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TECHNICAL SPECIFICATIONS

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for the proposed
CACHE HIGH SCHOOL
To be located
at the approximate address of
625 West 1200 North
Logan, Utah

PREPARED FOR:
CACHE-LANDMARK ENGINEERING, INC.
Care of:
Lance Anderson
1011 West 400 North, Suite 130
Logan, Utah 84321

PREPARED BY:
ACache Corp.
PROJECT NO. 1160009

May 16, 2016
May 16, 2016

Attn. Lance Anderson
Cache-Landmark Engineering, Inc.
1011 West 400 North, Suite 130
Logan, Utah 84321

Subject: Geotechnical Investigation for the proposed
CACHE HIGH SCHOOL
To be located at approximately
625 West 1200 North
Logan, Utah

ACache Corp. Project No. 1160009

Mr. Anderson

It is with great pleasure that ACache Corp. presents this report of our findings for the subject site. It contains the results of our findings and an engineering interpretation of the results with respect to the available project characteristics.

Soil samples were obtained during our investigation. Please note that we will store these samples for 30 days after the signed date on this report, at which time they will be discarded unless you request otherwise.

We appreciate the opportunity of working with you on this project and look forward to future projects with you. If you have questions regarding this project, or any other, please do not hesitate to contact us at (435)-760-3103.

Sincerely,

ACache Corp.

Jay E. Apedaile, P.E. M.S.
President

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   Figure 2: Site Map
   Figure 3: Symbol Legend
   Figures 4-6: Borehole Logs
   Figure 7: Test Data Summary
1.0 GENERAL PROJECT INFORMATION

1.1 Project Authorization

ACache Corp. (ACC) was retained by Lance Anderson of Cache-Landmark Engineering, Inc. to conduct a Geotechnical Subsurface Investigation for the proposed CACHE HIGH SCHOOL to be located at the approximate address of 625 West 1200 North in Logan, Utah (see Figures 1 and 2 in the Appendix).

1.2 Project Purpose and Description

The purpose of this study was to obtain design level soil information to be used in the design of the proposed structures. Based on the information provided by Cache-Landmark, Inc. the proposed construction will consist of the development of approximately 2.71 acres for a single story building with accompanying parking lot. The building is a slab on grade masonry structure with some tall ceilings and large spans in a gymnasium area. Structural loads are anticipated to consist of column loads ranging from 2 to 36 kips, and wall loads ranging from 2.0 to 6.0 kips per linear foot, for dead plus live loads. Final site grading information was not provided. ACC has assumed that the floor slab of the buildings will be placed at or above the current elevation of the site.

This report and the recommendations here in are based on the available project information. If this information is incorrect, then ACC shall be informed, preferably in writing, so ACC can evaluate the validity of this report.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Investigation

The site is located in an open fielded and old farm yard at an approximate address of 625 West 1200 North in Logan, Utah (see Figures 1 and 2 in the Appendix).

The general subsurface conditions at the site of the proposed structures were investigated by drilling 3 boreholes (B-) ranging in depth from 16.5-feet to 31.5-feet below the current site grade. We also conducted 6 Dynamic Cone Penetrometer (DCP) Tests across the site. The approximate location of each explored location is shown on Figure 2 in the Appendix. Soil samples were obtained at significant change of strata and in general accordance with ASTM D-420 and ASTM 2488. The subsurface conditions observed in the field investigation are discussed in Section 3.6 and in the Boring Logs.
Logs of the boreholes including a description of all soil strata encountered are presented in the Appendix as Figures 4-6. Sampling information and other pertinent data and observations are also included in the logs. A legend of the symbols used in the boring logs is presented in the Appendix as Figure 3.

2.2 Laboratory Investigation

Samples obtained during the field investigation were returned to the laboratory and inspected and classified in accordance with the Unified Soil Classification System (ASTM 2487). Selected laboratory tests were performed on representative soil samples to determine their classification and characteristics with respect to engineering design. The following list indicates typical laboratory tests which may have been conducted on some of the samples retrieved from the site.

<table>
<thead>
<tr>
<th>Test</th>
<th>Standard</th>
<th>To Determine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture Content</td>
<td>ASTM D 2216</td>
<td>% moisture representative of field conditions</td>
</tr>
<tr>
<td>Atterberg Limits</td>
<td>ASTM D 4318</td>
<td>Plasticity and workability</td>
</tr>
<tr>
<td>% Pass #200 Sieve</td>
<td>ASTM D 1140</td>
<td>% fines in sample</td>
</tr>
<tr>
<td>Dry Density</td>
<td>ASTM D 2937</td>
<td>Dry unit weight representative of field conditions</td>
</tr>
<tr>
<td>Consolidation</td>
<td>ASTM D 2435</td>
<td>Maximum past pressure, collapse, swell and consolidation Potential,</td>
</tr>
</tbody>
</table>

The testing results and the soil classifications are illustrated in the Test Data Summary Sheets contained in the Appendix (Figure 7).

3.0 FINDINGS

3.1 Site Conditions

At the time of this investigation the site consisted of open agricultural hay field and an old what appears to have not been used in a whial farm yard with some farm structures. There is a flowing spring on the north side just west of center of the lot. It looked like there might be a field drain system at the site to drain ground water from the site to make it easier to farm the land.

3.2 Surface Drainage

Currently, the majority of any surface runoff would drain to the west and to a ditch to the north. The soil conditions and the ground cover and gravel in the farm yard appear to be adequate in keeping the surface soils from eroding.
3.3 Geology

The site was mapped by James McCalpin as being formed from lacustrine silt and clay related to the Provo and Bonneville shorelines. It consists of layers of clay, silt and minor fine sands, usually deposited in thick beds in deep and quiet water. The observed soil conditions were consistent to those anticipated on the map.

3.4 Soil Profile

The soil profile at the site was fairly consistent. Topsoil was observed with depths from 12” followed by brown and tan clay to approximately 2’ then a tan medium stiff silty clay down to about 5’ below grade. Below that a brown stiff to medium stiff clay with mottling’s was observed to a depth of about 13’ below current grade. Below that a gray very soft clay with lenses of fine sand and silt with layers of poorly graded sand was observed to the full depth investigated (31.5’).

For detailed observations of the sub-soils, the location they were observed, the characteristic observed, and any other pertinent information observed in the field or in the laboratory, see the Boring Logs in the Appendix.

3.5 Fault and Seismicity

The site is located in a seismically active region. It is approximately 2.25-miles west of a mapped location of a section of the Utah East Cache Fault scarp, as depicted on the Surficial Geologic Map of the East Cache Fault Zone (James McCalpin, 1989). During the life of the project seismic activity caused by active faults in the area, have the potential of causing moderate to strong shaking. According to the findings of our subsurface investigation, and according to the guidelines of the International Building Code (IBC, 2012), we would recommend using a Site Class D (ASCE 7, Section 20) for the proposed structural design.

3.6 Liquefaction Evaluation

A site specific liquefaction assessment was conducted by obtaining SPT-N values and samples for laboratory analysis of the sub-soils to a depth of 31.5-feet below the current site grade. Liquefaction potential analysis was conducted following the procedures by Seed and Idriss (1982), Seed, et. Al, (1983; 1985), and Youd and Idriss (1997), using Standard Penetration Test (SPT), and laboratory results. According to the analysis, some of the deeper poorly graded sand layers are susceptible to liquefaction during a large seismic event. This could cause some sand boils to occur and some subsidence of the soil. We recommend stiffening the foundation walls and floor slabs as well as tying the floor slabs into the foundations walls to lessen the effects of any differential settlement that may occur.
3.7 Ground Water

Ground water was observed in all of the borings at depths of 2.25 to 4.0-feet. It is apparent that the ground water at the site is effected by the aquifer that is feeding the spring on the site.

It is likely that the groundwater fluctuates some during the year according to rainfall and other climatic and manmade (irrigation) influences. It is evident that ground water has been much deeper at some point in time given the observed desiccated clays. A detailed evaluation of the groundwater is beyond the scope of this investigation.

3.8 Site Subsurface Variations

It is our experience that variations in continuity and nature of subsurface conditions should be anticipated. Due to the nature and depositional characteristics of soils encountered at the site, care should be taken in interpolating or extrapolating subsurface conditions beyond the exploratory borings. Seasonal fluctuations in ground water conditions are likely to occur.

4.0 RECOMMENDATIONS

Recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions observed in the field and laboratory, as well as common engineering practice. Prudence and common engineering practices should be followed in conjunction to the recommendations of this report.

4.1 Site Preparation and Grading

All topsoil, vegetation, unsuitable soils, fill, construction debris and any other deleterious materials, should be removed from areas of new construction. This material shall not be used as structural fill. After striping and excavation to the proper subgrade elevation, the exposed subgrade should be proof-rolled with a loaded tandem axle dump truck or similar rubber tired vehicle. Soils that rut, or tend to deflect excessively, should be removed and replaced with properly compacted fill. Proof rolling and removal of pumping material should be witnessed by the geotechnical engineer, or his approved representative. For best results this should take place during a period of dry weather, as the observed silty clays will likely be susceptible to pumping if the moisture content is increased. The subgrade soils should be compacted to a minimum of 92 percent Modified Proctor maximum laboratory density (ASTM D 1557) at a moisture content ranging from -2 to +5 percentage point of optimum.

