is installed horizontally, edges are not required to occur over firm bearing.

C. Single or Double Layer Fire-Rated: Install gypsum board in accordance with the referenced fire-resistive assembly.

D. Double-Layer Installation: Use gypsum backing board for first layer. Use fire rated gypsum backing board for fire rated partitions and ceilings.

E. Gypsum Sheathing Board: Secure with long dimension parallel to wall studs, with ends butted, over firm bearing, and staggered. Fasten using screws. Install blocking for panel end joints when end joints do not occur over framing.
   1. Tape seal panel joints and penetrations; press sheathing tape firmly onto sheathing joints and around openings with gloved hand.

F. Moisture Resistant Gypsum Board: Use at plumbing fixture surrounds for other than tubs and showers and use for tub and shower surrounds when fiberglass surrounds are used.

G. Cementitious Backer Board: Install over studs, in accordance with manufacturer's instructions. Use at tub and shower surrounds that receive ceramic tile finish.

H. Fasteners: Use screws for attachment of all gypsum board, including cementitious backing board.

I. Coordinate fire resistive protection for recessed ceiling light fixtures with Division 16.
   1. If no fire resistive protection is provided by Division 16, install gypsum board "boxes" over lights recessed into fire-resistive ceiling assemblies; conform to requirements of authority having jurisdiction.

J. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

K. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 30 feet long.
   2. Locate vertical control joints in line with door jambs when possible and at all unit entry doors in line with both jambs.
   3. Construct control joints conforming to requirements for fire resistive rating the same as the wall or ceiling in which it is being installed.
   4. At all floor lines at exterior sheathing.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.07 JOINT TREATMENT

A. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840 and as scheduled below.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

C. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TEXTURE FINISH

A. Prime surfaces to receive texture finish coating with one coat of primer.

B. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

C. Install evenly, free from runs, skips, and sags.

D. Clean overspray from walls and other surfaces.

3.09 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.10 FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view, fire-rated wall areas above finished ceiling, whether or not accessible in the completed construction.

B. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.

C. Level 3: Walls and ceilings scheduled to receive textured finish.

D. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish, or wall coverings.

3.11 SCHEDULE OF FINISHES

A. Walls:
   1. Public / Common Spaces: Level 3-4: Taped and sanded, knockdown (light orange peel) finish.
   2. Within Dwelling Units: Level 3-4: Taped and sanded, knockdown (light orange peel) finish.

B. Ceilings:
   1. Public / Common Spaces: Level 3: Taped and sanded, knockdown finish.
   2. Public / Common Ceiling Soffits: TLevel 4: Taped and sanded, smooth finish horizontal and vertical surfaces.
   3. Dwelling Unit Bathrooms: Level 3: Taped and sanded, knockdown finish.
   4. Remainder of Dwelling Units: Level 3: Taped and sanded, knockdown finish.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Ceramic accessories.

D. Ceramic trim.

E. Non-ceramic trim.

1.02 REFERENCE STANDARDS

A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.
   1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.
   2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
   3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).
   4. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship; 2019.
   5. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
   6. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
   7. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).
   8. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
   9. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).
   10. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
   11. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2010 (Revised).
   12. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
   13. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior glue plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
   14. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).
   15. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2017.

B. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.
   1. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2013.1.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 1995.

D. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide instructions for using grouts and adhesives.

C. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.

D. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.05 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

1.06 EXTRA MATERIALS

A. Provide 10 sq. ft. of each size, color and surface finish of tile specified.

PART 2 PRODUCTS

2.01 TILE

A. Ceramic Tile
   1. Manufacturers: All products from the same manufacturer.
   2. Dal-Tile Corporation: www.daltile.com/#sle.
      a. Dal-Tile: CT-1, Style: TBD, Color: to be selected, 13" x 13" square tile. 6" high cove base and 3" bullnose cap.
   3. Summitville Tiles, Inc: www.summitville.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
   5. Provide an allowance of $3.80 for wall and floor tile, materials only. Include all installation and labor costs in base bid.

B. Quarry Tile: ANSI A137.1, and as follows:
   1. Manufacturers:
      a. American Olean: www.americanolean.com.
      b. Dal-Tile: www.daltile.com.
      c. Summitville Tiles, Inc: www.summitville.com.
      d. Substitutions: See Section 01600 - Product Requirements.
   2. Moisture Absorption: 0.5 to 3.0 percent.
   3. Size and Shape: 6 inch square.
   4. Thickness: 1/2 inch.
   5. Edges: Cushioned.
   6. Surface Finish: Non-slip (abrasive grit).
   7. Colors: To be selected from manufacturer's standard range.
   8. Trim Units: Matching bullnose and cove base shapes in sizes coordinated with field tile.

2.02 TRIM AND ACCESSORIES

A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:

a. Open edges of wall tile.
b. Wall corners, outside and inside.
c. Floor to wall joints.

2. Manufacturers:
   a. Schluter-Systems: www.schluter.com/#sle.

B. Thresholds: Marble, white or gray, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
   1. Applications:
      a. At doorways where tile terminates.

2.03 ADHESIVE MATERIALS

A. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure0.15 cu ft/min/sq ft.

2.04 MORTAR MATERIALS

A. Mortar Bond Coat Materials:
   1. Latex-Portland Cement type: ANSI A118.4.

2.05 GROUTS

A. Standard Grout: ANSI A118.6 standard cement grout.
   1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
   2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
   3. Color(s): As selected by Architect from manufacturer's full line.

B. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
   1. Applications: All floor tile and Where indicated.
   2. Color(s): As selected by Architect from manufacturer's full line.

2.06 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
   1. Applications: Between tile and plumbing fixtures.
   2. Color(s): As selected by Architect from manufacturer's full line.

B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
   1. Composition: Water-based colorless silicone.

C. Tile Sealer: Stain protection.

2.07 THICK-BED MATERIALS

A. Standard Grout: Polymer modified cement grout, sanded or unsanded, as specified in ANSI A118.7 specified in ANSI A118.6.
   1. Color: As selected.

2.08 ACCESSORY MATERIALS

A. Waterproofing (Anti-Fracture) Membrane (at Floors): Bostik-Inc. HYDROMENT ULTRA-SET, Laticrete International LATICRETE 9235 MEMBRANE, Noble Co. NOBLESEAL TS, or approved equivalent.

B. Tile Floor Edging: Terrazzo divider strip; 1/8 inch thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.

C. Expansion Joint Sealant: Multi-component urethane sealant conforming to ASTM C 920, Type M, Grade P, Use T; color as selected to complement tile. Include backer material conforming to requirements of TCA Handbook Method EJ171.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Section 03300 and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19 , manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Place edge strips at exposed tile edges.

D. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

F. Form internal angles square and external angles bullnosed.

G. Install ceramic accessories rigidly in prepared openings.

H. Install non-ceramic trim in accordance with manufacturer's instructions.

I. Install thresholds where indicated.

J. Sound tile after setting. Replace hollow sounding units.

K. Keep control and expansion joints free of mortar, grout, and adhesive.

L. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

M. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

N. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

O. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

P. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCA Handbook Method F115 latex-portland cement bond coat, with epoxy grout.

B. Over interior self leveling underlayment substrates, install in accordance with TCA Handbook Method F122, with latex-portland cement mortar bond coat and epoxy grout. Install waterproofing membrane at all tile floor installations over self leveling underlayment; extend membrane up adjacent vertical surfaces 3 inches minimum.

1. Where epoxy or furan grout is indicated, but not epoxy or furan bond coat, install in accordance with TCNA (HB) Method F115.

3.05 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F111, with cleavage membrane, unless otherwise indicated.
   1. Where epoxy or furan grout is indicated, but not epoxy or furan bond coat, install in accordance with TCNA (HB) Method F114, with cleavage membrane.

B. Cleavage Membrane: Lap edges and ends.

C. Waterproofing Membrane: Install as specified in Section ANSI A108.13.

D. Mortar Bed Thickness: 5/8 inch, unless otherwise indicated.

3.06 INSTALLATION - WALL TILE

A. Over gypsum wallboard on wood or metal studs install in accordance with TCA Handbook Method W223, thin-set with organic adhesive, unless otherwise indicated, standard grout.

3.07 INSTALLATION - EXPANSION JOINTS

A. At tiled floor areas exceeding 100 sf, provide expansion joints between the floor and adjoining walls and provide expansion joints at 12 feet oc maximum in both directions.

B. Install in accordance with TCA Handbook Method EJ171.

C. Seal expansion joints with expansion joint sealant and backer material.

3.08 CLEANING

A. Clean tile and grout surfaces.

3.09 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

E. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

F. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: Submit two samples ____by____ inch in size illustrating material and finish of acoustical units.

1.04 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 70 percent prior to, during, and after acoustical unit installation.

1.06 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category D, E, or F and complying with the following:

2.02 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. USG: www.usg.com.
   3. CertainTeed Corporation; []: www.certainteed.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Acoustical Units - General: ASTM E1264, Class A.

C. Acoustical Panels Type ACT1: Painted mineral fiber, conforming to the following:
   1. Size: 24 x 24 inches.
   2. Thickness: 3/4 inches.
   3. Edge: tegular edge.
   4. Product: Dunes by Armstrong or Eclipse ClimaPlus by USG
   5. Suspension System: Exposed grid Type A; steel, 15/16 inch wide.

D. Acoustical Panels Type ACT2: Painted mineral fiber, with the following characteristics:
   1. Size: 24 by 24 inches.
   2. Thickness: 5/8 inches.
   3. Edge: tegular.
   4. Product: Dunes by Armstrong; Product No. 1774.
   5. Suspension System: Exposed grid Type A; steel, 15/16 inch wide.

E. Acoustical Panels Type ACT3: Vinyl faced mineral fiber with the following characteristics:
   1. Typical Use: Commercial Kitchens and Pool, or other high humidity areas.
   2. Size: 24 by 48 inches and 24 by 24 inches.
   3. Thickness: 5/8 inches.
   4. Edge: Square.
   5. Product: PLAIN CERAMAGUARD by Armstrong; Product No. 605.
   6. Suspension System: Exposed grid Type B; aluminum, 15/16 inch wide.

2.03 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. Chicago Metallic Corporation: www.chicagometallic.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
   1. Materials:
      a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
      b. Aluminum Grid: Aluminum sheet, ASTM B209 (ASTM B209M).

C. Exposed Suspension System, Type A: Hot-dipped galvanized steel grid and cap.
   1. Application(s): Seismic.
   2. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
   3. Profile: Tee; 15/16 inch face width.
   4. Finish: Baked enamel.
   5. Color: White.
   6. Products:
      a. USG Corporation; Donn Brand ZXLA 15/16 inch Acoustical Suspension System: www.usg.com/ceilings/#sle.
      b. Armstrong World Industries, Inc.; Prelude XL 15/16 inch Acoustical Suspension System with 7800 12' hemmed angle moulding at perimeter.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Exposed Suspension System at Pool, Type B: commercial-quality cold rolled aluminum. Entire surface chemically cleansed, with aluminum capping prefinished in baked polyester paint
   1. Application(s): Seismic.
   2. Structural Classification: Light Duty, when tested in accordance with ASTM C635/C635M.
   3. Profile: Tee; 15/16 inch face width.
   4. Finish: Baked enamel.
   5. Color: White.
   6. Perimeter Edge Molding: aluminum with Monel or stainless steel hanger and hardware.

7. Curved Edge Moulding with accessories as recommended by manufacturer: Armstrong Axiom Classic, custom color, see plans for heights.
8. Products:
   a. Armstrong World Industries, Inc.; Prelude Plus XL.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

E. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
1. Profile: Tee; 15/16 inch and 9/16 inch wide faces, as indicated.
2. Construction: Single web.
3. Finish: White painted, except color matched to acoustical board when colored board is used.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12-gage 0.08 inch galvanized steel wire.

C. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.

D. Perimeter Moldings: Same metal and finish as grid.
1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected ceiling plans.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
1. Use longest practical lengths.

E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

F. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch clearance between grid ends and wall.

G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
1. Use longest practical lengths.
2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on panels within vestibules and within 10 ft of an exterior door where no vestibule occurs.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient tile flooring.

C. Resilient base.

D. Installation accessories.

1.02 REFERENCE STANDARDS

A. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2014).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect roll materials from damage by storing on end.

1.05 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 SHEET FLOORING

A. Vinyl Sheet Flooring: Type SV-1 Commons:
   1. Manufacturers:
      a. Parterre - Remedy - wood look.
      b. Teknoflor - wood look.

B. Vinyl Sheet Flooring; Type SV-2 (Wellness/Aerobics):
   1. Manufacturers:
      a. Gerflor; Product - Nera Contract Wood.

C. Vinyl Sheet Flooring; Type SV-3 (Units):
   1. Manufacturers:
      a. Armstrong; Product - Jumpstart

2.02 TILE FLOORING

A. Vinyl Composition Tile - Type ____: Homogeneous, with color extending throughout thickness.
   1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
   2. Size: 12 by 12 inch.
   3. Thickness: 0.125 inch.
   4. Pattern: _____.
   5. Manufacturers:
      a. Armstrong World Industries, Inc; _____: www.armstrong.com.
      b. Mannington Mills, Inc; _____: www.mannington.com.

c. Johnsonite, a Tarkett Company; Product ____: www.johnsonite.com.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

C. Moldings and Edge Strips: Metal[]; ADA compliant for edge exposed or transition edges.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Section 06100, and are ready to receive resilient flooring.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.

D. Verify that concrete and self leveling underlayment sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is fully cured.

C. Clean substrate.

D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - SHEET FLOORING

A. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.

B. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.

C. Double cut sheet at seams.

D. Lay flooring with tightly butted seams, without any seam sealer .

E. Double cut sheet; provide heat welded seams.

F. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. After installation of flooring, secure metal strips with stainless steel screws. Secure resilient strips by adhesive.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.05 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

D. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. After installation of flooring, secure metal strips with stainless steel screws.

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

G. Install feature strips where indicated. Fit joints tightly.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

C. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 68 16
SHEET CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet, stretched-in with cushion underlay and direct-glued.

B. Carpet in elevator car(s), direct glued.

C. Accessories.

1.02 PRICE AND PAYMENT PROCEDURES

A. Provide carpet labor and material cost breakdown per the following:
   1. Carpet Material: $26/yd cost to the Subcontractor for material. Do not include contractors mark-up, freight and delivery to the job site. Owner reserves the right to purchase the carpet directly based on quantities provided by the Carpet Subcontractor. Quantities based on multiple 12’-0” wide carpets with a pattern repeat of 18”w x 18”l.
   2. Carpet Labor: Installation of the carpet, including storage, handling, cutting and all labor and accessories required for complete installation of the specified carpets.
   3. Common Area Carpets.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate seaming plan, method of joining seams, direction of carpet pile and pattern, location of edge moldings and edge bindings .

C. Warranty: Submit manufacturer's warranty, signed by an officer of the company, and ensure that forms have been completed in Owner 's name and registered with manufacturer.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum three years documented experience.

1.05 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.

C. Ventilate installation area during installation and for 72 hours after installation.

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide 20 year manufacturer warranty for tuft bind.

C. Provide 10 year manufacturer warranty for wear, edge ravel, and delamination.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 CARPET

A. Carpet Types and general description of location (see Room Finish Schedules for specific locations):
   1. CPT1: Corridors
   2. CPT2: Lobby
   3. CPT3: Living Rooms

4. CPT5: Stairwells

B. Carpet Type CPT-4: Individual Unit Carpeting)
   1. Product: Eaglestone #HF083/83741 with pad manufactured by Shaw.
   2. Color: Color as selected from manufacturers standards.

2.03 CUSHION

A. Cushion: Carpenter/Raven, 6 lbs density, 7/16" thick.
   1. Use 3/8 inch thick cushion on stairs.

2.04 ACCESSORIES

A. Subfloor Filler: Type recommended by carpet manufacturer.

B. Tackless Strip: Carpet gripper, of type recommended by carpet manufacturer to suit application, with attachment devices.

C. Moldings and Edge Strips: Vinyl for direct glued carpet and embossed aluminum for carpet stretched over cushion, color as selected; ADA compliant for edge strips at exposed edges. Edge strips required at the transition between all adjacent floor coverings, and at unit entry doors.

D. Adhesives: Compatible with materials being adhered.

E. Seam Adhesive: Recommended by manufacturer.

F. Contact Adhesive: Compatible with carpet material; releasable type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified and are ready to receive carpet.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesives to subfloor surfaces.

D. Verify that concrete and self leveling underlayment sub-floor surfaces are ready for carpet installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by carpet manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install carpet and cushion in accordance with manufacturer's instructions and CRI 104 (Commercial).

C. Install carpet and cushion in accordance with manufacturer's instructions and CRI 104.

D. Verify carpet match before cutting to ensure minimal variation between dye lots.

E. Lay out carpet and locate seams in accordance with shop drawings.
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.

3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
4. Locate change of color or pattern between rooms under door centerline.
5. Provide monolithic color, pattern, and texture match within any one area.

F. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 STRETCHED-IN CARPET

A. Install tackless strips with pins facing the wall around entire perimeter, except across door openings. Use edge strip where carpet terminates at other floor coverings.

B. Space tackless strips slightly less than carpet thickness away from vertical surfaces, but not more than 3/8 inch.

C. Install cushion in maximum size pieces using spot adhesive to adhere to subfloor.

D. Lay out cushion so that seams will be perpendicular to, or offset from, minimum 6 inches from carpet seams.

E. Butt cushion edges together and tape seams.

F. Trim cushion tight to edge of tackless strip and around projections and contours.

G. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to all cut edges immediately.

H. Join seams using hot adhesive tape. Form seams straight, not overlapped or peaked, and free of gaps.

I. Following seaming, hook carpet onto tackless strip at one edge, power stretch, and hook firmly at other edges. Follow manufacturer's recommendations for method and amount of stretch.

J. Trim carpet neatly at walls and around interruptions. Tuck edges into space between tackless strip and wall.

K. Extend carpet as base finish up vertical surfaces to form base. Terminate top of base with bound carpet edge.

L. Complete installation of edge strips, concealing exposed edges. Bind cut edges where not concealed by edge strips.

3.05 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

F. Extend carpet as base finish up vertical surfaces to form base. Terminate top of base with bound carpet edge.

G. Complete installation of edge strips, concealing exposed edges. Bind cut edges where not concealed by edge strips.

3.06 INSTALLATION ON STAIRS

A. Install tackless strips at back of treads, with pins facing riser, and at bottom of riser, with pins facing tread.

B. Install cushion on stair treads butt tight to applied nosing.

C. Install carpet on stairs with the run of the pile in opposite direction of anticipated traffic to avoid peaking of backing at nosings.

D. Stretch carpet over stair treads, full width in one piece. Fold carpet under 1-1/2 inches on each side.

3.07 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

3.08 SCHEDULE

A. Install carpet in dwelling units, except within accessible (handicap) units, stretched over cushion.

B. Install carpet on stairs stretched over cushion.

C. Install other carpet by direct glue method.

END OF SECTION

SECTION 09 72 00
WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and prime painting.

B. Wall covering and borders.

1.02 PRICE AND PAYMENT PROCEDURES

A. See Section 01 21 00 - Allowances, for additional requirements.

B. Allowance includes purchase and delivery only.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on wall covering and adhesive.

C. Samples: Submit two samples of wall covering, ____by____ inch in size illustrating color, finish, and texture.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 MOCK-UP

A. Provide panel, 3 panel drops wide, full height, illustrating installed wall covering and joint seaming technique.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

PART 2 PRODUCTS

2.01 BASE BID ALLOWANCE

A. Wall Covering; Products WC1 - $20/LY, 54" wide, cost to contractor for materials only. Provide 8 different patterns.

2.02 WALL COVERINGS

A. General Requirements:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.

B. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.

C. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

D. Substrate Primer and Sealer: Alkyd enamel type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are prime painted and ready to receive work, and comply with requirements of wall covering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings unless moisture content of surfaces are below the recommended maximum of the wall covering manufacturer.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.02 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.

E. Marks: Seal with shellac those that may bleed through surface finishes.

F. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

G. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

B. Apply adhesive to wall surface immediately prior to application of wall covering.

C. Use wall covering in roll number sequence.

D. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.

E. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.

F. Horizontal seams are not acceptable.

G. Do not seam within 2 inches of internal corners or within 12 inches of external corners.

H. Install wall covering before installation of bases and items attached to or spaced slightly from wall surface.

I. Do not install wall covering more than 1/4 inch below top of resilient base.

J. Cover spaces above and below windows, above doors, in pattern sequence from roll.

K. Where wall covering tucks into reveals, or metal wallboard or plaster stops, apply with contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.

L. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed prior to work of this section.

3.05 PROTECTION

A. Do not permit construction activities at or near finished wall covering areas.

END OF SECTION

SECTION 09 77 34
FIBERGLASS REINFORCED PLASTIC PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced composite (FRP) panels.

B. Trim and installation accessories.

1.02 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard details and catalog data demonstrating compliance with referenced standards. Provide installation instructions.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store products indoors and protect from moisture, construction traffic, and damage.

B. Store panels flat on clean, dry surface. Do not stand on edge or stack on fresh concrete or other surfaces that emit moisture.

C. Store panels for at least 24 hours at temperature and humidity conditions approximating the average environment of the finished room.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manufacturers:
1. Graham FRP Composites Product EXCELINER XLA.
2. Kemlite Product FIRE-X GLASBORD: www.glasbord.com.
3. Lasco Panel Products Product LASCOBOARD CLASS A.
4. Glasteel Product SERIES 1200 SENTINEL.
5. Sequentia Incorporated Product STRUCTOGLAS 77136 Wall and Ceiling Panels; #1200FR-19.

B. Substitutions: See Section 01600 - Product Requirements.

2.02 PANEL MATERIALS

A. General:
1. Composite plastic panels of random chopped fiber glass roving, modified polyester copolymer, inorganic fillers, and pigments.
2. Resistant to rot, corrosion, staining, denting, peeling, and splintering.
3. USDA accepted.
4. Comply with ASTM D 3841, Type II.

B. Surface burning classification: Class A.
1. Flame spread (ASTM E 84): 25 or less.
2. Smoke developed (ASTM E 84): 450 or less.

C. Size:
1. Wall panel width: 48 inches.
2. Wall panel length: Full length for height of wall to a maximum of 144 inches.
3. Wall panel length: Provide full-length panels unless substrate dimensions exceed available fabricated size.
4. Thickness: 0.090 inches.
5. Dimensional Tolerances:
   a. Width and length: +/- 1/8 inch.
   b. Thickness: +/- 10 percent.
   c. Squareness: Not more than 1/8 inch out of square.

2.03 FINISHES

A. Exposed Surface: Pebble-like embossed finish.

B. Back Surface: Smooth. Imperfections that do not affect functional properties are not cause for rejection.

C. Color: White, uniform throughout.

2.04 TRIM ACCESSORIES

A. Provide panel manufacturer's standard vinyl moldings to meet project conditions.

B. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.
   2. Length to suit project conditions.

C. Adhesive: Structural construction adhesive as recommended by manufacturer.

D. Sealant: Clear silicone sealant as recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates that will receive panels to ensure that surfaces are smooth, dry, true, and free of dirt, dust, oil, or grease.

B. Remove high spots. Fill low spots.

C. Verify that substrate construction is completed and approved.

D. Correct deficiencies in substrate before installing panels.

3.02 INSTALLATION

A. Install in accordance with manufacturer's printed installation instructions, using both mechanical fasteners and adhesive.

B. Cutting Panels:
   1. Cut panels with carbide-tipped saw blade or swivel head shear.
   2. Allow 1/2 inch clearance in length per 8 foot panel length.
   3. Allow 1/8 inch clearance at cut-outs for penetrations.

C. Pre-drill fastener holes before applying adhesive. Use carbide-tipped drill.
   1. Drill 3/8 inch holes for 1/4 inch nominal fasteners.
   2. Space at 8 inches maximum on center at perimeter, approximately 1 inch from panel edge.
   3. Space in field in rows 16 inches on center, with fasteners spaced at 12 inches maximum on center.

D. Apply adhesive at temperature between 50 and 90 degrees F, unless otherwise approved.
   1. Spread adhesive 1/4-inch deep over entire back side of panel to achieve 100 percent coverage.
   2. Do not use beads of adhesive.
   3. Do not use mechanical fasteners or adhesive alone.
   4. Allow open time recommended by adhesive manufacturer before setting panels into position.
   5. Once in position, apply sufficient pressure to make full contact between panel and wall.
   6. Roll panel surface to ensure complete contact.
   7. If necessary, install bracing to maintain intimate contact until adhesive cures in accordance with manufacturer's instructions.

E. Panel Fasteners:
   1. Apply silicone sealant in pre-drilled fastener holes.
   2. Drive fasteners for snug fit. Do not over-tighten.
   3. Fasten leading edge of each panel after installing moldings.

F. Moldings:

1. Trim division bar to accommodate ceiling and base moldings.
2. Apply bead of silicone sealant to one side of division bar and install on leading edge of first panel.
3. Push molding all the way onto panel and pull back to allow 1/8 inch clearance.
4. Check plumb.
5. Fasten molding with coated lath nails, installed to leading edge of molding, only.
6. Complete fastening of panel, and remove excess sealant.
7. Apply sealant to leading edge of molding to receive next panel. Allow 1/8 inch clearance when installing panel.
8. Remove excess sealant from panels and moldings.

G. Sealants: Seal corner seams, ceiling and base junctures, around door frames and other openings, and between penetrating items and panel cut-outs.

3.03 ADJUST AND CLEAN

A. Remove scraps and debris from the site, and leave in a neat and clean condition.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Elevator pit ladders.
   3. Exposed surfaces of steel lintels and ledge angles.
   4. Prime surfaces to receive wall coverings.
   5. Mechanical and Electrical:
      a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
      d. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      e. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
      f. Paint all electrical panels within units and finished spaces to match wall.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

E. See Schedule - Surfaces to be Finished, at end of Section.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. Exterior Surfaces for Opaque Finish, Normal Environment.

1.03 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: Submit two stained and finished wood samples, 4 x 12 inch in size, illustrating proposed colors and finishes for wood items which are to match factory finished wood or simulated wood items.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 10 years experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Manufacturers - Paints, Stains, and Finishes:
   1. Base Manufacturer:Glidden Professional: The product numbers referenced below are Glidden Professional (GP) products unless noted otherwise.
   2. Other Acceptable Manufacturers:
      a. Sherwin-Williams Co.
      b. Hirshfield's
      c. Concrete masonry.

C. Interior Surfaces for Transparent Finish.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Supply each coating material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Paints and Coatings: Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

D. Opaque Finishes: Tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

E. Quantity: Supply each coating material in quantity required to complete entire project's work from a single production run.

F. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

G. Colors: To be selected from manufacturer's full range of available colors.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint WE-OP-3L - Wood, Opaque, Latex, 3 Coat:
1. 1 coat #2110N Stain Stomper Exterior Primer Sealer
2. 2 coats #2412V Ultra Hide 150 Satin

B. Wood, Opaque, Stain:
1. 1 coat #2110N Stain Stomper Exterior Primer Sealer
2. 2 coats #2600 Woodpride Exterior Aquacrylic Solid Color Stain

C. Metal, Alkyd, 2 Coat:
1. 1 coat primer if un-primed or spot prime if factory primed; according to metal type.
2. 1 coat #4308 DevGuard Alkyd Industrial Enamel Gloss.
   a. Provide 2 finish coats at hollow metal doors and frames.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
1. 1 coat #3210 Gripper Primer Sealer
2. 2 coats #1416V Ultra Hide 150

B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
1. 1 coat #1700 Woodpride Oil Stain
2. Urethane Finish:
   a. 1 coat #1902 Woodpride Polyurethane Satin, thinned 10 percent
   b. 1 coat #1902 Woodpride Polyurethane Satin

C. Masonry, Opaque, Latex, 3 Coat:
1. 1 coat #3010 Concrete Coatings Block Filler.
2. 2 coats #1412V Ultra Hide 150 Eggshell

D. Concrete, Opaque, Latex, 2 Coat:
1. 2 coats #1412V Ultra Hide 150 Eggshell

E. Metal (Including Mechanical/Electrical Equipment in Finished Spaces), Alkyd, 2 Coat:

1. 1 coat primer if un-primed or spot prime if factory primed; according to metal type.
2. 1 coat #1516 Alkyd SemiGloss.
    a. Provide 2 finish coats at hollow metal doors and frames.

F. Gypsum Board, Latex: (Note: spray first coat, apply and backroll second coat)
1. 1 coat Primer Sealer per manufacturer's recommendations.
    a. For dark tinted paint, apply dark tinted primer as recommended by manufacturer.
    b. **OPTION for vapor retarder membrane**: Hamilton Drywall Products: Perm Tex Vapor Barrier Primer, or approved equal. Must provide perm rating of less than 1 and shall meet the requirements of a Class II vapor retarder per the 2015 IBC.
        1) Other Acceptable Products: Sherwin Williams Moisture Vapor Barrier Interior Latex Primer/Finish B72W00001
2. Dwelling unit bathroom walls/ceilings, kitchen walls/ceilings, and all Public and Common areas (note: wall color NOT the same as ceiling color):
    a. 2 coats #1412V Ultra-Hide 150 Eggshell or Sherwin Williams "SherScrub" Latex Eggshell or ProMar 200 Zero VOC Interior Latex Low Sheen
3. Dwelling unit living rooms, bedrooms, closets, and similar spaces (note: wall color NOT the same as ceiling color:
    a. 2 coats #1210V Ultra-Hide 150 Flat or Sherwin Williams "SherScrub" Latex Flat

G. Gypsum Board, Epoxy, 3 Coat:
1. 1 coat #3210 Gripper Primer Sealer
2. 2 coats #4406 TruGlaze WB WaterBorne Epoxy SemiGloss
3. At all public space wet areas, to include but not limited to commercial kitchens, pools and spas, janitor closets.

H. Pavement Marking Paint:
1. 1 coat Ultra Hide Traffic Paint (white)

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Including but not limited to linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.

B. Coating Application Accessories: Including but not limited to all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required.

C. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as 'best' by the manufacturer.

D. Patching Material: Latex filler.

E. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

H. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

I. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

J. Copper Surfaces to be Painted: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.

K. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

L. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

M. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

N. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

O. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

P. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

Q. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

R. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's instructions.

D. Follow Color Schedule issued by Architect or Interior Designer.

E. Apply paints and coatings by brush, roller or spray. If spray application is used, back roll surfaces; fog ceilings in units, mechanical rooms, storage and janitor's closets. All other rooms to have different color ceiling from walls.

F. Coverage and hiding capability of paint shall be complete. Final paint film shall be of uniform finish, color, appearance and coverage.

G. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

H. Apply each coat to uniform appearance.

I. Sand wood and metal surfaces lightly between coats to achieve required finish.

J. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

K. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

L. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically indicated. Materials and products having factory-applied primer are not considered to be factory finished.
   2. Fire rating labels, equipment serial number and capacity labels, equipment nameplates and operating parts of equipment.
   3. Items indicated to receive other finishes.
   4. Items indicated to remain unfinished.
   5. Stainless steel items, anodized aluminum, bronze, terne and lead.
   6. Glass.
   7. Acoustical materials.
   8. Concealed pipes, ducts and conduits.

B. Paint the surfaces described below.

C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
   1. Paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment occurring in finished areas to match background surfaces, unless otherwise indicated.
   2. Paint all equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.
   3. Paint shop-primed items occurring in finished areas.
   4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

E. Concrete, Concrete Block Masonry: Finish all surfaces exposed to view on the interior of the building, unless noted otherwise. Paint exposed to view exterior surfaces where indicated.

F. Gypsum Board: Finish all surfaces exposed to view.

G. Wood: Finish all surfaces exposed to view which is not factory finished.

H. Steel Doors and Frames: Finish all surfaces exposed to view.

I. Steel Fabrications: Finish all surfaces exposed to view.

J. Shop-Primed Metal Items: Finish all surfaces exposed to view.
   1. Finish the following items:
      a. Exposed surfaces of lintels.
      b. Countertop support brackets.
      c. Guardposts and bollards.

K. Pavement markings in parking garage. Paint parking stall numbers on parking garage walls.

END OF SECTION

SECTION 10 14 01
PLASTIC SIGNS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior plastic plaque identification signs.

B. Parking and traffic control signage.

C. Signs made of individual plastic letters.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.

C. Samples:
   1. For each type of sign, submit two samples of each color, 2 x 2 inch in size, from which color selection shall be made.
   2. Submit two full size sample interior message signs illustrating type, style, letter font, and colors specified; method of attachment.

D. Manufacturer's Installation Instructions: Include installation template and attachment devices.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years of experience.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Package signs, labeled in name groups.

B. Store adhesive attachment tape at ambient room temperatures.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install signs when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 PLASTIC PLAQUE SIGNS

A. Plastic Signs: Colored plastic with raised imagery produced by reverse engraving, photopolymer process, vacuum forming, or "blasting" into the surface. Text and symbols contrasting color to background. Include Grade 2 braille. Do not use adhesive applied imagery.
   1. Comply with applicable provisions of ANSI/ICC A117.1, including Braille.
   2. Background and Imagery Color: As selected from manufacturer's full range.
   3. Total Thickness: 1/8 inch.
   4. Edges: Beveled.
   5. Symbols: On 6 inch high, minimum, background.
   6. Character Font: Helvetica.

2.02 INDIVIDUAL GRAPHICS - PLASTIC

A. Comply with applicable provisions of ANSI/ICC A117.1 for signs not required to be tactile.

B. Material: Solid color injection molded plastic, painted finish, for building address and building identification.
   1. Thickness: Manufacturer's standard appropriate to height.
   2. Height:
      a. Building Address(es): 4 inches.
      b. Building Identification: 6 inches, unless otherwise indicated.
   3. Edges: Square.

C. Character Style: Color and font style as selected from the manufacturer's full range.

D. Mounting: Adhesive furnished by sign manufacturer.

2.03 TRAFFIC SIGNS

A. Manufacture signs from 16 gauge aluminum. Provide standard traffic symbols of type indicated.
   1. Provide one 12 x 18 inch handicap parking sign per handicap parking stall. Include all messages required by the State and ADA. At 8-foot wide van accessible access aisle provide one 12 x 18 inch sign which states: "ACCESS AISLE, NO PARKING."
   2. Provide standard 'Stop' signs at each driveway intersection. Size as required by applicable municipal standard.
   3. For each parking stall within parking garage, provide one 12 x 8 inch sign which states "RESERVED PARKING" and includes a one or two digit number.

2.04 ACCESSORIES

A. Mounting Hardware:
   1. Traffic Control Signs: Galvanized steel bolts, nuts, and washers of type to suit mounting.

B. Tape Adhesive: Double sided tape, permanent adhesive.

C. Adhesive for Individual Graphics: As recommended by manufacturer for substrate.

D. Posts: U-channel, steel, 7 feet long, baked enamel finish.

PART 3 EXECUTION

3.01 INSTALLATION - INTERIOR SIGNS

A. Install in accordance with manufacturer's instructions.
   1. Use tape adhesive.

B. Locate signs on wall, adjacent to latch jamb of door frame, at 5'-0" from centerline of sign to floor.
   1. At pairs of doors, locate signs on the wall to right of right door leaf, at 5'-0" from centerline of sign to floor.
   2. Request direction at doors where wall surface is not of sufficient size to receive sign.

C. Locate signs so a person may approach within 3 inches of signage without encountering protruding objects or standing within swing of door.

D. Install signs after surfaces are finished, in locations scheduled.

3.02 INSTALLATION - INDIVIDUAL GRAPHICS

A. Install in accordance with manufacturer's instructions.

B. Install signs after surfaces are finished, in locations indicated.

C. Install individual graphics level, unless otherwise indicated, with characters uniformly and consistently spaced.

3.03 INSTALLATION - TRAFFIC SIGNS

A. At exterior locations, mount signs on steel post.

B. At interior locations, mount directly on concrete or masonry walls.

3.04 SCHEDULES

A. Storage Locker Identification Signs:
   1. Provide one plastic plaque sign at each storage locker: 3 x 2 inch size, with three 1 inch high digits and braille.

B. Stair Identification Signs (Stair Enclosure Side): BY OWNER
   1. Provide 12" x 12" signage with text size, position, and content conforming to IBC. Indicate stair location or name, floor level, roof access or not, and termini.
   2. Locate at each floor level of each stair with centerline of sign 5'-0" above landing floor in a position that is readily visible with the door in either the open or closed position; verify proposed location with the Building Official.

C. Occupant Load Signs for Assembly Occupancies: BY OWNER
   1. Text message only, indicating occupant load and concentrated use occupant load. Provide one plastic plaque sign for each assembly space. Size as required for message; 5/8 inch high text. Locate as directed by Fire Marshal.

D. Room Identification Signs: BY OWNER
   1. Provide one plastic plaque sign at each location scheduled below, except provide multiple signs when indicated: Size as required for message - minimum height 3 1/2"; Character height: 1 inch high text and braille. Comply with ANSI A117.1 standards where required.
      a. STAIR (at each floor on corridor side):,
         1) Provide one sign for each door to each enclosed stair; include message "EXIT" and identify with stair name/number (TBD). Verify pictogram requirement with Authorities having jurisdiction.
      b. ELEVATOR SIGNS:
         1) Provide 9x9 inch signs with the text message, braille, and pictograms: "DO NOT USE ELEVATOR IN CASE OF FIRE"; verify actual text message and required pictograms with Authorities having jurisdiction.
      c. FLOOR # (# shall be equal to floor number; provide one for each floor, installed at elevator area)

E. Individual Graphics:
   1. Provide one set of 4 digit building address signs.
   2. Provide one set of building identification signs mounted on Site Sign as detailed; message as indicated.

F. Traffic Control Signs: Provide as described in Part 2.

END OF SECTION

SECTION 10 21 23
CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface mounted overhead metal curtain track and guides.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for curtain fabric characteristics and _____.

C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.

D. Samples: Submit two fabric samples, ____ by ____ inch in size illustrating fabric color.

E. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cubicle Track and Curtains:
   1. Creative Healthcare Products, Inc.
   2. Construction Specialties, Inc; Track Systems: www.c-sgroup.com/#sle.
   3. Imperial Fastener Co., Inc; ____: www.imperialfastener.com/#sle.

2.02 TRACKS AND TRACK COMPONENTS

A. Tracks: Extruded aluminum sections; one piece per track run.
   1. Profile: Channel.
   2. Mounting: Surface.
   3. Structural Performance: Capable of supporting vertical test load of 50 lbs without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
   4. Track End Stop: To fit track section.
   5. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
   6. Finish on Exposed Surfaces: Clear anodized.

B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.

C. Wand: Plastic, attached to lead carrier, for pull-to-close action.

D. Installation Accessories: Types required for specified mounting method and substrate conditions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.

B. Verify that field measurements are as indicated.

3.02 INSTALLATION

A. Install curtain track to be secure, rigid, and true to ceiling line.

B. Install end cap and stop device.

C. Secure track to ceiling system.

D. Install curtains on carriers ensuring smooth operation.

3.03 SCHEDULES

A. Provide where indicated on the drawings.

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms, residential bathrooms, and utility rooms.

B. Grab bars.

1.02 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

B. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2011.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

1.04 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: GAMCO.

B. Commercial Toilet, Shower, and Bath Accessories:
   1. American Specialties, Inc.
   2. Bobrick Washroom Equipment, Inc.
   3. Bradley Corporation.
   4. Nutone "HallMack".
   5. TSM.

C. Substitutions: Section 01 60 00 - Product Requirements.

D. Provide products of each category type by single manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

B. Keys: Provide 2 keys for each accessory to Owner; master key all lockable accessories and key all accessories alike

C. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03 FINISHES

A. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel. Color White.

B. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

2.04 FABRICATION

A. Stamped names or labels on exposed faces of toilet and bath accessory units are not permitted.
   1. Provide unobtrusive labels indicating manufacturer and model number on surface not exposed to view.

B. Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous piano hinge or minimum of two 1-1/2 inch pin hinges of same metal as unit cabinet.

C. Fabricate units of all welded construction, without mitered corners. Provide anchorage which is fully concealed when unit is closed.
   1. Grind welded joints smooth.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as instructed by the manufacturer.