Near the structures no more then 3-feet of soil should be added to the current site grade and effort should be exercised to minimize the extent of large areas of fill as it could induce long term settlement issues.
4.2 Foundation Recommendations for Buildings

Conventional spot and continuous wall foundations may be used for the support of the proposed structure at the subject site. Based on field and laboratory data an **allowable bearing capacity of 1500 psf**. may be used for strip and spot foundations provided the following recommendations are observed:

- Foundations shall be placed on native undisturbed or compacted soils or compacted structural fill (conforming to Sections 5.2 and 5.3).
- Onsite soils shall be examined by a qualified geotechnical engineer from this office, to verify that all topsoil, construction debris, soft spots, and any other deleterious materials have been removed prior to the placement of footings or structural fill.
- Structural fill shall be a well-graded granular soil, free of organics, debris, or other deleterious materials as outlined in Section 5.3.
- Structural fill shall be compacted as outlined in Section 5.3.
- Structural fill shall extend as a minimum 1-foot past the edge of the footing, and then for every 1-foot of fill (vertically) placed below the footing, it shall extend a minimum of 1-foot horizontally.
- Continuous footing width shall be maintained at a minimum of 18 inches and a maximum of 5.0 feet.
- Spot footings shall be a minimum of 24 inches in width and a maximum of 6.0 feet.
- Exterior footings shall be placed a minimum of 30 inches below final grade, and interior footing shall be placed a minimum of 16 inches below grade for frost protection.

Allowable bearing pressure may be increased by 1/3 for temporary loads such as wind or seismic forces. Foundations designed and constructed in accordance with our recommendations could experience some settlement. If the recommendations provided herein are observed, we estimate settlement should not exceed one inch, with differential settlements on the order of one-half inch. We anticipate approximately 75 percent of initial settlement to take place during construction.

4.3 Lateral Soil Pressures

Lateral soil pressures are dependent on the type of soil present. For the native clay the following lateral soil pressures shall be used for design:

1. An equivalent fluid pressure of 58 pounds per cubic foot (pcf) for the active case. That is when the structure is allowed to yield, that is to say the structure is allowed to move away from the soil. This requires a minimum movement or
rotation at the top of the wall of 0.001H, where “H” is the height of the wall (bottom of footing to top of wall).
2. 78 pcf for the at-rest case. That is when the wall is not allowed to yield.
3. 244 pcf for the passive case. That is when the wall exerts pressure on the soil.
4. A coefficient of friction of 0.23 shall be used for the interface between the native silty clay and the cast-in-place concrete.

4.4 Drainage

For constructability, adequate surface drainage should be provided at the site to minimize any increase in moisture content of the foundation supporting soils during and after construction. Foundation soils shall be protected from any increase in moisture.

For final grade we recommend all areas around the structures be generously sloped to provide drainage away from these areas. We recommend a minimum slope of 6 inches in the first 10 feet away from the structure.

4.5 Floor Slabs

All topsoil and deleterious materials shall be removed (typically about 6 to 10-inches of topsoil at this site). We recommend a minimum of 6 inches of free draining structural fill, free from organic material and debris, be used just below floor slabs as a vapor barrier. If grade is required to be re-established or raised above current grade a structural fill shall be used and placed in accordance with Sections 5.2 and 5.3.

4.6 Pavement Design

We expect site traffic to consist primarily of lightweight vehicle and pedestrian traffic with some commercial traffic. Both flexible and ridged pavement design options are provided below. The following minimum recommended pavement sections are based on an estimated CBR of 1.5% and a likelihood of frost heave:

<table>
<thead>
<tr>
<th>Option #1</th>
<th>Flexible Pavement Design Section Thickness (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Pedestrian Traffic</td>
</tr>
<tr>
<td>Asphalt Pavement</td>
<td>-</td>
</tr>
<tr>
<td>Concrete Pavement</td>
<td>4</td>
</tr>
<tr>
<td>Road-Base Material</td>
<td>-</td>
</tr>
<tr>
<td>Sub base</td>
<td>8</td>
</tr>
<tr>
<td>Total Thickness</td>
<td>12</td>
</tr>
</tbody>
</table>
To insure a long life of the asphalt, water should be directed quickly off of the asphalt and into a concrete gutter or drain. The asphalt pavement should be compacted to 96% of the maximum density for the asphalt material.

<table>
<thead>
<tr>
<th>Option #2</th>
<th>Flexible Pavement Design Section Thickness (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Pedestrian Traffic</td>
</tr>
<tr>
<td>Concrete Pavement</td>
<td>4</td>
</tr>
<tr>
<td>Sub base</td>
<td>8</td>
</tr>
<tr>
<td>Total Thickness</td>
<td>12</td>
</tr>
</tbody>
</table>

The concrete shall have a minimum compressive strength of 3,500 psi. at 28 days. It should also have $5 \pm 1$ percent entrained air for durability and workability. A fiber mesh is also recommended to enhance the durability of the concrete. To reduce the potential for cracking, appropriate construction joints are required. Joints shall be designed in accordance with current Portland Cement Association guidelines. Joint shall be sealed to infiltration into pavement joints.

It is further recommended that all topsoil and fill materials are removed prior to the placing of base material, and structural fill. The native soils shall be proof rolled as outlined in Section 4.1. If any areas appear soft, they should be removed and replaced with structural fill. An engineered fabric may need to be used during wet periods as heavy equipment may pump the moist clays and weaken them. All structural fill materials overlying native soil should be compacted in accordance with Section 5.2 of this report.

5.0 GENERAL CONSTRUCTION CONSIDERATIONS

The guidelines and recommendations outlined below address the geotechnically related construction considerations for this project.

5.1 Foundation Excavations

All areas that will support foundation loads should be inspected by the geotechnical engineer, or his approved representative, to insure that all loose, soft, or otherwise undesirable material is removed, and that the structure will bear on satisfactory material. This shall occur prior to the placement of any structural fill or concrete. All topsoil shall be removed prior to the placement of foundations or pavements. (We recommend giving this office a few days notice for scheduling.) Any loose or deleterious material should be replaced with a free draining granular fill as outlined in Sections 5.2 and 5.3.
If unsatisfactory material pockets are encountered in the excavation, the undesirable material should be removed, and the elevation re-established by backfilling. This backfilling can be done with a lean concrete, or a well-compacted structural fill as define in Section 5.3.

All structural fill supporting footing loads should be compacted to at least 95 percent of the Modified Proctor Maximum Density (ASTM D 1557), provided the foundation is designed as outlined in Section 4.2. Compaction tests should be taken on each lift to insure the required compaction is being achieved.

Foundation excavations shall be protected against any harmful change in condition such as disturbance, rain, and freezing. Surface runoff should be directed away from the excavation and not allowed to pond. Ideally all footing concrete should be poured the same day as the excavation is made. If this is not practical, the foundation excavation should be adequately protected, and foundation placement should take place as soon as possible. For best construction results we recommend that earth work be conducted during the dry months of the year, typically June through October.

Excavation slopes shall maintain a maximum slope of 2 horizontal to 1 vertical. It may be possible to have steeper slopes for temporary excavations. This will depend on the conditions location and precautions taken. Contact our office for further consultation. Otherwise if it is required that slopes are steeper, it is necessary that excavation shoring/bracing be used.

5.2 Fill Compaction

All fill material should be compacted in accordance to the following criteria based on the Modified Proctor Maximum Laboratory Density (ASTM D 1557):

1. Structural fill, supporting foundations. 95%
2. Structural fill, below floor stabs 94%
3. Backfill of trenches
   a. Below foundations 95%
   b. Below floor stabs 94%
   c. Below pavements 94%
   d. Others 90%
4. Beneath Pavements 95%

Compaction should be accomplished by placing the fill in a maximum of 8-inch loose lifts, and mechanically compacting each lift to the specified minimum density. Field density tests should be performed on each lift as necessary to insure that compaction is being achieved. As a minimum 33% of all spot footings, and one test for every 50 lineal feet of continuous wall footings shall be tested for each lift.
5.3 Types of Fill

5.3.1 Structural Fill: Sub-base (pit-run)

Well-graded granular soils free of organics, debris, or other deleterious materials are recommended for use as structural fill at this site. We recommend a well-graded sandy gravel material with no less than 5%, and no more than 10% passing the #200 sieve, and no particles greater than 4 inches in maximum dimension. Structural fill shall be compacted at a moisture content ranging from -2 to +6 percentage point of optimum in accordance to the Modified Proctor Maximum Laboratory Density (ASTM D 1557).

5.3.2 Structural Fill: Roadbase

Granular soils free of organics or other deleterious materials and debris. We recommend a sand and fractured gravel material with between 5 and 12 percent passing the #200 sieve, and no particles greater than approximately 1 inch in maximum dimension.

5.3.3 Non-Structural Fill

On-site soils appear to be suitable for non-structural site grading and landscaping fill. All fill material shall be approved by the engineer prior to placement.

5.4 Quality Control

Our recommendations are based on the assumption that adequate quality control testing and observations will be conducted during construction to verify compliance. This may include but is not necessarily limited to the following:

5.4.1 Field observations

Observations during all phases of construction should occur. Observations such as site preparation, foundation excavation, structural fill placement, and concrete placement.

5.4.2 Fill Compaction

Compaction testing is required for all Structural supporting fill materials. Maximum Dry Density (Proctor-ASTM 1557) tests should be requested by the contractor immediately after delivery of any granular fill materials. The maximum density information should then be used for field density tests on each lift as necessary to insure that the required compaction is being achieved.
5.4.3 Concrete Quality

We recommend that freshly mixed concrete be tested in accordance with ASTM designations as follows:

- Slump, Temperature, Unit Weight, and Yield testing should be conducted on every delivery truck (ASTM C 138 and C 143).

- Entrained Air testing should also be conducted on every delivery truck for exposed concrete or concrete placed above the frost line (ASTM C 231).

- Test cylinders should be taken a minimum of every 50 cubic yards. Cylinder compressive strength tests should be conducted at 7 and 28 days from the placement date (ASTM C 31).

6.0 LIMITATIONS

The recommendations submitted in this report were based on evaluating the information obtained from the borings and site investigation, and the design details furnished by Cache-Landmark Engineering, Inc. for the proposed project. The borehole data reflects the subsurface condition only at the specific location at the particular time designated on the borehole logs. Soil and ground water conditions may differ from conditions encountered at the actual borehole location. The nature and extent of any variation in the borehole may not become evident until construction begins. If variations do appear, it may become necessary to re-evaluate the recommendations of this report after we have observed the variation. If ACache Corp. is not notified of changes to the project or variations of the soils, ACache Corp. will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specification, or professional advice contained herein, have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

Once the plans and specifications are more complete, the Geotechnical Engineer shall be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. If ACache Corp. is not retained to perform these functions, ACache Corp. will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of Cache-Landmark Engineering, Inc. for the specific use on the proposed CACHE HIGH SCHOOL to be located near 625 West 1200 North in Logan, Utah.
7.0 REFERENCES

ASTM, American Society for Testing and Materials 1997


APPENDIX
## Unified Soil Classification System

### Field Identification Procedures

<table>
<thead>
<tr>
<th>COARSE GRAINED SOILS</th>
<th>GRAVELS</th>
<th>CLEAN GRAVELS</th>
<th>WIDE RANGE IN GRAIN SIZE AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>More than half of coarse fraction is greater than No. 4 sieve size</td>
<td>(Lime or No fines)</td>
<td>Predominantly one size or a range of sizes with some intermediate sizes missing.</td>
</tr>
<tr>
<td></td>
<td>For visual classification, the 1/4&quot; sieve may be used as equivalent to the No. 4 sieve size.</td>
<td>(Appropriate amount of fines)</td>
<td>Gravelly fines (for identification procedure see CL below).</td>
</tr>
<tr>
<td></td>
<td>Sands with fines</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than half of coarse fraction is less than No. 4 sieve size</td>
<td>(Lime or No fines)</td>
<td>Predominantly one size or a range of sizes with some intermediate sizes missing.</td>
</tr>
<tr>
<td></td>
<td>For visual classification, the 1/4&quot; sieve may be used as equivalent to the No. 4 sieve size.</td>
<td>(Appropriate amount of fines)</td>
<td>Sandly fines (for identification procedure see CL below).</td>
</tr>
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</table>

### Fine Grained Soils

<table>
<thead>
<tr>
<th>SILTS AND CLAYS</th>
<th>LIQUID LIMIT LESS THAN 50</th>
<th>LIQUID LIMIT GREATER THAN 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid limit less than 50</td>
<td>Liquid limit greater than 50</td>
</tr>
</tbody>
</table>

### Identification Procedures on Fraction Smaller than No. 40 Sieve Size

<table>
<thead>
<tr>
<th>FINE GRAINED SOILS</th>
<th>TYPICAL DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General Notes

1. In general, Unified Soil Classification Designations presented on the logs were evaluated by visual methods only. Some, actual designations (based on laboratory testing) may differ.
2. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. No warranty is provided as to the continuity of soil conditions between individual sample locations.

### Log Key Symbols

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Stratification

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seem</td>
<td>1/4 - 1/2&quot;</td>
</tr>
<tr>
<td>Layer</td>
<td>1/2 - 12&quot;</td>
</tr>
</tbody>
</table>

### Cememntation

<table>
<thead>
<tr>
<th>MODIFIERS</th>
<th>MOISTURE CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakly</td>
<td>Trace</td>
</tr>
<tr>
<td>Moderately</td>
<td>Some</td>
</tr>
<tr>
<td>Strongly</td>
<td>With</td>
</tr>
</tbody>
</table>

### Moisture Content

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>FIELD TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>Absence of moisture, dusty, dry to the touch</td>
</tr>
<tr>
<td>Moist</td>
<td>Damp but no visible water</td>
</tr>
<tr>
<td>Wet</td>
<td>Visible water, usually soil below Water Table</td>
</tr>
</tbody>
</table>

---

**Figure 3**
ACache Corp.
Engineering a Firm Foundation

BORING LOG
Cache High School

BORING No. : B-1
JOB No. : 1160009
DATE : 4/30/2016
SHEET 1 OF 1

PROJECT : Cache High School
625 West 1200 North, Logan, Ut.

BORING TYPE : Hollow Stem Auger
CAD FILE : 1160009 Figures.dwg

SURF. EL. : 
BORE DIA. : 8"
DEPTH : 31.5'

WATER EL. : (approximate)

DEPTH, Ft.
GRAPHIC LOG
SAMPLE

SOIL DESCRIPTION
% FINER No. 200 SIEVE
BLOWS/FT.
LIQUID
PLASTIC
MOISTURE
CONTENT, %

12"~2'
Black clayey Topsoil.
9
38
22
22.8

2"~4.75'
Brown CLAY (CL); medium stiff.
10
49
24
24.9

4.75"~14'
Light Brown silty CLAY (CL); trace fine sands in lenses, medium stiff to stiff, moist to wet, mottlings.
8
8
27.0
26.2

14"~31.5'
Gray silty fine SAND, sandy fine Silt (SP~SM); loose to soft, layered in thin layers with occasional thick layers of porrly graded sand, wet.
50
5
33.0

87
13
25.5

End at required 31.5'

REMARKS:

REMARKS:
Blows/Ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer

WTR DEPTH @ COMPL. : 2.25' at end of day.

FIELD ENG.: Jay A.
COMPLETION DATE : 4/30/2016

FIGURE 4
**SOIL DESCRIPTION**

- **Surface~12'**: Black clayey Topsoil.
- **12'~2'**: Brown CLAY (CL); medium stiff.
- **2'~5.5'**: Light Brown silty CLAY (CL); trace fine sands in lenses, medium stiff to stiff, moist to wet, mottlings.
- **5.5'~13'**: Brown CLAY (CL); stiff to medium stiff, wet, iron mottlings and calcium deposits, trace fine sand in lenses.
- **13'~16.5'**: Gray CLAY (CL); soft to very soft, wet, trace fine sand in lenses increasing with depth.

**REMARKS**:

- **REMARKS**: Blows/Ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer.

**FIELD ENG.**: Jay A.

**COMPLETE DATE**: 4/30/2016
<table>
<thead>
<tr>
<th>DEPTH, Ft.</th>
<th>GRAPHIC LOG SAMPLE</th>
<th>SOIL DESCRIPTION</th>
<th>% FINER NO. 200 SIEVE</th>
<th>BLOWS/FT.</th>
<th>LIQUID LIMIT</th>
<th>PLASTIC LIMIT</th>
<th>MOISTURE CONTENT, %</th>
<th>SHEAR STRENGTH, TSF</th>
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<tr>
<td>12.5</td>
<td>12.5</td>
<td>Surface~12&quot;: Black clayey Topsoil.</td>
<td>8</td>
<td>23.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5~5.5</td>
<td>2.5</td>
<td>12&quot;~2&quot;: Brown CLAY (CL); medium stiff.</td>
<td>7</td>
<td>25.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.5~13</td>
<td>5.5</td>
<td>2’~5.5’: LightBrown silty CLAY (CL); trace fine sands in lenses, medium stiff to stiff, moist to wet, mottlings.</td>
<td>10</td>
<td>26.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>5.5’~13’: Brown CLAY (CL); stiff to medium stiff, wet, iron mottlings and calcium deposits, trace fine sand in lenses.</td>
<td>7</td>
<td>27.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>13’~16.5’: Gray CLAY (CL); soft to very soft, wet, trace fine sand in lenses increasing with depth.</td>
<td>0</td>
<td>53.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>17</td>
<td></td>
<td>End at required 17’</td>
<td></td>
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</table>