D. See Section 06100 for installation of blocking and reinforcing plates in walls.

3.02 PREPARATION

A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

D. Grab Bars, including towel bars: Install to be capable of supporting 300 lbs.

3.04 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation. Verify that mechanisms function smoothly.

B. Polish exposed surfaces after removing protective coatings.

3.05 SCHEDULE

A. Dwelling Unit Bathrooms: At each bathroom provide:
   1. Grab Bars: 150S-T sizes as shown on drawings - white
   2. Toilet Paper Holder: 761
   3. Robe Hook: 753 (one per bathroom)
   4. Shower Curtain Rod: 100 SRC (length as required)
   5. Towel Hanging Bars: Grab bar 100S (1-30" and 1-24" or lengths as indicated on drawings) - white.
   6. Towel Rings: Provide one per bathroom.
   7. Medicine Cabinet as shown on drawings (not over vanity sink), Kohler K-CB-CLC2026FS; installation recessed or surface mount may vary.

B. Accessible Dwelling Unit Bathrooms: In addition to the above, provide:
   1. One Additional Robe Hook: 753 (mount one at 5'-4" AFF and one at 4'-0" AFF)

C. Public Toilet Rooms/Showers: Provide the following items for each toilet/shower room.
   NOTE: ITEMS 2-5 ARE OWNER'S VENDOR SUPPLIED/CONTRACTOR INSTALLED.
   1. Two Robe Hooks: 753 (mount one at 5'-4" AFF and one at 4'-0" AFF)
   2. Surface Mounted Paper Towel Dispenser: TD-2
   3. Surface Mounted Waste Receptacle: WR-2 (7 gallon capacity; 6 inch projection)
   4. Soap Dispenser: #G-58AP, 1 per sink
   5. Double Toilet Paper Holder: #814 - NRC (no roll control), 1 per toilet
   6. Grab Bars: #150S-T, sizes as shown on drawings - #4 satin finish.
   7. Folding Shower Seat: SS-3R/L-ADA @ accessible shower.
   8. Shower Curtain Rod: 100 SRC (length as required) @ showers.

D. Janitor's Closets: Provide the following items at each janitor's closet:
   1. Shelf With Mop and Broom Holders: US-1, 30 inches long

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.02 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

B. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated and approved or certified by applicable local codes and regulations.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

C. Product Data: Provide extinguisher operational features.

D. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company certified or authorized by applicable code or regulation to install Work of this Section.

1.06 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers:
1. Amerex
2. Ansul
3. Badger-Powhattan
4. General
5. JL Industries, Inc.
6. Kidde
7. Larsen's Mfg. Co.

B. Fire Extinguisher Cabinets:
1. JL Industries, Inc.
2. Larsen's Mfg. Co.
3. Norris Industries.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Multi-Purpose Dry Chemical Type: Cast steel tank, with pressure gage.
1. Class 4A-80BC.
2. Size 10.

3. Finish: Baked enamel, red color.

2.03 FIRE EXTINGUISHER CABINETS

A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.

B. Cabinet Configuration: Semi-recessed type typically; surface mount type in parking garage.
   1. Size to accommodate accessories.
   2. Trim: Returned to wall surface, with [2-1/2] inch projection; manufacturer's standard face width.
   3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.

D. Door Glazing: Float glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.

E. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

F. Fabrication: Weld, fill, and grind components smooth.

G. Finish of Cabinet Exterior Trim and Door: No.4 - Brushed stainless steel.

H. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

B. Inspection Tags: Provide inspection tags on all extinguishers

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, ____ inches from finished floor to inside bottom of cabinet.

C. Secure rigidly in place.

D. Place extinguishers in cabinets.

E. Just prior to Substantial Completion, inspect each fire extinguisher.
   1. Provide a signed tag indicating such inspection and conforming to the requirements of the authority having jurisdiction.

3.03 SCHEDULES

A. Corridors, Parking Garage, Other Public Spaces, if Any, and Elsewhere as Indicated: Install fire extinguishers in cabinets.

B. Equipment Rooms, Receiving Rooms, Storage Rooms, and Other Similar Non-Public Spaces: Install fire extinguishers on brackets.

END OF SECTION

SECTION 10 51 00
LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic lockers. Provide 13 double high lockers in pool Lobby and 7 double high lockers in Employee Lounge

B. Locker units with hinged doors.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Wood grounds and attachment strips.

1.03 REFERENCE STANDARDS

A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan and key codes.

D. Selection Samples: Submit two samples 1 x 1 inch in size illustrating manufacturers full range of colors from which selection shall be made.

E. Verification Samples: Submit two samples 3 x 6 inches in size, of each color selected; applied to specified base metal.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Solid Plastic Lockers:
   1. Columbia Lockers, a division of PSiSC; PolyLife Lockers: www.psisc.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SOLID PLASTIC LOCKERS

A. Lockers: Factory assembled, made of high density polyethylene (HDPE) panels, tested in accordance with NFPA 286, homogenous color throughout, with mortise and tenon joints with stainless steel fasteners or heat fused joints.
   1. Doors: Full overlay without frame.
   2. Where locker ends or sides are exposed, provide same finish as fronts or provide extra panels to match fronts.
   3. Ventilation: By open space between the back of the door and locker body.
   4. Provide filler strips where indicated, securely attached to lockers.
   5. Door Color: To be selected by Architect.
   6. Body Color: Manufacturer's standard white or light color.

B. Component Thicknesses:
   1. Doors: 1/2 inch minimum thickness.
   2. Locker Body: Tops, bottoms, backs, and shelves 3/8 inch minimum.
   3. End Panels and Filler Panels: 1/2 inch minimum thickness.
   4. Sloped Tops: 1/2 inch minimum thickness.
   5. Toe Kick Plates: 1/2 inch minimum thickness.

C. Solid Plastic Panels: High Density polyethylene (HDPE) formed under high pressure into solid plastic components.

1. Surface Burning Characteristics: Flame spread index of 75 or less, and smoke developed index of 450 or less; when tested in accordance with ASTM E84.

D. Hinges: Full height of locker, manufacturer's standard heavy duty type.

E. Coat Hooks: Stainless steel; attached with tamperproof screws.

F. Number Plates: Provide rectangular shaped aluminum plates. Form numbers ____ inch high of block font style with ADA designation, in contrasting color.

G. Locks: Locker manufacturer's standard type of style indicated above.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install lockers plumb and square.

C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.

D. Bolt adjoining locker units together to provide rigid installation.

E. Install end panels, filler panels, and sloped tops.

F. Install accessories.

G. Replace components that do not operate smoothly.

3.02 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10 56 24
WIRE STORAGE SHELVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire storage shelving and related installation accessories.

1.02 REFERENCES

A. ASTM A610 - Standard Test Methods for Sampling and Testing Ferroalloys for Determination of Size.

1.03 PERFORMANCE REQUIREMENTS

A. Shelf Load Capacity: Support 75 pounds per square foot.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data illustrating physical characteristics of shelving.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ClosetMaid: www.closetmaid.com.

B. Greenfield Metal Products Co., Inc.; Product GREENFIELD SHELVING: www.greenfieldshelving.com.

C. Rubbermaid (formerly Lee-Rowan Co): www.rubbermaidcloset.com.

D. Schulte Corp: www.schultestorage.com.

E. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Wire: ASTM A610, Grade C-1008, bright basic cold-drawn steel wire, 100,000 psi average tensile strength.

2.03 ACCESSORIES

A. Mounting Hardware: Support brackets, pole supports, end brackets, clips, u-clamps, and fasteners to permit mounting to gypsum board walls without requiring concealed blocking or structural support.

B. End Caps: Provide for cut and exposed-end wires.

2.04 FABRICATION

A. Assemble into pre-sized shelf units with longitudinal wires and cross-deck wires resistance welded at each intersection.

B. Shelving Unit Type:

1. Clothes Closets: Shelf and rod, 12 inches deep, "free-slide" type rod, 1 inch oc deck-wire spacing. Provide double shelf & rod at 50% of all unit closets.

2.05 FACTORY FINISH

A. Finish: Epoxy or PVC coating, white color.

PART 3 EXECUTION

3.01 PREPARATION

A. Field verify lengths, depths, and quantities required.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Use fasteners appropriate to substrate and recommended by manufacturer of shelving.

C. Install units plumb and level, firmly anchored in locations indicated.
   1. Intermediate Support Brackets: Provide at 3 feet oc maximum for shelving spans longer than 3'-6".
   2. Back Clips: Space 12 inches oc maximum, beginning 1-1/2 to 2 inches from side wall.

D. Unless otherwise indicated, install clothes closet shelf and rod with shelf at:
   1. 5'-0" above finish floor in non-accessible units.
   2. 4'-0" above finish floor in accessible (handicap) units at all project types.

3.03 ERECTION TOLERANCES

A. Maximum Variation From Level: 1/4 inch in 6 feet.

B. Maximum Variation From True Position: 1/2 inch.

3.04 CLEANING

A. Remove labels and wrapping materials from shelving units.

B. Clean wall surfaces if soiled during installation of shelving.

END OF SECTION

SECTION 10 74 00
EQUIPMENT SCREENS

PART 1 - GENERAL

1.01 SUMMARY - FOR USE AT EQUIPMENT ON POOL ROOF, IF NEEDED. VERIFY MEP & POOL DESIGNER FOR EQUIPMENT. PLACEMENT AND TYPE OF EQUIPMENT WILL ALSO INDICATE IF SCREENS ARE POST MOUNTED ON THE ROOF OR HUNG FROM EQUIPMENT.

1.02 SECTION INCLUDES:

A. Pre-formed thermoplastic panel for enclosing roof top mechanical equipment.

B. Aluminum assembly framing for direct attachment of screening panels to mechanical equipment; no base or curb required unless shown otherwise on drawings..

C. Aluminum extrusions to permit easy access to mechanical equipment for servicing.

1.03 REFERENCES

A. American Society for Testing and Materials: Standard Specifications for
   1. ASTM B 221-96 - Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Profiles, and Tubes.
      a. The Aluminum Association, Inc.
         1) AA ADM-1516166 (1994) - Aluminum Design Manual
         2) American Society of Civil Engineers.
            (a) ASCE 7-95 - Minimum Design Loads for Buildings and Other Structures.

1.04 SYSTEM DESCRIPTION

A. Design Criteria:
   1. Manufacturer is responsible for the structural design of all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.
   2. Framing shall be designed in accordance with the Aluminum Design Manual to resist the following loading:
      a. ASCE 7-95 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's catalog data, detail sheets, specification and other data sufficient to indicate compliance with these specifications.

B. Shop Drawings: Indicate layouts heights, component connection details, and details of interface with adjacent construction. Mark data to indicate:

C. Roof top mechanical equipment to be enclosed.

D. Samples:
   1. Samples of Materials: Thermoplastic panels.
   2. Color Selection: Submit paint chips with full range of colors (minimum of eight) available for Architect's selection.

E. Certification: Manufacturer's Certificate of Compliance certifying that thermoplastic panels supplied meet or exceed requirements specified.

F. Closeout Submittals: Warranty documents, issued and executed by manufacturer, countersigned by Contractor.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of building authorities having jurisdiction in Project location.

B. Manufacturer Qualifications: Minimum five (5) years documented experience producing systems specified in this section.

1.07 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Storage and Handling: Protect materials and finishes during handling and installation to prevent damage.

1.08 PROJECT CONDITIONS

A. Field Measurements: Take measurements of actual Roof top unit for fit without gaps. Indicate measurements on shop drawings fully documenting any field condition that may interfere with the screen system installation.

1.09 COORDINATION

A. Installer for work under this Section shall be responsible for coordination of panel and framing sizes and required options with the Contractor's requirements.
   1. Request information on sizes and options required from the Contractor.
      a. Submit shop drawings to the Contractor and obtain written approval of shop drawing from the Contractor prior to fabrication.

1.10 WARRANTY

A. If any part of the rooftop equipment screen fails because of a manufacturing defect within one year from the date of substantial completion, the manufacturer will furnish without charge the required replacement part(s). Any local transportation, related service labor or diagnostic call charges are not included.

B. This warranty does not cover failure of your rooftop equipment screen if it is damaged by the Owner, or if the failure is caused by improper installation. In no event shall Warrantor be liable for incidental or consequential damages.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Products: "Envisor Screening System" by CityScapes Incorporated, 4200 Lyman Ct. Hilliard, OH 43026. 1-877-727-3367 www.cityscapesinc.com
   1. Substitutions: Unistrut Component Materials.

2.02 MATERIALS

A. Thermoformed Plastic Panels: Fabricated from rigid medium impact thermo-formed ABS (Acrylic Butylene Styrene) sheets.
   1. Minimum thickness 3/16".
   2. Framing: Aluminum Plate, Shapes and Bar: ASTM B 221, alloy 6061-T5 or 6063-T5.
   3. Threaded Fasteners: All screws, bolts, nut and washers shall be Stainless steel.
      a. Corner assembly fasteners shall be #10-16 x stainless steel TEK screws. Length as required to develop full holding capacity of screw when fastened to Mechanical Equipment.
      b. Provide lock washer or other locking device at all bolted connections.

2.03 FABRICATION

A. Provide factory-formed panel systems with continuous interlocking panel connections and indicated or necessary components: Form all components true to shape, accurate in size, square and free from distortion or defects. Cut panels to precise lengths indicated on approved shop drawings.

B. Fabricate all panels to slide horizontally to allow access to unit access panels behind.

C. Panel Design, Style and Trim:
   1. Panel Style: Vertical
   2. Panel Design: Louver
   3. Decorative Top Trim Profile: None

4. Trim and Closures: Fabricated from 24 gage metal, and finished with the manufacturers standard coating system, unless shown otherwise on drawings.
5. Framing: Fabricate and assemble components in largest practical sizes, for delivery to the site.
    a. Construct corner assemblies to required shape with joints tightly fitted.
    b. Supply components required for anchorage of framing. Fabricate anchors and related components of material and finish as required, or as specifically noted.

2.04 FINISHES

A. Aluminum Framing: Mill.

B. Panel Coating: Manufacturer's standard coating system, factory-applied.
    1. Color: Selected from full range of manufacturer's standard colors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Installer's Examination: Examine conditions under which construction activities of this section are to be performed.
    1. Submit written notification to Architect and Screen manufacturer if such conditions are unacceptable.
    2. Beginning erection constitutes installer's acceptance of conditions.

3.02 INSTALLATION

A. Install units in accordance with the manufacturer's instructions and approved shop drawings. Keep perimeter lines straight, plumb, and level. Provide brackets, anchors, and accessories necessary for a complete installation.

B. Fasten structural supports to HVAC units without damaging operation of the unit.
    1. Provide corner and mid-span assemblies as required by approved shop drawings so that the panels are supported uniformly.
    2. Fastening bottom rail using bolts to permit ease of access to HVAC units.

C. Insert thermoplastic panels into structural supports, except where fixed attachment points are indicated. Butt thermoplastic panels to adjacent panels for uniform fit. Fasten fixed panels in accordance with the shop drawings.

D. Metal Separation: Where aluminum materials would contact dissimilar materials, insert rubber grommets at attachment points, thus eliminating where dissimilar metals would otherwise be in contact.

E. Do not cut or abrade finishes which cannot be restored. Return items with such finishes to shop for required alterations.

3.03 ERECTION TOLERANCES

A. Maximum misalignment from true position: 1/4".

3.04 CLEANING AND PROTECTION

A. Remove all protective masking from material immediately after installation.

B. Protection:
    1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
    2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.

C. Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.
    1. Clean units in accordance with the manufacturer's instructions.

END OF SECTION

SECTION 11 30 13
RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Kitchen appliances

B. Laundry appliances

1.02 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.05 PROJECT CONDITIONS

A. Coordinate appliance delivery with the Owner.

B. Coordinate installation with size, location and installation of service utilities.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. GE Applainces (www.geappliances.com) products are specified, unless otherwise noted.

B. Other Acceptable Manufacturers:
   1. Whirlpool Corp: www.whirlpool.com.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 KITCHEN AND LAUNDRY APPLIANCES

A. All appliances to be Energy Star rated. Substitute higher quality level or larger size to achieve Energy Star rating, if necessary. Referenced numbers are GE appliances. All appliance colors: stainless steel.

B. Care Center:
   1. Unit Compact Refrigerator - GMR03GAEWW
   2. Meds - Avanti BCA5102SS (lockable)
   3. Laundry -
      a. Washer - WNRD2050DWC
      b. Dryer - DNCD450EGWC
   4. Neighborhood kitchens - (2)
      a. Refrigerator - GHT21GBEWW
      b. Range - JSP39DNWW
         1) Backguard Kit - JXS32WW

c. Microwave - JES1460DSWW
d. Garbage Disposal - GFC325V

C. Employee Lounge:
1. Microwave - JES1460DSWW(2)
2. Refrigerator - GTH21GBEWW(2)

2.03 ACCESSORIES

A. Provide cord and plug for each appliance.

B. Grease Shields: Baked enamel on steel, white; matching screws, @ adjacent "tall" cabinet, provide at side of ranges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adjoining finishes are complete.

B. Verify utility rough-ins are provided and correctly located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install all accessories, etc. per manufacturer's instructions.

C. Level appliances to manufacturer's recommended tolerance; use adjustable legs of appliances when available.

D. Anchor built-in equipment in place.

E. Connect to utilities.

3.03 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.04 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION

SECTION 12 21 13
HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Horizontal slat louver blinds - in units only.

B. Operating hardware.

C. Motor controls for motorized blinds at Lodge Auditorium/Chapel and Theater.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. WCMA A100.1 - Safety of Corded Window Covering Products; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating physical and dimensional characteristics.
   1. Motorized Blinds: Include power requirements and standard wiring diagrams.

C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
   1. Motorized Blinds: Include schematic system riser diagram indicating component interconnections, detailed sequence of operations describing system functions, and requirements for interface with other systems.

D. Samples: Submit two samples, ____ inch long illustrating slat materials and finish, cord type and color.

1.04 QUALITY ASSURANCE

A. Motorized Blinds: Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 PROJECT CONDITIONS

A. Take field measurements to determine sizes required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Horizontal Louver Blinds:
   1. Hunter Douglas Product CONTRACT CELEBRITY 1" Aluminum Blinds.
   2. Levelor Home Fashions Contract Division Product MONACO.
   3. Springs Window Fashions Division, Inc. Product BALI CUSTO-MISER 2000.

B. Dual Motorized Roller Shades
   1. Hunter Douglas; Product ROLLER SHADES FR
      a. Fabric shade, as selected from manufacturer's standard.
      b. Blockout shade with aluminum side channels, sill chanels and RB 500 bottom bar.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BLINDS WITHOUT SIDE GUIDES

A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.

B. Blinds: Horizontal slat louvers hung from full-width headrail with full-width bottom rail; manual control of raising and lowering by cord with full range locking; blade angle adjustable by cord; complying with WCMA A100.1.

C. Metal Slats: Spring tempered pre-finished aluminum; radiused slat corners, with manufacturing burrs removed.
   1. Width: 1 inch.
   2. Thickness: 0.008 inch.
   3. Color: 2 colors As selected from manufacturer's full range. One color for unit interiors and one color for public spaces.

D. Slat Support: Woven polypropylene cord, ladder configuration.

E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
   1. Color: Same as slats.

F. Bottom Rail: Pre-finished, formed aluminum with top side shaped to match slat curvature; with end caps. Color: Same as headrail.

G. Lift Cord: Braided; continuous loop (unless noted to be cordless below).
   1. Free end weighted.
   2. Color: As selected by Architect.

H. Cordless Blinds: Provide cordless blinds at all Memory Care units.

I. Control Wand: Extruded hollow plastic; square or round shape.
   1. Removable type.
   2. Length of window opening height less 3 inches, except extend all wands to within 4 feet of the floor.
   3. Color: Clear.
   4. At tall windows with blinds 'stacked' vertically provide hook at end of upper blind control wand and separate reach rod for adjustment.

J. Headrail Attachment: Wall brackets.

2.03 FABRICATION

A. Fabricate blinds to fit within openings with uniform edge clearance of 1/4 inch.

B. Fabricate blinds to cover window frames completely.

C. At openings requiring multiple blind units, provide separate blind assemblies with space of 1/4 inch between blinds, located at window mullion centers.

D. Limit any one blind to 7'-6" maximum length and 4'-0" maximum width. Where multiple window group divide point of blinds should match the vertical and/or horizontal mullions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings are ready to receive the work.

3.02 INSTALLATION

A. Install blinds in accordance with manufacturer's instructions.

B. Secure in place with flush countersunk fasteners.

C. Place intermediate head supports at 48 inch on center for blinds over 60 inches wide or over 40 sf in area.

3.03 TOLERANCES

A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.

B. Maximum Offset From Level: 1/8 inch.

3.04 ADJUSTING

A. Adjust blinds for smooth operation.

3.05 CLEANING

A. Clean blind surfaces just prior to occupancy.

3.06 SCHEDULE

A. Provide metal blinds at all exterior dwelling unit and office windows and swing doors.

END OF SECTION

SECTION 12 35 30
RESIDENTIAL CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dwelling unit kitchen cabinets and countertops.

B. Dwelling unit vanity cabinets.

C. Dwelling Unit Medicine Cabinets.

D. Casework hardware.

1.02 RELATED SECTIONS

A. Section 06410 - Custom Cabinets: Cabinets, shelving, and plastic laminate countertops for other than dwelling units and Community Rooms.

B. Section 06620 - Cast Plastic Fabrications: Cast plastic (cultured marble) countertops, sinks, and window sills.

1.03 REFERENCE STANDARDS

A. KCMA A161.1 - Performance and Construction Standard for Kitchen and Vanity Cabinets; 2012.

B. KCMA (DIR) - Directory of Certified Cabinet Manufacturers; current edition, online.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, configurations, construction details, and joint details.

C. Shop Drawings: Indicate casework locations, elevations, clearances required, rough-in and anchor placement dimensions and tolerances, and _____.

D. Manufacturer's Qualification Statement.

E. Samples:
   1. Submit two samples, 6 x 6 inch in size, illustrating each color of finish; demonstrate maximum range of color variation.
   2. Submit one sample of full size cabinet front, 12 inches wide minimum, color as selected for use, including drawer and door front.

F. Certificate: Submit manufacturer's certification that casework and countertops are formaldehyde free.

1.05 QUALITY ASSURANCE

A. Products: Complying with KCMA A161.1 and KCMA Certified.

B. Manufacturer: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Residential Casework:

B. Acceptable Manufacturers:
   1. Grandview Products Co. Inc. (316) 421-6950.
   2. Medallion (800-543-4074).
   3. Mid Continent (612-297-0661).
   4. Parr Cabinetry.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COMPONENTS

A. Cabinet Construction: Square edge, recessed panel "Shaker Style". Softwood lumber framing and particle board, tempered hardboard gables.
   1. Facing, end and box frame to match specified wood and finish with vinyl lined interior.
   2. Provide slide out shelves in all base cabinets, except sink cabinet. Provide 4 slide out shelves in pantry cabinets.
   3. Provide matching toe kicks.

B. Medicine Cabinets: Matching door style and box construction to vanity cabinets, 16x26 door, mount 40" aff.

C. Bolts, Nuts, Washers and Screws: Of size and type to suit application.

D. Concealed Joint Fasteners: Threaded steel.

2.03 HARDWARE

A. Hardware: Manufacturer's standard, except as indicated below.

B. Drawer and Door Pulls: Amerock Inspirations #BP1584 or similar, 3 inches. Finish: to match door hardware.

C. Drawer Slides: Two side slides and tracks with a drawer stop that allows drawer removal.

2.04 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fabricate corners and joints without gaps.

C. Fabricate each unit to be rigid and not dependent on adjacent units for rigidity.

D. Provide bottom panel for base cabinets and finished panel for exposed ends. Provide matching filler pieces.

E. Manufacture casework without the use of urea formaldehyde or treat and seal in a manner preventing emission of formaldehyde.

F. Wall Unit Shelves: Adjustable.

G. Drawers: Full depth.

H. Base Cabinet Shelves: Slide out.

I. Provide matching prefinished wood trim at kick space.

J. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces not @ countertops.

K. Form smooth edges. Form material for countertops, facing, and shelves from continuous sheets.

L. Provide cutouts for plumbing fixtures and appliances. Prime paint contact surfaces of cut edges.

M. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.05 FINISHES

A. Plastic Laminate Counter Tops:
   1. Colors to be selected by Architect from Manufacturer's full range of color selections.

B. External Cabinet Surfaces: Stained and finished Maple.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of support framing and concealed blocking.

3.02 INSTALLATION

A. Install casework, components and accessories in accordance with manufacturer's instructions.
B. Use anchoring devices to suit conditions and substrate materials encountered.
C. Set casework items plumb and square, securely anchored to building structure.
D. Carefully scribe casework abutting other components, with maximum gaps of _____ inch.
E. Close ends of units, back splashes, shelves and bases.

3.03 ADJUSTING

A. Adjust doors, drawers, hardware, and other moving or operating parts to function smoothly.

3.04 CLEANING

A. Clean casework, countertops, shelves, and hardware.

3.05 PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.

END OF SECTION

SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid Surfacing Countertops

B. Wall-hung counters and vanity tops.

1.02 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

B. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

C. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.

D. MIA (DSDM) - Dimensional Stone Design Manual; VII, 2007.

E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

F. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

F. Installation Instructions: Manufacturer's installation instructions and recommendations.

G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch, minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.

c. Color and Pattern: As selected by Architect from manufacturer's full line.
d. Manufacturers:
1) Dupont: www.corian.com.
2) Formica Corporation: www.formica.com.
3) Avonite Surfaces : www.avonitesurfaces.com.
4) Wilsonart, LLC: www.wilsonart.com.
5) Substitutions: See Section 01 60 00 - Product Requirements.
3. Other Components Thickness: 1/2 inch, minimum.
4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

B. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
1. Flat Sheet Thickness: 1-1/4 inch, minimum.
2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
a. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
b. Finish on Exposed Surfaces: Polished.
c. Color and Pattern: As selected by from manufacturer's full line.
d. Manufacturers:
1) Cambria.
2) Substitutions: See Section 01 60 00 - Product Requirements.
3. Wall Panels: 1/2 inch, and 3/4 inch thick.
4. Other Components Thickness: 3/4 inch, minimum.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

2.02 MATERIALS

A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

B. Joint Sealant: Mildew-resistant silicone sealant, white.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
1. Join lengths of tops using best method recommended by manufacturer.
2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Seal joint between back/end splashes and vertical surfaces.

3.03 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.04 CLEANING

A. Clean countertops surfaces thoroughly.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 14 20 10
PASSENGER ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Complete elevator systems.