**REMARKS:** Blows/ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer

**WTR DEPTH @ COMPL.:** 3.5’

**COMPLETION DATE:** 4/30/2016
### Test Data Summary

<table>
<thead>
<tr>
<th>HOLE NO./SAMPLE NO.</th>
<th>DEPTH (ft) BELOW GROUND SURFACE</th>
<th>STANDARD PENETRATION BLOWS PER FOOT</th>
<th>IN-PLACE DENSITY UNIT WEIGHT (estimated) LB./FT.³</th>
<th>MOISTURE PERCENT</th>
<th>GRADATION % PASSING NO. 200 SIEVE</th>
<th>TORVANE SHEAR UNITS/FT²</th>
<th>ATTERBERG LIMITS</th>
<th>SOIL CLASSIFICATION</th>
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<td>128</td>
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<td>10</td>
<td>125</td>
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<td>25</td>
<td>24</td>
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<td>123</td>
<td>27.0</td>
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<td>49</td>
<td>25</td>
<td>24</td>
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<tr>
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<td>25</td>
<td>25</td>
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<td>B-2/13</td>
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<td>B-2/14</td>
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<td>26.3</td>
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<tr>
<td>B-3/15</td>
<td>3.0</td>
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<td>23.4</td>
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<td>B-3/16</td>
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<td>B-3/17</td>
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<td>B-3/18</td>
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<td>20</td>
<td>25</td>
<td>25</td>
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</table>

Cache Hight School
BIDDING DOCUMENTS
00100  CMGC’s Subcontractor’s Bidding Documents
     Advertisement for Bid
     Bid Form (Additional Bidding Requirements)
     Exemption Certificate
     Payment Request Form
     Subcontract Agreement
     Waiver and Release Form Conditional
     Waiver & Release Form Final Payment
00700  General Conditions
     AIA Document A201 – General Conditions of the Contract for
     Construction
00400  Substitution Request Form
00810  Modifications to General Conditions
00820  Supplementary conditions
00900  Addenda and Modifications
SECTION 00010 – ADVERTISEMENT FOR BIDS:

PROJECT: CACHE HIGH SCHOOL REPLACEMENT for Cache County School District located at approximately 1180 North 600 West, Logan, Utah 84321.

DESCRIPTION: Provide lump sum bids for divisions 00100-16000 for Construction phase as per Architectural drawings and specifications. This project will begin April 17, 2017 and will occur through July 20, 2018.

TIME AND PLACE: DWA Construction, Inc. will receive contractor and supplier bids for the project at their Corporate Office located at 76 West 2400 North P.O. Box 3448, Logan, Utah 84323 on March 15, 2017 @ 2:00 PM. Faxed or emailed bids will be accepted.

TYPE OF BID: The package will be bid using a low bid best Value selection process.

PRE-BID MEETING: No pre-bid meeting will be held.

COMPLETION LIQUIDATED DAMAGE: Liquidated damages will be assessed in the amount of $1,000.00 for each calendar day that the project is delayed based on the project schedule for each trade. Construction will begin April 17, 2017 and be completed by July 20, 2018.

BIDDING DOCUMENTS: Bidding documents will be available March 1, 2017 thru the office of DWA Construction, Inc., 76 West 2400 North P.O. Box 3448, Logan, Utah 84323 in accordance with the Instructions to Bidders. Bidders will be limited to one (1) set of documents. These sets WILL NOT be available to keep for the duration of the bidding. No partial sets of documents will be issued. Plans will also be available for viewing at our website www.dwaconstruct.com and the following plan rooms:

1. Mountain Land Plan Room: 583 W 3560 S Suite 4 Salt Lake City UT 84115 Phone: 801-288-1188 Fax 801-288-1184

2. DWA Construction, Inc.: 76 West 2400 North Logan, Utah 84341 Phone: (435) 752-6860 Fax (435) 752-7606

3. Intermountain Contractor: www.construction.com/projectcenter/

PERFORMANCE AND PAYMENT: Upon receipt of a contract in excess of $150,000.00, the successful Contractor shall furnish to the Owner (at the CM/Owner’s option) a 100 percent Performance and Payment Bond in accordance with the Instructions to Bidders.

BID BONDS: Bid Bonds will be required on all bids in excess of $150,000.00.

RIGHT TO REJECT BIDS: DWA Construction, Inc. and the Owner reserves the right to reject any or all bids and to waive any irregularities in any bid or in the bidding.

END OF SECTION
BID FORM

Cache High School
Cache County School District

Bid form must be completed in its entirety for bid to be considered.

Subcontractor/supplier name: ______________________________________________________
Address: _____________________________________________________________
Contractor’s License number: _____________________________________________
Phone Number: ______________ Fax number: ______________
Email Address: _____________________________________________________________
Name of Contact: _____________________________________________________________

BID TO:          DWA Construction, Inc.
                  76 West 2400 North
                  P.O. Box 3448
                  Logan, Utah  84323-3448
                  Phone: 435-752-6860  Fax: 435-752-7606
                  E-mail: dennis@dwaconstruct.com or lee.b@dwaconstruct.com

      PLEASE NOTE that this project is tax exempt – DO NOT include sales tax.
If you are bidding more than one specification section,
Please attach additional breakdown information.

      Acknowledge addendums: (list each separately) __, __, __, __, __, __.

Bidding Section(s): __________________________________________________________
Base bid: ($________________________)
Written amount: ______________________________________________________________dollars
ADDITIONAL INFORMATION NEEDED:

**Mechanical:**
*Division 15000* (Must be a complete bid)

- Plumbing Contractor ________________________________
  Cost $_________________________
- HVAC Contractor ________________________________
  Cost $_________________________
- Controls Contractor ________________________________
  Cost $_________________________
- Test & Balance Contractor ________________________________
  Cost $_________________________
- Insulation Contractor ________________________________
  Cost $_________________________

*Division 16000* (Must be a complete bid)

- Electrical Contractor ________________________________
  Cost $_________________________
- Fire Alarm System contractor ________________________________
  Cost $_________________________
- Intercommunications System contractor ________________________________
  Cost $_________________________
- Classroom Sound Amplification System contractor ________________________________
  Cost $_________________________
- Telecommunications cabling system contractor ________________________________
  Cost $_________________________
ADDITIONAL BIDDING REQUIREMENTS:

( Failure to respond where required may result in disqualification of bid)

1. Bids shall be priced lump sum to furnish and / or install all material and / or equipment as required by plans and specifications for a complete installation.

2. The construction duration portion of this project will be 12 months or less. Material and equipment must be delivered and installed in accordance with the Construction Manager’s schedule as updated throughout the project. Liquidated damages are $1000.00 per day. See Advertisement for Bids.

3. COST OF PAYMENT AND PERFORMANCE BOND: $________________. Only bids over $150,000.00 will require a performance and payment bond at CM/Owner option. (This amount will be added to the base bid amount, if payment and performance bonds are required. If no amount is provided, it will be presumed that the bidder is unable to bond for its work on this project and may be cause for rejection).

4. The Construction Manager and Owner reserve the right to accept or reject any and all proposals or alternates with or without cause for any reason determined to be in the owner’s best interest and to waive any bidding informality or irregularity.

5. The undersigned bidder, having examined the Drawings, Specifications and related documents in their entirety, and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of labor, hereby proposes to complete the work listed above in accordance with the Contract Documents and within the time set forth, at the price stated above and upon the subcontract form included in the Specifications. The above price is to cover all expenses incurred in performing the work required under the Contract Documents.

6. CONTRACTOR’S QUALIFICATION STATEMENT: Upon request the low bidder’s shall submit AIA Document A305 Contractor’s Qualification Statement. Failure to show a statement satisfactory to the Owner or Construction Manager will be reason to reject the bid as non responsive. Past performance on similar projects, the demonstrated ability to complete work on schedule and ability to perform the work on this project to the satisfaction of the Owner and Construction Manager will be a priority.

BY ITS SIGNATURE, BIDDER ACKNOWLEDGES THAT THE BID DOCUMENTS ARE A COMPLETE PACKAGE. BIDDER CERTIFIES IT HAS REVIEWED ALL BID DOCUMENTS TO DETERMINE ITS TOTAL SCOPE OF WORK AND HAVE INCLUDED ALL RELATED COSTS.

Name of Bidder
____________________________________________________________
Authorized Signature ______________________ Date __________
Printed name of authorized signature _____________________________
Contact phone number

_________________________________________________________
Name of institution claiming exemption (purchaser)  
DWA Construction Inc.

Telephone Number  
435-752-6860

Street Address  
76 West 2400 North, P.O. Box 3448

City  
Logan

State  
Utah

Authorized Signature  
Lee M Black

Name (please print)  
Lee M Black

Title  
Estimator

Name of Seller or Supplier:  

Date  

The person signing this certificate MUST check the applicable box showing the basis for which the exemption is being claimed.
Questions should be directed (preferably in writing) to Taxpayer Services, Utah State Tax Commission, 210 N 1950 W, Salt Lake City, UT 84134. Telephone 801-297-2200, or toll free 1-800-662-4335.

DO NOT SEND THIS CERTIFICATE TO THE TAX COMMISSION
Keep it with your records in case of an audit.

☐ UNITED STATES GOVERNMENT OR NATIVE AMERICAN TRIBE  
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of essential governmental or tribal functions.
NOTE: Includes sales of tangible personal property to federally chartered credit unions. “Directly” does not include per diem, entity advances, or government reimbursements for employee credit card purchases.

☐ CONSTRUCTION MATERIALS PURCHASED FOR SCHOOLS OR PUBLIC TRANSIT DISTRICTS  
I certify the construction materials purchased are on behalf of a public elementary or secondary school, or public transit district. I further certify the purchased construction materials will be installed or converted into real property owned by the school or public transit district.

Name of school or public transit district:  
Cache County School District

Name of project:  
Cache High School

☒ UTAH STATE AND LOCAL GOVERNMENTS AND PUBLIC ELEMENTARY AND SECONDARY SCHOOLS  
Sales Tax License No. 12286526-010-STC
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of that entity’s essential functions. For construction materials, if the purchaser is a Utah state or local government, these construction materials will be installed or converted into real property by employees of this government entity. “Directly” does not include per diem, entity advances, or government reimbursements for employee credit card purchases.
CAUTION: This exemption does not apply to government or educational entities of other states.

☒ HEBER VALLEY HISTORIC RAILROAD  
I certify these purchases and sales are by the Heber Valley Historic Railroad Authority or its operators and are related to the operation and maintenance of the Heber Valley Historic Railroad.

☒ FOREIGN DIPLOMAT  
I certify the purchases are authorized by a diplomatic tax exemption card issued by the United States.
Foreign diplomat number:  

To be valid this certificate must be filled in completely, including a check mark in the proper box.

A sales tax license number is required only where indicated.
Please sign, date and, if applicable, include your license or exemption number.

NOTE TO SELLER: Keep this certificate on file since it must be available for audit review.
NOTE TO PURCHASER: Keep a copy of this certificate for your records. You must notify the seller of cancellation, modification, or limitation of the exemption you have claimed.

If you need an accommodation under the Americans with Disabilities Act, contact the Tax Commission at (801) 297-3811 or TDD (801) 297-2020. Please allow three working days for a response.
PAYMENT REQUEST FORM

Project Name: Cache High School Replacement

Invoice/Payment Application Number: _______________  Period Ending Date: _______________

STATEMENT OF CONTRACT AMOUNT:
1. Original Contract Amount $_____________
2. Approved Change Orders $_____________
3. Adjusted Contract Amount (Add or Subtract line 2 from line 1) $_____________

PROGRESS BILLING:
4. Work Completed and Materials Provided on Contract to Date (___ % to date) $_____________
5. Less Retention (5% to date) $_____________
6. Total Work Completed and Materials Provided Less Retention (Subtract line 5 from line 4) $_____________
7. Total Previous Application for Payments (Line 6 from previous application) $_____________
8. AMOUNT DUE THIS REQUEST (Subtract line 7 from line 6) $_____________

LABOR & MATERIALS SUPPLIED THIS MONTH:
9. Materials supplied this month $_____________
10. Labor this month $_____________

Supplier/Subcontractor Lien Releases (DWA provided forms) must be provided prior to distribution of payments.
Waiver & Releases attached to this payment request form? (circle one)  Yes  No
Name and Amount of Two-Party Checks required on this months draw: ________________________________

Company Name: ________________________________
DWA Utah Conditional Waiver & Release Upon Progress Payment must be attached to this request.

By: ________________________________
(Signature Here)

Print Name: ________________________________
Title: ________________________________
Date: ________________________________

P.O. Box 3448
Logan, UT 84323-3448  www.dwaconstruct.com
Phone: 435-752-6860  Fax: 435-752-7606
SUBCONTRACT AGREEMENT

THIS SUBCONTRACT AGREEMENT (hereinafter Agreement), made at Logan, Utah, this ___ day of______, 2017, by and between DWA CONSTRUCTION, INC., P.O. Box 3448, Logan, Utah 84323, hereinafter referred to as DWA, and_____________________, hereinafter referred to as the Subcontractor. DWA and Subcontractor agree as follows:

1. SCOPE OF WORK
   a. The Project
   
   Cache High School Replacement
   Approx 1180 North 600 WEST, Logan, UTAH 84321

   b. The work to be performed by the Subcontractor under the terms of this Agreement consists of completion of the Work in a manner that all components will work as intended, and of furnishing of all labor and material, tools, implements, and equipment, scaffolding, permits, fees, warranties, taxes, etc., to do all of the following:

   (All items to be performed by Subcontractor in 1.b., 1.c. and 1.d. are hereinafter referenced as the Work). Project Completion Date JULY 20, 2018

   Base Bid: $_____
   Alternates: $_____

   TOTAL AMOUNT: $______
   (with alternates) Acknowledged Addendums

   Project Is Exempt from Utah Sales Tax

c. Work per Contract. The Work shall be done in strict accordance with complete plans and specifications as prepared by Design West Architects, for Cache County School District. Owner, for which construction DWA has the prime contract and all documents referenced in the prime contract with the Owner, together with all addenda or authorized changes issued prior to the date of execution of this Agreement (hereafter collectively the Contract). Subcontractor acknowledges receipt of all of the Contract. No delineation of duties of the Subcontractor in this Agreement shall be utilized to avoid requirements of the Contract, including plans and specifications, for the Work of Subcontractor.

   d. Work Standard. All Work to be performed as set forth herein above shall be complete and shall be accomplished in accordance with the plans, specifications, addenda, shop drawings, and architect’s directions received by Subcontractor. All Work shall be done in a workmanlike manner, shall be acceptable to DWA, and shall comply in every detail to the Owner’s plans and specifications. In the event of any doubt or question arising between DWA and Subcontractor with respect to the Work, the decision of the Architect shall be conclusive and binding.

   e. No Architect. Should there be no supervising architect over the Work, then the matter in question shall be determined as provided in Section 11 of this Agreement.

   f. Submittals. Within 30 days after signing of this Agreement, Subcontractor shall issue by mail or email all required Submittals to DWA, together with detailed information as to how they comply with the Contract. No submittal shall be deemed accepted until signed in writing by DWA, and acceptance by DWA does not change the requirement of compliance with the contract, plans and specifications, for which subcontractor remains responsible. Any rejected Submittal shall be replaced within seven (7) calendar days of notice of the rejection correcting the reason for the rejection.

2. PAYMENTS
   a. Requests for Payment. DWA agrees to pay to the Subcontractor for the satisfactory completion of the Work the sum of _________ dollars and 00 cents****** ($0.00) in monthly payments of 95% of the Work performed in any preceding month, in accordance with the Request for Payment prepared by the Subcontractor and as approved by DWA and Architect, such payments to be made only as payments are received by DWA from the Owner covering the approved portion of the Subcontractor’s monthly Request for Payment (Draws). DWA may in its discretion make payments in the name of Subcontractor to any employee, supplier or subcontractors of Subcontractor (hereinafter collectively Subs) who have furnished materials or labor to said Subcontractor for this Project. Subcontractor agrees to use the attached Request for Payment (Exhibit A) in all submittals for payment, and with each submittal for payment to deliver a fully executed Lien Release (Exhibit B for progress payments and Exhibit C for Final Payment) for the Work to date, including but not limited to Lien Releasse from all material suppliers and Subs. DWA may modify the form of the Request for Payment and Lien Releases as needed.

   b. Documentation and Verification. DWA shall have the right to request underlying documentation to support any Request for Payment submitted by Subcontractor to DWA. Upon such request, Subcontractor shall provide the underlying documents that justify the costs set forth in the Request for Payment. DWA also has the right and Subcontractor hereby authorizes DWA to communicate with any Subs, suppliers and employees regarding the status of Subcontractor’s accounts with respect to the Project and authorizes all Subs, suppliers and employees to disclose the requested information to DWA.

   c. Timing. Draw requests must be submitted by the 25th of each month. Payment to Subcontractor will be made for completed, acceptable Work no later than thirty (30) days after payment has been received by DWA from Owner.

   d. No Request for Payment. In the event the Subcontractor does not submit to DWA such Request for Payment prior to the date of submission of DWA’s monthly Draw, then DWA may include in its monthly Draw to the Owner for work performed during the preceding month such amount as it shall deem proper for the Work of the Subcontractor for the preceding month, and the Subcontractor agrees to accept such approved portion thereof as its regular monthly payment, as described above.

   Liquidated Damages $1000.00/Calendar Day
e. Fiduciary Duty. The Subcontractor agrees that any funds received for the performance of the Work under this Agreement shall be used exclusively for labor, materials, and equipment furnished for this Project, that the Subcontractor has a fiduciary responsibility with respect to these funds, and that these funds will not be diverted to satisfy obligations the Subcontractor may have under any other contracts, debts, liabilities or obligations unrelated to the Project.

f. Withheld/Offset Payments. DWA may withhold a monthly payment and/or final payment to such extent as may be necessary in the exercise of DWA’s discretion to protect DWA from loss for which the Subcontractor is responsible, including but not limited to, loss resulting from defective Work or untimely Work, third party claims, failure of Subcontractor to pay employees or suppliers, incomplete Requests for Payment, failure to submit required documentation, or the filing of any mechanics lien, its pendents or related claims. If Subcontractor has unfulfilled obligations to DWA on other projects DWA may exercise a right of offset of sums from other projects due to DWA from Subcontractor against any payment due Subcontractor herein.

g. Extra Work. If Subcontractor performs extra work or changes to the Work without receiving a written Change Order prior to the execution of such Work, DWA shall be under no obligation to compensate the Subcontractor for such work.

h. Final Payment and Warranty. Before final payment is made, the Subcontractor agrees to execute to DWA and/or the Owner a written lien release (together with liens releases from all material suppliers and Subs) and/or waiver, and a written guarantee for its Work, agreeing to make good without cost to the Owner or DWA any and all defects due to imperfect workmanship and/or materials which may appear within the period so established in the contract documents; and if no such period be stipulated in the Contract, then such guarantee shall be executed for a period of one year from date of substantial completion of the Project. The Subcontractor further agrees to execute any special guarantees as provided by the terms of the Contract, prior to final payment.

3. PROSECUTION OF WORK, DELAYS, ETC.

a. Time Is of the Essence and Contracting Terms. DWA and the Subcontractor agree to be bound by the terms of the Contract, construction regulations, general conditions, plans and specifications, and any and all other contract documents, if any there be, insofar as applicable to this Agreement, and to that portion of the Work herein described to be performed by the Subcontractor. If conflicting requirements of Subcontractor exist in the Contract and this Agreement or otherwise, Subcontractor shall be bound to do the additional, greater or more costly requirements as part of its bid.

b. Schedule. DWA shall establish the Work Schedule (Schedule) within the first month after signing this Agreement, which Schedule may be reasonably modified and refined by DWA, who shall give notice of the same to the Subcontractor. DWA is the owner of the Schedule and of all float and slack time within the Schedule.

c. Commencement. Commencement of the Work by Subcontractor is an expression by the Subcontractor that:

(1) This Agreement has been accepted in its entirety;

(2) The Subcontractor has fully reviewed and analyzed all of the Plans and Specifications, this Agreement and Contract documents, and the Total Agreement Amount in paragraph 1.b. is fair, just and complete compensation for the Work;

(3) The Subcontractor is aware of any impact or interference which the site, site conditions, climate, construction sequence, and the work of other Subcontractors will have upon access, operations, efficiency, and related factors of the Work to be performed by the Subcontractor; and

(4) It is the Subcontractor’s responsibility to identify any non-code compliant construction details, omissions and discrepancies with respect to the Work and none have been identified.

d. Due Diligence. The Subcontractor shall prosecute its Work with due diligence so as not to delay the Project and the work of DWA or other Subcontractors, and in the event that the Subcontractor neglects and/or fails to supply the necessary labor and/or materials, tools, implements, equipment, etc., in the opinion of DWA, then DWA shall notify the Subcontractor in writing setting forth the deficiency and/or delinquency; and within three (3) business days after date of such written notice, if the Subcontractor fails to correct the Work or to commence and continue correction of such default or neglect with diligence and promptness, DWA shall have the right if DWA so desires to take over the Work of the Subcontractor in full, and exclude the Subcontractor from any further participation in the Work covered by this Agreement; or at DWA’s option, DWA may take over such portion of the Subcontractor’s Work as DWA shall deem to be in the best interest of DWA, and permit the Subcontractor to continue with the remaining portions of the Work.

e. Replacement and Costs. Whichever method DWA might elect to pursue in c. above, in addition to any and all other remedies in this Agreement, in law and in equity, the Subcontractor agrees to release DWA, for its use only, without recourse, all materials, tools, implements, equipment, etc., on the site, belonging to or in the possession of the Subcontractor, for the benefit of DWA, in correcting or completing the Work covered in this Agreement; and DWA agrees to correct or complete the Work to best of DWA’s ability and in the most economical manner available to DWA at the time. Any costs incurred by DWA in doing any such portion of the Work covered by this Agreement shall be charged against any monies due or to become due under the terms of this Agreement; and in the event the total amount due or to become due under the terms of this Agreement shall be insufficient to cover the costs accrued by DWA in completing the Work, the Subcontractor and its sureties, if any, shall be bound and liable to DWA for the difference.

f. Delays. If Subcontractor believes any delays in the Schedule are required through no fault of the Subcontractor, within seven (7) days after the event giving rise to the delay, Subcontractor must submit a written change order to DWA, specifying and detailing any basis for increased costs; and upon failure to timely submit, Subcontractor waives any right to submit or have approved the change order.

g. Delay Liability. The Subcontractor shall not be held liable for any delays arising out of acts of God, strikes, embargoes, or other causes explicitly determined to be beyond the control of the Subcontractor. Subcontractor will be responsible for liquidated damages of $ 1000.00 per day for any delay to DWA or any other subcontractors which may be directly attributable to Subcontractor; and provided, further, that if the Subcontractor fails to meet the Schedule as determined by DWA and as it may reasonably be amended from time to time by DWA under this Agreement, DWA may withhold from the contract price due the Subcontractor under this Agreement an amount equal to $ 1000.00 per day times the number of days after the Schedule until that portion of the Work is completed, and in such event shall apply said sum against all sums owing from DWA to Subcontractor, and Subcontractor agrees to pay any deficiency on demand. All delay charges will be deducted from the amount due Subcontractor.

h. Defects. Should the proper and accurate performance of any Work under this Agreement depend wholly or partially upon the proper workmanship or accurate performance of any work or materials furnished by DWA or of other Subcontractors on the Project, the Subcontractor agrees to use all means necessary to discover any such defects and report the same in writing to DWA before proceeding with the Work which is so dependent, and shall allow DWA a reasonable amount of time in which to remedy such defects; and in the event Subcontractor does not report to DWA in writing, then it shall be assumed that the Subcontractor has fully accepted the work of others as being satisfactory, and Subcontractor shall be fully responsible therefor after the satisfactory performance of the Work covered by this Agreement, regardless of the defective work of others.

i. Clean-up. Subcontractor will be responsible for clean-up, removal, and proper disposal of all debris from working on the Project. Failure to clean up rubbish and debris shall serve as cause for withholding further payments to Subcontractor until such time as this condition is corrected to the satisfaction of DWA. Use of the dumpster located on the
Project site is under the discretion of DWA, and all charges for use will be deducted from sums due Subcontractor. Daily clean up of all tools, equipment, material, and debris is required.

j. Loss/Theft. DWA assumes no responsibility whatsoever on account of any loss or damage to tools or equipment or for materials while on the Project site or prior to installation. Further, DWA assumes no responsibility whatsoever on account of loss by theft or otherwise of Subcontractor’s tools or equipment while on the Project site.

k. Subs. The Subcontractor represents and warrants the following to be the sole Subs and sole suppliers:

No Subs or suppliers may be changed without the written consent of DWA.

l. Punchlist Items. When the Subcontractor considers that the Work is substantially complete, the Subcontractor shall prepare and submit to DWA a comprehensive list of items to be completed or corrected prior to final payment (the Punchlist). DWA shall have the right to supplement the Punchlist with additional items that DWA or Owner deems reasonably necessary to complete the Project based upon DWA’s or Owner’s independent inspection of the Work. Failure to include an item on the Punchlist shall not alter the responsibility of the Subcontractor to complete all Work in accordance with the Contract Documents.

m. Final Completion. The Subcontractor shall cause Punchlist items to be completed within the timeframe, if any, determined by the Architect or, if no timeframe is so determined, then within thirty (30) days of the Completion Date. In the event that the Subcontractor fails to correct or promptly commence to correct the deficiencies within the time period required for the Subcontractor to do so, DWA may, upon three (3) days written notice to the Subcontractor, take over and perform some or all of the Punchlist items. DWA may deduct from the final payment the actual cost to DWA of performing or causing others to perform these Punchlist items. DWA may withhold one hundred and fifty percent (150%) of the estimated cost to complete the Punchlist items until Subcontractor completes the Punchlist items in accordance with the Contract Documents or DWA completes or causes others to complete the Punchlist items.6.

4. SAFETY

The Subcontractor shall perform all Work in compliance with all Federal, State, and Local Safety regulations and standards (including OSHA), DWA’S Safety rules and policies, and in such manner that will protect the Subcontractor’s employees and others from injury. The Subcontractor shall require all persons, employees, workers, material men related to the performance of this Agreement to wear regulation hard hats while on the Project site. If Subcontractor’s employees are found on the Project site not wearing hard hats after written notice has been previously given to comply with this provision, Subcontractor will be subject to a $2,500.00 per occurrence fine, which will be deducted from sums due Subcontractor. In addition, Subcontractor agrees to pay any and all fines, penalties and assessments resulting from failure to comply with any of the foregoing and to indemnify and hold DWA harmless from payment of the same. If any unsafe work is being performed by others on the Project and is observed by the Subcontractor, Subcontractor shall notify DWA immediately of such.

5. SURETY BOND

The Subcontractor agrees to furnish to DWA, at the Subcontractor’s expense, a surety bond guaranteeing the faithful performance, including completion, of this Agreement and the payment of all labor and material bills in connection with the execution of the Work covered by this Agreement. The bond is to be written by a surety company designated or approved by DWA, and in a form satisfactory to DWA.

6. PERMITS, LICENSES, FEES, TAXES, ETC.

The Subcontractor shall, at Subcontractor’s own cost and expense, apply for and obtain all necessary permits and licenses and shall conform strictly to the laws, ordinances and regulations in force in the locality where the Work on the Project is being done. The Subcontractor shall indemnify and hold DWA harmless against liability by reason of the Subcontractor having failed to pay federal, state, county or municipal taxes or to otherwise comply with applicable laws, ordinances and regulations.

7. INSURANCE

a. The Subcontractor agrees to comply in all respects with the employment and payment of labor required by law.

b. The Subcontractor agrees to carry comprehensive public liability and property damage insurance, and such other insurance as DWA might deem necessary, in an amount as approved by DWA in order to protect Owner, DWA and Subcontractor against loss resulting from any acts of the Subcontractor, its agents and/or employees, including but not limited to the following:

   (1) Commercial General Liability policy (CGL) with limits not less than $1,000,000 each occurrence and $2,000,000 aggregate for the Project.

      (a) CGL coverage must be written on ISO occurrence form CG 00 01 10/01 or an equivalent, providing coverage for the indemnifications required in this Agreement, including but not limited to independent contractors, products-completed operations, personal injury and property damage.

      (b) DWA, Owner and all other parties required of DWA, must be named as an additional insured on the CGL policy using an additional insured endorsement that provides primary, non-contributory coverage AND completed operations coverage.

      (c) The subcontractor must maintain CGL coverage for itself and all additional insureds for the duration of the Project and maintain Complete Operations coverage for itself and each additional insured for at least 3 years after completion of the Work or the length of the state’s statute of repose, whichever is greater.

   (2) Business Automobile Liability coverage with limits of $1,000,000 each accident. Coverage should include liability arising out of all owned, leased, hired and non-owned automobiles.

   (3) Commercial Umbrella coverage with limits of at least $2,000,000. Coverage must include all entities that are additional insureds on the CGL.

   (4) Workers’ Compensation and Employers’ Liability coverage with limits of at least $500,000 each accident, $500,000 for bodily injury by accident, and $500,000 each employee for injury by disease.

   (5) To the fullest extent permitted by law, all policies must provide a waiver of subrogation on the CGL, Business Automobile, Workers’ Compensation and Umbrella Liability policies.
(6) A copy of the additional insured endorsements and policies must be provided to DWA prior to commencement of Work or within seven (7) days of written request of DWA, whichever first occurs.

c. All insurance must provide at least thirty (30) days written notice to DWA prior to cancellation of any insurance. All insurance must have a Best’s rating of no less than A- and must be authorized to do business in the state where the Project is located.

d. If any insurance coverage, clauses or limits beyond those provided herein are required in the Contract, the Subcontractor shall provide the same.

8. ASSUMPTION OF DUTIES AND INDEMNIFICATION

a. The Subcontractor assumes toward DWA all the obligations and responsibilities that DWA assumes toward the Owner. The Subcontractor shall indemnify DWA and the Owner against, and save them harmless from, any all loss, damage, expenses, costs, and attorney’s fees incurred or suffered on account of any breach this Agreement, or any conditions, provisions or covenants of the Agreement.

To the fullest extend permitted by law, Subcontractor shall indemnify, defend, and hold harmless DWA and its agents, affiliates, and employees from and against all claims, liabilities, damages, losses, and expenses, including but not limited to attorney’s fees, arising out of or resulting from the performance of the Work, provided that any such claim, liability, damage, loss or expense (1) is attributable to bodily injury, sickness, disease, or death, or to injury or destruction of tangible property including the loss of use resulting therefrom, or (2) due to any failure by Subcontractor to make any payment to Subs, materials providers, or others who have provided services or materials in connection with the Work. In the event of any collection action or mechanics lien filed by a labor or materials supplier against the Project for which DWA or Owner has paid or any other claim arising under this paragraph or Agreement, DWA may either (i) tender the defense of such claims to Subcontractor or (ii) retain an attorney and defend such claims and receive reimbursement from Subcontractor or all costs and attorney fees thereby incurred, and (3) is caused by whole or in part by an act or an omission of Subcontractor, anyone directly or indirectly employed by Subcontractor, or anyone for whose acts Subcontractor may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

9. CHANGES, ADDITIONS AND DEDUCTIONS

a. DWA may add or deduct from the amount of Work covered by this Agreement; and any changes made in the amount of Work involved, or any other parts of this Agreement, shall be by a written amendment hereto setting forth in detail the changes involved and the value thereof which shall be mutually agreed upon between DWA and the Subcontractor; if mutual agreement is not possible, then the value of the Work shall be determined as provided in Section 11 of this Agreement. In either event, however, the Subcontractor agrees to proceed with the Work as changed when so ordered in writing by DWA so as to not delay the progress of the Work, and pending any determination of the value thereof.

b. Change orders must be broken down by material and labor with markups as indicated in the specifications.

c. The Subcontractor agrees to make no claim for additional, extra or changed work outside the scope of this Agreement, and the terms hereof shall be conclusive with respect to this Agreement unless altered in writing signed by the parties.

d. The Subcontractor agrees not to sublet, transfer or assign this Agreement or any funds due or to become due or any part thereof without the written consent of DWA.

e. Any questions, clarifications, etc. must be submitted in writing to DWA as soon as they arise.

f. Do not proceed with any changes or alterations to the plans and specifications without written approval from Architect and DWA.

g. The Subcontractor shall promptly comply with Construction Directives.

10. BACK CHARGES

There will absolutely be no back charges and/or extra charges by Subcontractor against DWA or Owner, without prior approval in writing signed by DWA. Otherwise, any back charges are prohibited, null and void, and shall be absorbed by the Subcontractor. Any back charges assessed to the Subcontractor by DWA will be calculated at cost plus 10%.

11. DISPUTES

In the event of any dispute between DWA and Subcontractor covering the scope of the Work, the dispute shall be settled in the manner provided by the Contract for the Project. If none be provided, or if there arises any dispute concerning matters in connection with this Agreement and/or the scope of Work, then such disputes shall be first submitted to mediation with a qualified mediator, and if mediation is not successful, then settled by a ruling of a board of arbitration consisting of three members, one selected by DWA, one by the Subcontractor, and the third member shall be selected by the first two members. DWA and Subcontractor shall bear the expense of their selected members respectively, but the expenses of the third member shall be borne by the party requesting the arbitration in writing. DWA and Subcontractor agree to be bound by the findings of any such board of arbitration, finally and without recourse to any courts of law.

12. DEFAULT AND TERMINATION OF CONTRACT

a. Default. The following events, or any of them, shall constitute events of default by the Subcontractor:

(1) Failure to perform Work as required by the Schedule;
(2) Failure or neglect to correct Work found to be defective by and at the reasonable discretion of DWA;
(3) Failure to supply materials which have been specified, or to supply the specified quality;
(4) Failure to supply materials of sufficient quantity;
(5) Failure to begin Work pursuant to the terms of this Agreement;
(6) Failure to supply a workforce of sufficient size or skill level;
(7) Failure to carry out and complete the Work without delay to the Project, DWA, or other subcontractors;
(8) Failure to make prompt payments for materials, labor, equipment and services provided to the Project;
(9) Failure to observe and abide by all applicable laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over the Project;
(10) In the sole opinion of DWA, abandonment of the Project and the Subcontractor’s Work under this Agreement;
(11) Failure to comply with the licensing laws of the state in which the Work is performed;
(12) Failure to comply with any of the terms of this Agreement;
(13) Reasonable doubt that the remaining Work of Subcontractor can be completed for the then unpaid balance to the Subcontractor.
(14) DWA in its reasonable discretion determines Subcontractor’s ability to complete the Work or complete it in a timely manner is uncertain or unlikely.

b. Notice of Default. If the Subcontractor fails to perform in accordance with the terms of this Agreement, DWA may provide to Subcontractor a “Notice of Default” specifying the nature of the Subcontractor’s default.

c. Remedy of Default. The Subcontractor shall have three (3) business days from the time of issuance of the Notice of Default to remedy and correct the default. However, if such default is not corrected within the terms or time limits required for performance under this Agreement, or if in the sole discretion of DWA, the Subcontractor will not be able to do so, DWA may terminate this Agreement and dismiss the Subcontractor from the Project and have the Work performed by itself or others.

(1) Termination of this Agreement by default shall not relieve the Subcontractor from obligations of warranty, quality and conformity of the Work, and any and all payments due from the Subcontractor or any other terms included in this Agreement.

(2) The Subcontractor agrees to release to DWA, without recourse, any materials on the Project site belonging to the Subcontractor for the benefit of completing the Work.

d. No Waiver of Default. Any failure by DWA to enforce or require the strict keeping and performance of any of the terms or conditions of this Agreement:

(1) Shall not constitute a waiver of the terms or conditions of this Agreement,

(2) Shall not affect or impair such terms or conditions in any way,

(3) Shall not impair or waive the right of DWA to avail itself of such remedies as it may have for any breach or breaches of the terms or conditions of this Agreement.

e. Termination.

(1) If the Work has been stopped, abandoned or suspended for more than ninety (90) calendar days not due to the fault or neglect of the Subcontractor, or if DWA has refused or neglected to pay amounts due to the Subcontractor pursuant to this Agreement within thirty (30) calendar days after such amounts have become due, and if DWA fails to cure such default within seven (7) business days after receiving a written notice from the Subcontractor of such default, then the Subcontractor may terminate this Agreement upon giving DWA seven (7) business days’ prior written notice. The Subcontractor shall have no right to terminate this Agreement or suspend services hereunder on account of a failure by the Owner to make payment to DWA for all or any portion of the Work. Upon such termination, the Subcontractor shall be entitled to recover from DWA payment for all Work satisfactorily performed and for which payment has been received by DWA from the Owner but not yet paid to the Subcontractor. In no event shall DWA be liable to the Subcontractor or to persons or entities performing any portion of the Work for or on behalf of the Subcontractor, for any special, indirect or consequential damages or losses of anticipated profits arising out of a termination by the Subcontractor pursuant to this Paragraph 12.e(1).

(2) Should the Owner terminate its Contract with DWA, or any part which includes the Work, DWA shall so notify the Subcontractor in writing in a timely matter, and upon written notification, this Agreement shall be terminated and the Subcontractor shall immediately stop the Work, follow DWA’s instruction regarding shutdown and termination procedures, and mitigate all costs. Any termination of this Agreement pursuant to this Paragraph 12.e(2) shall be without liability to DWA.

(3) DWA may, at any time, and at its sole discretion, terminate this Subcontractor without cause and without regard to any fault or failure to perform by any party, and solely for DWA’s convenience. Termination by DWA for convenience shall be by notice of termination delivered to the Subcontractor specifying the effective date thereof. In the event of DWA’s termination of the Agreement for convenience, DWA shall pay to the Subcontractor the portion of the Agreement price allocable to the Work satisfactorily completed prior to the effective date of termination and for which payment has been received by DWA from the Owner. In no event shall DWA be liable to the Subcontractor or persons or entities performing any portion of the Subs’ Work for or on behalf of the Subcontractor, for any special, indirect or consequential damages or losses of anticipated profits arising out of a termination of the Agreement by DWA for convenience pursuant to this Paragraph 12.e(3). Upon a determination by an arbitrator that a termination of the Agreement by DWA for cause pursuant to Paragraph 12.e(4) was wrongful, such termination will be deemed converted to a termination for convenience pursuant to this Paragraph 12.e(3) and the Subcontractor’s remedies for wrongful termination shall be limited to the recovery of the payments permitted for a termination by DWA for convenience as set forth in this Paragraph 12.e(3).

(4) If the Subcontractor fails to correct or to commence and satisfactorily continue correction of a default within three (3) business days after written notification issued under Paragraph 12.b, then DWA may terminate the Agreement for cause. Upon such termination, DWA may use any materials, implements, equipment, appliances or tools furnished by or belonging to the Subcontractor to complete the Work. DWA also may furnish those materials and equipment and/or employ such workers or subcontractors as DWA deems necessary to maintain the orderly progress of the Work. All costs and expenses incurred by DWA in performing the Work and in employing others to perform the Work, including reasonable overhead, profit and attorneys’ fees, shall be deducted from any monies due or to become due the Subcontractor under this Agreement. The Subcontractor shall be liable for the payment of any amount by which such costs and expenses plus any other damages suffered by DWA as a consequence of the Subcontractor’s breach of this Agreement may exceed the unpaid balance of the Agreement price.

f. Conditions Following Subcontractor Termination for Cause.

(1) Right of Retention. Upon receipt or the sending of a Notification to Terminate, or upon termination of this Agreement under Paragraph 12.e(4), the Subcontractor acknowledges the right of DWA to retain:

(a) Up to 10% of the total value of all Work performed by the Subcontractor through the expiration of the warranty period, or

(b) Up to 10% of the total value of all Work performed by the Subcontractor for a period not exceeding the statute of limitations for liens, or

(c) Up to 10% of the total value of all Work performed by the Subcontractor for a period not to exceed the time allowed by law for filing wage claims by the Subcontractor’s employees.

(2) If the Subcontractor is called upon to perform warranty work and the Subcontractor fails to correct such Work within the warranty terms of this Agreement, DWA may use the retained funds to pay for the correction of the defective Work.

(3) Any funds retained pursuant to this Section shall be released in full to the Subcontractor within ten business days of the expiration of the applicable retention term if all warranty Work has been performed and completed pursuant to the terms of this Agreement.
g. **Suspension.** DWA may, for just cause or by direction, suspend all or part of the Subcontractor’s Work. DWA will give written notice to the Subcontractor stating the nature, effective date and anticipated duration of such suspension, whereupon the Subcontractor shall suspend Work to the extent specified and shall place no further orders or perform no other Work except as permitted by DWA’s notice of suspension. During the period of such suspension, the Subcontractor must care for all Work, materials and equipment at the Project site or at storage areas under the Subcontractor’s responsibility. The Agreement price shall be adjusted by Change Order if the cost of the Work is increased or decreased by reason of such suspension. If additional time for completion of the Work is required as a result of such suspension, the Subcontractor shall submit a written request for additional time prior to resuming the Work. Failure to submit a written request for additional time due to such suspension shall result in no extension of time being granted.

In the event the prime contract between the Owner and DWA should be terminated prior to its completion, then DWA and Subcontractor agree that an equitable settlement for Work performed (less damages and offsets) under this Agreement prior to such termination will be made as provided by the contract documents, if such provision be made; or, if none such exist, next by mutual agreement; or failing either of these methods, by arbitration as provided in Section 11.

13. **FINANCIAL POSITION**

Subcontractor herewith certifies that no bankruptcy proceeding has been filed in any chapter of the United States or State Bankruptcy Acts, and further that no such bankruptcy action is intended or contemplated by said Subcontractor, or if Subcontractor has filed or files a voluntary or any creditor files against Subcontractor an involuntary petition under any facet of the Bankruptcy Act, DWA may terminate this Agreement and immediately be relieved of any further obligations except as provided in Section 11 of this Agreement. Subcontractor also authorizes DWA to regularly as determined by DWA obtain credit and other financial reports on Subcontractor.

14. **ENFORCEMENT**

Upon default, the defaulting party agrees to pay all costs and attorney’s fees reasonably incurred by the party not in default in enforcing the terms of this Agreement of its rights herein.

15. **SEVERABILITY**

If any paragraph or portion of this Agreement is found illegal or unenforceable for any reason, the rest of this Agreement shall remain in full force and effect, and the failure of one clause shall not affect any other clause or paragraph of this Agreement.

DWA and Subcontractor signify their understanding and agreement with the terms by signing, and that this document incorporates the full understanding and agreement between the parties.

**CONTRACTOR:**

DWA CONSTRUCTION, INC.

DATED: _______________________

By: _______________________

Title: _______________________

**SUBCONTRACTOR:**

__________________________

DATED: _______________________

By: _______________________

Title: _______________________

Tax Id No. ________________________
CONDITIONAL WAIVER AND RELEASE
UPON PROGRESS PAYMENT

Property Name: Cache High School Replacement
Property Location: Approx. 1180 North 600 West, Logan, Utah 84321
Undersigned’s Customer: ________________________________
Invoice/Payment Application Number: ________________________
Payment Amount: ________________________________
Payment Period: ________________________________

To the extent provided below, this document becomes effective to release and the undersigned is considered to waive any notice of lien or right under Utah Code Ann., Title 38, Chapter 1, Mechanics’ Liens, or any bond right under Utah Code Ann., Title 14, Contractors Bonds, or Section 63-56-504 related to payment rights the undersigned has on the above described Property once:

1. The undersigned endorses a check in the above referenced Payment Amount payable to the undersigned; and

2. The check is paid by the depository institution on which it is drawn.

This waiver and release applies to a progress payment for the work, materials, equipment, or a combination of work, materials, and equipment furnished by the undersigned to the Property or to the Undersigned’s Customer which are the subject of the Invoice or Payment Application, but only to the extent of the Payment Amount.

This waiver and release does not apply to any retention withheld; any items, modifications, or changes pending approval; disputed items and claims; or items furnished or invoiced after the Payment Period.

The undersigned warrants that the undersigned either has already paid or will use the money the undersigned receives from this progress payment promptly to pay in full all the undersigned’s laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment that are the subject of this waiver and release.

Dated: __________________________________________

(Company Name)

By: __________________________________________

Its: __________________________________________
WAIVER AND RELEASE  
UPON FINAL PAYMENT

Property Name: Cache High School Replacement
Property Location: Approximately 1180 North 600 West, Logan, Utah 84321
Undersigned’s Customer: 
Invoice/Payment Application Number: 
Payment Amount: 

To the extent provided below, this document becomes effective to release and the undersigned is considered to waive any notice of lien or right under Utah Code Ann., Title 38, Chapter 1, Mechanics’ Liens, or any bond right under Utah Code Ann., Title 14, Contractors Bonds, or Section 63-56-504 related to payment rights the undersigned has on the above described Property once:

1. The undersigned endorses a check in the above referenced Payment Amount payable to the undersigned; and

2. The check is paid by the depository institution on which it is drawn.

This waiver and release applies to the final payment for the work, materials, equipment, or a combination of work, materials, and equipment furnished by the undersigned to the Property or to the Undersigned’s Customer.

The undersigned warrants that the undersigned either has already paid or will use the money the undersigned receives from the final payment promptly to pay in full all the undersigned’s laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment that are the subject of this waiver and release.

Dated: 

(Company Name)

By: 

Its: 

P.O. Box 3448
Logan, Utah 84323-3448
Phone: 435-752-6860
Fax: 435-752-7606
www.dwaconstruct.com
We