B. Excavating and backfilling for hydraulic cylinder casing.

C. Elevator maintenance.

D. Hoisting and rigging for installation of elevator systems.

E. Elevator sill support angles and pit ladders.

1.02 REFERENCE STANDARDS

A. ADAAG - Americans with Disabilities Act Accessibility Guidelines.

B. AISC 360 - Specification for Structural Steel Buildings; 2010.

C. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; 2014.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

G. UL (BMD) - Building Materials Directory; current edition.

H. UL (ECMD) - Electrical Construction Materials Directory; current edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate the following information:
   1. Locations of Machine Room Equipment: Driving machines, controllers, governors and other components.
   2. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
   3. Individual weight of principal components; load reaction at points of support.
   4. Clearances and over-travel of car and counterweight.
   5. Locations in hoistway and machine room of traveling cables and connections for car light.
   6. Location and sizes of access doors, doors, and frames.
   7. Expected heat dissipation of elevator equipment in machine room.
   8. Electrical characteristics and connection requirements.

C. Product Data: Provide data on the following items:
   1. Signal and operating fixtures, operating panels, indicators.
   2. Cab design, dimensions, layout, and components.
   3. Cab and hoistway door and frame details.
   4. Electrical characteristics and connection requirements.

D. Maintenance Data: Include:
   1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
   2. Technical information for servicing operating equipment.
   3. Legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with applicable code and ADAAG and as supplemented in this section.

B. Perform structural steel design, fabrication, and installation in accordance with AISC 360, Specification for Structural Steel Buildings. Perform seismic design in accordance with applicable code.

C. Perform welding of steel in accordance with AWS D1.1/D1.1M.

D. Fabricate and install door and frame assemblies in accordance with NFPA 80.

E. Perform electrical work in accordance with NFPA 70.

F. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years experience.

G. Installer Qualifications: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

H. Products Requiring Fire Resistance Rating: Listed and classified by UL.

I. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 PRE-INSTALLATION MEETING

A. Review schedule of installation, installation procedures and conditions, and coordination with related work.

B. Review use of elevator for construction purposes, hours of use, scheduling of its use, cleanliness of cab, employment of operator, maintenance of system.

1.06 PROJECT CONDITIONS

A. Construction Use of Elevator: Enclose elevator when required for transport of construction personnel and materials.
   1. Enclose cab with protective plywood on floor, walls, and ceiling.
   2. Provide temporary lighting.
   3. Provide control panel with manual and emergency operation with key operation for attendant operator.

B. If elevator machine room or hoistway size must be adjusted, elevator contractor to identify requirements in bid.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for elevator operating equipment and devices.

1.08 MAINTENANCE SERVICE (SEE END OF SECTION)

A. Provide routine service work during working hours.

B. Provide emergency call back service including, but not limited to, life safety problems at all hours.

C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. ThyssenKrupp Elevator: www.thyssenkruppelevator.com.
   2. Otis Elevator Co: www.otis.com.
   3. Schindler Elevator Corp: www.us.schindler.com.

B. Substitutions: See Section 01 60 00 - Product Requirements.

C. All components to be manufactured by same entity, unless otherwise indicated.

2.02 ELEVATORS

A. Elevators No.1: Passenger, holeless hydraulic type with cylinder in hoistway.

1. Operation and Controls: Two-stop automatic.
2. Cab Design: "Vertical" plastic laminate panels with reveals hung over baked enamel finish metal car walls, #4 finish stainless steel front return walls and doors, aluminum frame, concealed frame suspended satin steel ceiling with recessed lights.
3. Hoistway Doors and Frames: Baked enamel on steel.
4. Cab Height: 96 inches.
5. Hoistway and Cab Entrance Frame Opening Size: 48 x 84 inches.
6. Door Type: Double leaf.
7. Door Operation: Side opening.
8. Rated Net Capacity: 2500 lbs.
9. Rated Speed: 100 ft/min.
10. Clear Net Platform Size: Mfr standard that meets WA Elevator Code for stretcher.
11. Travel Distance: As indicated on drawings.
12. Number of Stops: 2.
13. Openings: _____ Front. .

B. Hydraulic Cylinder Casing Corrosion Protection: Fully sealed Holeless PVC sleeve with pit monitor.

2.03 CONTROLS

A. Elevators to have non-proprietary controllers.

B. Elevator Controls: Provide landing buttons and hall lanterns (Wall Mounted).

C. Door Controls:
1. Program door control to open doors automatically when car arrives at floor.
2. Render "Door Close" button inoperative when car is standing at dispatching terminal with doors open.
3. Door Safety Devices: Infrared detector device, pulsed screen car door protective device projecting across entire entrance opening; capable of detecting obstruction and reversing doors without contact with the obstruction.
   a. Arrange controls to prevent elevator operation if device is not operative.
4. If doors are prevented from closing for approximately ten seconds because of an obstruction, automatically disconnect door reopening devices, close doors more slowly until obstruction is cleared. Sound buzzer.
5. Controls shall be MOVF as manufactured by G.A.L. or equal.

D. Landing Buttons (Hall Pushbutton Stations): Stainless steel illuminating type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows. (Wall Mounted, not Frame Mounted).
1. The fixture cover plates to have the appendix 'H' engraved and paint filled on them and the fire service phase I instruction will be engraved and paint filled for the cover plat at the main egress floor.

E. Hall Lanterns: Illuminating red or green, vertical style. Or Car Riding Lanterns, as option.

F. Hall Position Indicator (In Hall/Lobby): Illuminating red or green. Provide at main floor landing only.

G. Car Position Indicator (In Car): Illuminating red or green, with audible signal as each floor is passed and at arrival.

H. Interconnect elevator control system with building fire alarm systems.

I. Provide "Firefighter's Operation" in accordance with applicable code. Designated Landing: Verify with local Fire Inspector.

J. Main car operating panel shall be installed to include all code requirements. All illumination of button devices shall be installed with LED cluster light bulbs. Appropriate firefighter's service key switch, jewel, and fire call cancel buttons shall meet current code. The car-operating panel shall have the independent service key switch mounted on the top portion of the panels above the call buttons. The main car operating panel shall contain a recessed service cabinet with the

inspection switch, keyed stop switch, GFIC receptacle, fan and light switches as a minimum and comply with the latest code requirements. The firefighter's phase II instructions shall be engraved in the car operating panels. The emergency light unit shall be incorporated within the panels. A push to talk phone shall be incorporated into each car operating panel. The unit will be programmed to the Contractor's 24 hour number at no charge. There will be no charge for this service throughout the interim or warranty or extended maintenance. The phone unit and related requirements will comply with the latest prevailing code authorities' interpretation level of acceptance. An 'S' button shall be included in the car operating panel to limit the passing floor gong assembly. The 'S' button, when pushed, will allow the passing floor gong to operate for the full directional trip before reversal. The passing floor gong shall be silent until the 'S' button is pushed for the total directional trip.

K. Hoistway Vent Fixture

L. Hoistway Access Fixtures

2.04 FEATURES AND ACCESSORIES

A. Emergency Communications: ADA compliant two-way non-verbal emergency communication system.

B. Handrail: Brushed (#4 finish) stainless steel type, 1-1/2 inch diameter; mount on back and side walls.

C. Pads and Hooks: Include protective pads and permanently mounted wall stud posts for all sides of the car.

D. Sill Support Angles and Pit Ladders: Provide; conform to requirements of Section 05500.

E. Emergency key box to be installed in the main egress elevator lobby.

F. Elevator personnel box to be installed in the elevator equipment room.

2.05 EMERGENCY POWER

A. Provide battery "back-up" power so cab returns to first floor and doors open if power is interrupted.

B. Arrange elevator operation to operate under emergency power when generator power is connected to building. Coordinate with Electrical Contractor.

C. Emergency Power Supply: Building emergency power; provide for emergency power characteristics and phase rotation same as for normal power. Provide transfer switches and auxiliary contacts in accordance with Section _____. Install connections to power feeders.

D. Provide operational control circuitry for adapting the change from normal to emergency power.

E. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

F. After the above operation has completed one complete cycle, operate one pre-selected elevator in normal operation from the emergency power supply. If the pre-selected car fails to operate, automatically select another car to operate.

G. Provide manual switch to override the automatic selection procedure.

2.06 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:
   1. 208 volts, three phase, 60 Hz; verify requirements with electrical contractor.
   2. Starter Characteristics: Solid State starting.

2.07 MACHINE ROOM FITTINGS

A. Wall-Mounted Frames: Glazed with clear plastic; sized as required. Provide one for master electric and hydraulic schematic and one for lubrication chart. Install charts.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that hoistway, pit, and machine room are ready for work of this section.

C. Verify hoistway shaft and openings are of correct size and within tolerance.

D. Verify that proposed support points for temporary hoisting will support loads that will be imposed.

E. Verify location and size of machine foundation and position of machine foundation bolts.

F. Verify that electrical power is available and of the correct characteristics.

3.02 PREPARATION

A. Arrange for temporary electrical power for installation work and testing of elevator components.

B. Install temporary hoisting and rigging equipment.

C. Excavate for hydraulic cylinder casing and hydraulic lines between plunger and remote machine room in accordance with Division 2.

3.03 INSTALLATION

A. Install system components. Connect equipment to building utilities.

B. Provide conduit, boxes, wiring, and accessories.

C. Install hydraulic piping between cylinder and pump unit.

D. Mount machines on vibration and acoustic isolators, on bed plate and concrete pad. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.

E. Accommodate equipment in space indicated.

F. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.

G. Accurately machine and align guide rails. Form smooth joints with machined splice plates.

H. Field Welds: Chip and clean away oxidation and residue, wire brush; spot prime with two coats.

I. Coordinate installation of hoistway wall construction.

J. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

K. Fill hoistway door frames solid with grout in accordance with Section 04 20 00.

L. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.

M. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.

N. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.

O. Adjust equipment for smooth and quiet operation.

3.04 ERECTION TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 .

B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

A. Testing and inspection by regulatory agencies will be performed at their discretion.
   1. Schedule tests with agencies and notify Owner and Architect.
   2. Obtain permits required to perform tests.
   3. Document regulatory agency tests and inspections in accordance with the requirements of Section 01 40 00.
   4. Perform tests required by regulatory agencies.
   5. Furnish test and approval certificates issued by authorities having jurisdiction.

B. Perform testing and inspection in accordance with requirements of Section 01 40 00.
   1. Perform tests as required by ASME A17.2.
   2. Provide two weeks written notice of date and time of tests.
   3. Supply instruments and execute specific tests.

3.06 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.

B. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

3.07 CLEANING AND PROTECTION

A. Remove temporary hoisting and rigging equipment; repair any damage caused by same.

B. Remove protective coverings from finished surfaces.

C. Clean surfaces and components ready for inspection.

D. Do not permit construction traffic within cab after cleaning.

3.08 MAINTENANCE

A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.

B. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer or original installer.

C. Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.

D. Examine system components monthly. Clean, adjust, and lubricate equipment.

E. Include systematic examination, adjustment, and lubrication of elevator equipment. Maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

F. Perform work without removing cars during peak traffic periods.

END OF SECTION

SECTION 14 91 00
FACILITY CHUTES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gravity chutes for waste (trash, refuse).

1.02 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; current edition.

B. NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.

C. NFPA 82 - Standard on Incinerators and Waste and Linen Handling Systems and Equipment; 2014.

D. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for additional requirements.

B. Product Data: Manufacturer's printed data sheets on each component, indicating which options are provided.

C. Shop Drawings: Provide detailed layout of chute and components, indicating interface with structure, enclosing walls, and utilities; include the following:
   1. Openings in floors and required clearances.
   2. Location and size of each field connection to structure.
   3. Pipe sizes and locations.
   4. Electrical wiring sizes, conduits, and location of connections.
   5. Clearly indicate components required but not furnished by chute installer.

D. Certificates: Certify that chute assembly meets or exceeds NFPA 82 and other specified requirements.

E. Manufacturer's Qualification Statement.

F. Installer's Qualification Statement.

G. Operation and Maintenance Data: Manufacturer's operation instructions.
   1. See Section 01 78 00 - Closeout Submittals, for additional requirements.
   2. Include control wiring diagrams.

1.04 QUALITY ASSURANCE

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Products Requiring Electrical Connection: Listed and classified by UL (DIR), ITS (DIR), or testing agency acceptable to authorities having jurisdiction as suitable for the purpose specified and indicated.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
   1. With not less than 10 years of experience.

D. Installer Qualifications: Company specializing in performing work of the type specified and with at least two years of documented experience.
   1. With minimum 5 years of experience.

E. Pre-Installation Meeting: Convene 7 days before start of installation to review code requirements, manufacturer's recommendations, and related work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Facility Chutes:
   1. Cutler Manufacturing Corporation.

2. Wilkinson-Hi-Rise LLC: www.whrise.com.
3. Midland Metalcraft Corp.
4. Valiant Products, Inc; _____: www.valiantproductsinc.com/#sle.
5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FACILITY CHUTES

A. Waste Materials and Recyclables Chutes: Sheet metal, round, constant diameter extending from above roof to lowest floor, with chute intake doors at each floor and bottom of chute discharge door into designated room as indicated on drawings; complying with requirements of NFPA 82, and the local building code and authorities having jurisdiction.
   1. Chute Diameter: 24 inches inside.
   2. Intake Doors: Hopper type, self-closing and self-latching, with electric interlock.
   3. Intake Door Size: 15 by 18 inches wide by high.
   4. Provide electric interlock system and sensors that automatically prevents the following:
   5. Sanitizing unit manual controls and to activate spray cleaning from discharge room. Sanitizing unit installed at top intake room of chute.

2.03 COMPONENTS

A. Chute: Factory-fabricated to the greatest extent possible, with continuously welded or lock-seamed joints and smooth, non-snag interior (no protruding bolts, rivets, hardware, sharp edges or corners).
   1. Sheet Metal Thickness: 16 gauge, 0.06 inch.
   2. Fire Rating: In compliance with local building code requirements.
   3. Throat Sections: Provide sloped throat sections for chute intake doors, of same material and construction as chute.
   4. Fabricate with support frames at each floor with sound isolator pads and expansion joints in chute between each support point.

B. Chute Intake Doors: Factory-assembled, UL (DIR) listed and labeled door and frame, with self- or automatic-closing and positive latching; frame designed for chase construction, and flush-mounted.
   1. Material: Stainless steel, brushed or satin finish.
   2. Fire Rating: In compliance with local building code requirements.
   3. Fire Rating: 1-1/2 hour ("B" label) with 30-minute temperature rise of 250 degrees F .
   4. Pulls: T-handle or lever handle latch; polished stainless steel.
   5. Signs: Mark on frame or door face the purpose of the chute, using engraving, integral raised lettering, or other permanent signs.

C. Discharge Doors: Aluminum-coated steel; normally-open, 1-1/2 hour ("B" label) fire rated, with fusible link closing; style as required by chute configuration.
   1. Vertical Discharge Style: Inclined horizontally rolling shutter, closing by gravity.

D. Chute Access Doors: Same construction and fire rating as chute intake doors, with locks; provide wherever equipment requiring maintenance is located inside chute, including sprinklers, plumbing and electrical connections.

E. Roof Vent: Full diameter, extending minimum 48 inches above roof level, with roof deck flange.
   1. Material: Manufacturer's standard.
   2. Counterflashing and clamping ring of non-ferrous metal compatible with chute material. Refer to Section 07 62 00.
   3. Top Unit: Screened vent.

F. Fire Sprinklers: Comply with NFPA 82 and NFPA 13; provide 1/2 inch NPS sprinkler heads mounted inside chute intake throats at the following locations:
   1. At or above the top intake opening.
   2. At the lowest intake opening.
   3. In buildings of more than two stories, at every other floor.

G. Spray Cleaning Equipment:

1. Flushing Spray Unit: Solenoid controlled 3/4 inch NPS spray head mounted above top intake door. Refer to Section 22 10 05 for water piping connections and Section 26 05 83 for wiring connections.
2. Sanitizing Unit: Tank and feeder to introduce disinfectant into flushing spray line.
   a. Provide backflow preventer valve and actuator switch.
   b. Capacity: 1 gallon, minimum.
   c. Accessible through access door immediately above top intake door.

H. Electrical Controls: 110 V AC.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install facility chutes and equipment in accordance with NFPA 82, requirements of local authorities having jurisdiction, and manufacturer's instructions.

B. Maintain fire-resistive capacity of enclosing walls.

C. Install facility chute plumb and without offsets or obstructions that might prevent free fall of materials, except where indicated on drawings.

D. Anchor securely in manner required to withstand impact and weight of materials in chute.

E. Install roof vent flange to roof deck prior to installation of roofing.

F. Install counterflashing after roofing installation.

G. Adjust doors and other operating components for smooth operation.

3.02 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Notify Owner and Architect at least 7 days prior to testing.

C. Place bagged material of expected size in chute to verify free fall.

D. Test the facility chute components for proper operation.
   1. Operate doors, locks, and interlocks.
   2. Operate spray cleaning devices.
   3. Simulate fire conditions inside chute to verify sprinkler and detector operation.

3.03 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. After completion of enclosing walls, clean exposed facility chute components; do not remove testing agency labels.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site for site structures.

C. Soil corrections.

D. Finish grading.

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Section 31 23 16 - Excavation.

C. Section 31 23 23 - Fill: Filling and compaction.

D. Section 02921 - Seeding: Finish ground cover.

E. Section 02923 - Sodding: Finish ground cover.

1.03 PROJECT CONDITIONS

A. Protect above- and below-grade utilities that remain.

B. Protect plants, lawns, and other features to remain as a portion of final landscaping.

C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: See Section 31 23 23.

B. Other Fill Materials: See Section 31 23 23.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Make soil corrections defined in the Geotechnical Report; follow procedures and use materials defined in the Report.

D. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

E. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

F. When excavations extend below footing and slab bearing elevations, oversize the excavation horizontally 1 foot for every foot of excavation depth below the indicated bearing elevation.

G. When excavating through roots, perform work by hand and cut roots with sharp axe.

H. See Section 31 23 23 for filling procedures.

I. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.

J. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

K. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

E. Place topsoil in areas where seeding, sodding, and planting are indicated.

F. Place topsoil where required to level finish grade.

G. Place topsoil to the following compacted thicknesses:
   1. Areas to be Seeded with Grass: 4 inches.
   2. Areas to be Sodded: 4 inches.
   3. Shrub Beds: 18 inches.
   4. Flower Beds: 12 inches.

H. Place topsoil during dry weather.

I. Remove roots, weeds, rocks, and foreign material while spreading.

J. Near plants spread topsoil manually to prevent damage.

K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

L. Lightly compact placed topsoil.

M. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 FIELD QUALITY CONTROL

A. See Section 31 23 23 for compaction density testing.

3.08 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for building volume below grade, slabs-on-grade, paving, site structures, and utilities within the building.

1.02 RELATED REQUIREMENTS

A. Document _____-_____: Geotechnical report; bore hole locations and findings of subsurface materials.

B. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.

C. Section 31 22 00 - Grading: Soil removal from surface of site.

D. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

E. Section 33 41 00 - Subdrainage: Filter aggregate and filter fabric for foundation drainage systems.

1.03 PROJECT CONDITIONS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut utility trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 23 23.

H. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

I. Remove excavated material that is unsuitable for re-use from site.

J. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 22 00.

K. Remove excess excavated material from site.

3.02 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.03 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

SECTION 31 23 16.13
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Document 00300 - Information Available to Bidders: Geotechnical report; bore hole locations and findings of subsurface materials.

B. Section 31 22 00 - Grading: Site grading.

C. Section 31 23 16 - Excavation: Building and foundation excavating.

D. Section 31 23 23 - Fill: Backfilling at building and foundations.

1.03 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: 10 pound sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

C. Protect plants, lawns, rock outcroppings, and other features to remain.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Fill and Topsoil: Conform to requirements of Section 02316.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

G. Remove excavated material that is unsuitable for re-use from site.

H. Remove excess excavated material from site.

I. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

J. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.03 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.04 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

F. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

G. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. Other areas: Use structural fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

H. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under slabs-on-grade, foundations, and similar construction: 97 percent of maximum dry density.
   2. At upper 3 feet of fill below bituminous concrete paving: 100 percent of maximum dry density.
   3. At other locations: 95 percent of maximum dry density.

I. Reshape and re-compact fills subjected to vehicular traffic.

3.05 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Utility Piping, Conduits, Duct Bank, and _____ and _____:
   1. Bedding: Use general fill.
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact as previously specified in this Section.

C. At Pipe Culverts:
   1. Bedding: Use general fill.
   2. Cover with structural fill.
   3. Fill up to subgrade elevation.
   4. Compact as previously specified in this Section.

3.06 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.07 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: For each 2 feet of depth of backfill, conduct at least one test 100 feet oc in utility trenches to verify compliance with design requirements..

3.08 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 31 23 23
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade.

B. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Section 31 05 19 - Geosynthetics for Earthwork.

B. Section 31 22 00 - Grading: Site grading.

C. Section 31 23 16 - Excavation: Removal and handling of soil to be re-used.

D. Section 33 41 00 - Subdrainage: Filter aggregate and filter fabric for foundation drainage systems.

1.03 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

B. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Soil Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site as defined as acceptable for use in the Geotechnical Report; when required to complete the Work defined by the Contract Documents, supplement with imported borrow.
   1. Free of lumps larger than 4 inches, rocks larger than 4 inches, and debris.
   2. Conforming to ASTM D 2487 Group Symbol: Any of the sand or gravel group symbols.

B. Structural (Engineered) Fill: Imported borrow or subsoil excavated on site if approved by the Geotechnical Engineer.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 2 inch sieve: 100 percent passing.
      b. 1 inch sieve: 95 percent passing.
      c. 3/4 inch sieve: 95 to 100 percent passing.
      d. 5/8 inch sieve: 75 to 100 percent passing.
      e. 3/8 inch sieve: 55 to 85 percent passing.
      f. No. 4 sieve: 35 to 60 percent passing.
      g. No. 16 sieve: 15 to 35 percent passing.

h. No. 40: 10 to 25 percent passing.
i. No. 200: 5 to 10 percent passing.

C. Sand: Natural river or bank sand or crushed stone; free of silt, clay, loam, friable or soluble materials, and organic matter.
1. Graded in accordance with ASTM C136/C136M; within the following limits:
a. No. 4 sieve: 100 percent passing.
b. No. 14 sieve: 10 to 100 percent passing.
c. No. 50 sieve: 5 to 90 percent passing.
d. No. 100 sieve: 4 to 30 percent passing.
e. No. 200 sieve: 0 to 5 percent passing.

D. Topsoil: Topsoil excavated on-site; supplement with imported borrow when required to complete the Work defined by the Contract Documents.
1. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
2. Acidity range (pH) of 5.5 to 7.5 for imported borrow.
3. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter. for imported borrow.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 31 22 00 for additional requirements.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify structural ability of unsupported walls to support imposed loads by the fill.

E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Proof roll subgrade surface to verify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

F. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

G. Correct areas that are over-excavated.

1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 100 percent of maximum dry density.
2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

H. Compaction Density Unless Otherwise Specified or Indicated:
1. Under slabs-on-grade and similar construction: 97 percent of maximum dry density.
2. At upper 3 feet of fill below bituminous concrete paving: 100 percent of maximum dry density.
3. At other locations: 95 percent of maximum dry density.

I. Reshape and re-compact fills subjected to vehicular traffic.

J. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Under Interior Slabs-On-Grade and Exterior Concrete Pavement and Walks:
1. Use general fill.
2. Compact to 95 percent of maximum dry density.
3. Cover with sand.
a. Depth: 6 inches for interior slabs and 4 inches for exterior paving and walks.
b. Compact to 95 percent of maximum dry density.

B. At Foundation Walls and Footings:
1. Use general fill.
2. Fill up to subgrade elevation.
3. Compact each lift to 90 percent of maximum dry density when below lawn or planting areas.
4. Compact each lift to 95 percent of maximum dry density when below slab on grade or paved areas.
5. Do not backfill against unsupported foundation walls.

C. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
1. Drainage fill and geotextile: Section 31 05 19.
2. Cover drainage fill with general fill.
3. Compact as defined for fill at foundation walls.

D. At Lawn and Planting Areas:
1. Use general fill.
2. Fill up to subgrade elevations.
3. Compact to 90 percent of maximum dry density.
4. See Section 31 22 00 for topsoil placement.

E. Under Bituminous Concrete Paving:
1. Use general fill.
2. Fill up to bottom of aggregate base course elevation.
3. See Section 02741 for aggregate base course placed over fill.
4. Compact to 100 percent of maximum dry density in the upper 3 feet below finish paving elevation.
5. Compact to 95 percent of maximum dry density when more than 3 feet below finish paving elevation.

3.05 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.06 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 31 19
DECORATIVE METAL FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Decorative aluminum fences.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

D. Manufacturer's Warranty.

1.03 DELIVERY, STORAGE AND HANDLING

A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.04 WARRANTY

A. Finish: 20 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 FENCES

A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:

B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
   1. Total Coating Thickness: 2 mils, minimum.

2.03 ALUMINUM FENCE

A. Fence Panels: 6 feet high by 6 feet long.
   1. Panel Style: Two rail.
   2. Panel Strength: Capable of supporting 270 pounds minimum load applied at midspan without deflection.
   3. Attach panels to posts with manufacturer's standard panel brackets and recommended fasteners.

B. Color: Manufacturer's standard, factory applied Dark Bronze.

END OF SECTION

SECTION 32 32 24
MODULAR CONCRETE RETAINING WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Modular concrete retaining wall units to the lines and grades designated on the construction drawings and as specified herein.

1.02 RELATED SECTIONS

A. Section 02315 - Excavation.

B. Section 02316 - Fill and Backfill.

1.03 DEFINITIONS

A. Backfill: Soil used as fill behind drainage aggregate and within the reinforced soil mass, if applicable.

B. Drainage aggregate: Material used around and directly behind concrete wall units.

C. Geosynthetic reinforcement: Material specifically fabricated for use as a soil reinforcement.

D. Wall fill: Free-draining aggregate material used within and around concrete retaining wall units.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature, including installation instructions.

C. Shop Drawings: Retaining wall system design including wall heights, geosynthetic reinforcement and drainage provisions.
   1. Prepared and signed by a Qualified Professional Engineer retained by the Installer and licensed in the State of wall installation.

1.05 DELIVERY, STORAGE AND HANDLING

A. Inspect the materials upon delivery to assure that specified products have been received.

B. Deliver and handle materials in manner that will prevent damage.
   1. Store above ground on wood pallets or blocking.
   2. Remove damaged or otherwise unsuitable material, when so determined, from the site.
   3. Faces of the modular concrete units shall be free of chips, cracks and stains.

C. Prevent wet cement, epoxy, excessive mud, etc., from coming in contact with the materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Modular Concrete Retaining Wall Units:
   1. Versa-Lok Retaining Wall Systems; Product RETAINING WALL UNITS
   2. Anchor Wall Systems, Inc.; Product ANCHOR DIAMOND RETAINING WALL UNITS.
   3. Keystone Retaining Wall Systems, Inc.; Product RETAINING WALL UNITS.
   4. Rockwood Retaining Wall Systems, Inc.; Product RETAINING WALLS CLASSIC.

B. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Modular Concrete Retaining Wall Units: High strength, high density concrete units, freeze-thaw resistant; provide set back for each course of wall height.
   1. Provide units with an integral concrete shear connection flange along the lower rear edge or with non-corrosive pin connector system.
   2. Complying with requirements of ASTM C 90 except having compressive strength of 3,000 psi, minimum, and water absorption of 7.0 percent, maximum.
   3. Freeze thaw resistance in accordance with ASTM C 666, modified to 50 cycles.

4. Color: As selected from manufacturer's standard selections to match "Anchor Block" Toffee or Buckskin.
5. Face geometry: Straight.
6. Texture: Split/Rock Face.
7. Minimum face area: 0.67 square feet.
8. Minimum weight: 100 pounds per square foot of wall face, including fill within units.

B. Geosynthetic Reinforcement: Woven polyester fiber geogrid, expanded polyethylene sheet geogrid, or woven polypropylene geotextile.

C. Base: Drainage aggregate as specified in this section.

D. Drainage Aggregate: Free-draining, coarse aggregate complying with ASTM 448, size no. 57, 67, 6, 7 or 8.

E. Backfill: On-site soils unless otherwise indicated on the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which retaining walls are to be erected and notify Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 EXCAVATION

A. Excavate to the lines and grades shown on the drawings. Over-excavation will not be compensated and replacement with compacted fill or wall system components will be required at Contractor's expense. Take care not to disturb base beyond the lines shown.

B. Excavate as required for footing or base dimension shown on the drawings, unless otherwise directed.

C. Obtain the Geotechnical Engineer's approval of subgrade to ensure that the actual soil strength meets or exceeds that required.

D. Remove soil not meeting the required strength, and replace with acceptable material.

E. Fill over-excavated areas with compacted backfill material.

F. Proof-roll foundation soil prior to fill and geosynthetic reinforcement placement.

3.03 BASE COURSE PREPARATION

A. Place granular base materials as indicated on the Drawings, but not less than 6 inches (150 mm) thick.

B. Place base materials upon undisturbed soils or on foundation soils properly backfilled.

C. Compact base material so as to provide a level, hard surface on which to place the first course of units.

D. Prepare base materials to ensure complete contact of retaining wall unit with base material. Do not allow gaps.

3.04 ERECTION

A. Erect units in accordance with manufacturer's recommendations and as specified herein.

B. Place first course of concrete wall units on the prepared base material. Check units for level and alignment. Ensure that the top of all units in base course are at the same elevation.

C. Ensure that concrete wall units are in full contact with base.

D. Place concrete wall units side by side for full length of wall alignment. Alignment may be done by using a string line or offset of wall line.

E. Fill all voids between and within concrete wall units with drainage aggregate.

F. Place at least 12 inches of drainage aggregate behind the concrete wall units.

G. Remove excess fill from top of concrete wall units and install next course. Ensure that drainage aggregate and backfill are compacted before installation of next course.

H. Pull each succeeding course forward as far as possible until the locating surface contacts the locating surface of the unit in the preceding course.

I. Backfill as each course is completed.

J. Install geosynthetic reinforcement in accordance with retaining wall manufacturer's design recommendations and as indicated on drawings.

3.05 BACKFILL PLACEMENT

A. Place, spread, and compact reinforced backfill in a manner to minimize slack in reinforcement.

B. Place and compact fill in the reinforced zone.
   1. Lifts not exceeding 6 to 8 inches (150 to 200 mm) in loose thickness where hand-operated compaction equipment is used.
   2. Lifts not exceeding 12 inches (300 mm) in loose thickness where heavy, self-propelled compaction equipment is used.

C. Compact fill placed in reinforced zone to minimum 95 percent of soil's standard Proctor density (per ASTM D 698) or as recommended by project Geotechnical Engineer.

D. Allow only lightweight hand-operated equipment within 4 feet (1.22 m) of back of retaining wall units, or one-half the wall height, whichever is greater.

3.06 CAP UNIT INSTALLATION

A. Apply construction adhesive to the top surface of the unit below and place the cap unit into desired position.

B. Cut cap units if necessary to obtain the proper fit.

C. Backfill and compact to finish grade.

3.07 ADJUSTING AND CLEANING

A. Replace damaged units prior to Substantial Completion.

B. Remove debris and scrap from the site.

C. Leave adjacent paved areas broom clean.

END OF SECTION

SECTION 33 01 10.58
DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Disinfection of site domestic water lines and site fire water lines specified in Section 33 14 16.

B. Testing and reporting results.

1.02 RELATED REQUIREMENTS

A. Section 33 14 16 - Site Water Utility Distribution Piping.

1.03 REFERENCE STANDARDS

A. AWWA B300 - Hypochlorites; 2011.

B. AWWA B301 - Liquid Chlorine; 2010.

C. AWWA B302 - Ammonium Sulfate; 2010.

D. AWWA B303 - Sodium Chlorite; 2010.

E. AWWA C651 - Disinfecting Water Mains; 2005.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Test Reports: Indicate results comparative to specified requirements.

C. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

D. Bacteriological report:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water complies, or fails to comply, with bacterial standards of _____.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651.

B. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum 5 years experience.

C. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of Washington.

D. Submit bacteriologist's signature and authority associated with testing.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code or regulation for performing the work of this Section.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of water system.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.02 DISINFECTION

A. Provide and attach equipment required to perform the work.

B. Inject treatment disinfectant into piping system.

C. Maintain disinfectant in system for 24 hours.

D. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.

E. Replace permanent system devices removed for disinfection.

F. Pressure test system to City standards. Repair leaks and re-test.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. Test samples in accordance with AWWA C651.

END OF SECTION

SECTION 33 14 16
SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water pipe for site conveyance lines.

B. Pipe valves.

C. Fire hydrants.

D. Pipe and fittings for site water lines including domestic water lines and fire water lines to within 5 feet of exterior wall of building.

E. Valves and Fire hydrants.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for thrust restraints.

B. Section 21 11 00 - Facility Fire-Suppression Water-Service Piping.

C. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.

C. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

D. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.

E. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2010.

F. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2012.

G. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service; 2009.

H. AWWA C502 - Dry-Barrel Fire Hydrants; 2014.

I. AWWA C504 - Rubber-Seated Butterfly Valves 3 In. (75 mm) Through 72 In. (1,800 mm); 2010.

J. UL 246 - Hydrants for Fire-Protection Service; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with municipality requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.01 WATER PIPE

A. Ductile Iron Pipe: AWWA C151/A21.51:
   1. Fittings: Ductile iron, standard thickness.
   2. Joints: AWWA C111/A21.11, Styrene butadiene rubber (SBR) or vulcanized SBR gasket with rods.
   3. Jackets: AWWA C105/A21.5 polyethylene jacket.

B. Copper Tubing: ASTM B88, Type K, Annealed:
   1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
   2. Joints: Compression connection or AWS A5.8M/A5.8, BCuP silver braze.

C. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service" in large letters.

2.02 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves Up To 3 Inches:
   1. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, post indicator, valve key, and extension box.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

C. Gate Valves 3 Inches and Over:
   1. AWWA C500, iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, post indicator, valve key, and extension box.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

D. Butterfly Valves From 2 Inches to 24 Inches:
   1. AWWA C504, iron body, bronze disc, resilient replaceable seat, water or lug ends, ten position lever handle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 HYDRANTS

A. Hydrants: AWWA C502, UL 246, dry barrel type.
   1. Inside dimension: 7 inches minimum, with minimum 5 inches diameter valve seat opening.
   2. Minimum net water area of barrel not less than 190 percent of valve opening.
   3. 6 inch bell or mechanical joint inlet connection with accessories, gland bolts, and gaskets.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Hydrant Extensions: Fabricate in multiples of 6 inches with rod and coupling to increase barrel length.

C. Hose and Streamer Connection: Match sizes and threads with local Fire Department, two hose nozzles, one pumper nozzle.

D. Finish: Primer and two coats of enamel in color required by local Fire Department.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 23 16.13.

B. Cover: As specified in Section 31 23 16.13.

2.05 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

3.03 INSTALLATION - VALVES AND HYDRANTS

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway in accordance with Section 21 11 00.

D. Set hydrants to grade, with nozzles at least 20 inches above ground in accordance with Section 21 11 00.

E. Locate control valve 4 inches away from hydrant.

F. Provide a drainage pit 36 inches square by 24 inches deep filled with 2 inches washed gravel. Encase elbow of hydrant in gravel to 6 inches above drain opening. Do not connect drain opening to sewer.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Perform field inspection and testing in accordance with Section 01 40 00.

C. Pressure test water piping to City standards.

D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

SECTION 33 31 13
SITE SANITARY SEWERAGE GRAVITY PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary sewerage drainage piping, fittings, and accessories.

B. Connection of building sanitary drainage system to municipal sewers.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Section 33 05 61 - Concrete Manholes.

1.03 REFERENCE STANDARDS

A. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2015.

1.04 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Project Record Documents:
   1. Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 PROJECT CONDITIONS

A. Coordinate the Work with termination of sanitary sewer connection outside building, connection to municipal sewer utility service, and trenching.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Plastic Pipe: ASTM D 3034, Type PSM, Poly(Vinyl Chloride) (PVC) material; inside nominal diameter as indicated, bell and spigot style rubber gasketed joints.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 31 23 16.13.

B. Pipe Cover Material: As specified in Section 31 23 16.13.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 23 16.13 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with ASTM D 2321 and manufacturer's instructions. Seal joints watertight.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Install to within 5 feet of the exterior building wall.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

C. Pressure Test: Test in accordance with _____.

3.04 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 41 00
SUBDRAINAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building Perimeter and Retaining Wall Drainage Systems.

B. Under-Slab Drainage Systems per design/build subcontractor to follow AET recommendations in geotechnical report.

C. Filter aggregate and fabric and bedding.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16 - Excavation: Excavating for subdrainage system piping and surrounding filter aggregate.

B. Section 31 23 23 - Fill: Backfilling over filter aggregate, up to subgrade elevation.

PART 2 PRODUCTS

2.01 PIPE MATERIALS

A. Corrugated Plastic Tubing: Flexible type; 4 inch diameter, with required fittings.

B. Use perforated pipe at subdrainage system; unperforated through sleeved walls.

2.02 AGGREGATE AND BEDDING

A. Filter Aggregate: Clean gravel or crushed rock, coarse to fine with 100 percent passing a 1/2 inch sieve, 15 percent passing a No. 20 sieve, and 2 percent maximum passing a No. 100 sieve.

2.03 ACCESSORIES

A. Pipe Couplings: Solid plastic.

B. Filter Fabric: Water pervious type, black polyolefin. Pre-applied "sock" around pipe material.

C. Pipe Hangers: Imbeded pipe hangers in concrete slab above to hold pipe in place as soil subsides.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

3.02 PREPARATION

A. Hand trim excavations to required elevations. Correct over-excavation with filter aggregate.

B. Remove large stones or other hard matter that could damage drainage piping or impede consistent backfilling or compaction.

3.03 INSTALLATION

A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.

B. Place drainage pipe on clean cut subsoil.

C. Locate pipe hangers as recommended by product manufacturer.

D. Mechanically join pipe ends.

E. Install pipe couplings.

F. Install filter aggregate at sides, over joint covers and top of pipe. Provide top cover compacted thickness of 12 inches.

G. Place aggregate in maximum 4 inch lifts, consolidating each lift.

H. Connect to storm sewer system with unperforated pipe .

3.04 PROTECTION

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

END OF SECTION

SECTION 33 42 11
STORM DRAINAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stormwater drainage piping.

B. Stormwater pipe accessories.

C. Gutter and downspout collection systems.

D. Connection of drainage system to municipal sewers.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Section 33 05 61 - Concrete Manholes.

1.03 REFERENCE STANDARDS

A. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2015.

B. ASTM C76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric); 2014.

C. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2012.

D. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric); 2011.

E. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015.

F. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2015.

1.04 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Project Record Documents:
   1. Record location of pipe runs, connections, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

1.07 PROJECT CONDITIONS

A. Coordinate the work with termination of storm sewer connection outside building, trenching, connection to foundation drainage system.

B. Provide for collection of downspouts into underground storm sewer.

PART 2 PRODUCTS

2.01 STORMWATER PIPE MATERIALS

A. Concrete Pipe: Reinforced, ASTM C76 (ASTM C76M), Class II with Wall type A; mesh reinforcement; inside nominal diameter as noted on Drawings.

B. Reinforced Concrete Pipe Joint Device: ASTM C443 (ASTM C443M) rubber compression gasket joint.

C. Plastic Pipe: ASTM D 3034, Type PSM, Poly(Vinyl Chloride) (PVC) material; inside diameter as indicated, bell and spigot style rubber gasketed joints.

D. Plastic Pipe: ASTM D1785, Schedule 40, Poly(Vinyl Chloride) (PVC) material; inside nominal diameter of 6 and 8 inches, bell and spigot style solvent sealed joint end for downspout collection.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required. Provide rectangular shaped termination fittings for connection to downspouts.

B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Stormwater Service" in large letters.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 23 16.13.

B. Cover: As specified in Section 31 23 16.13.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 23 16.13 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with ASTM D 2321 and manufacturer's instructions. Seal joints watertight.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Connect to building storm drainage system, foundation drainage system, and utility/municipal system.

E. Install continuous trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01 40 00 - Quality Requirements.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

C. Pressure Test: Test in accordance with City requirements.

3.04 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION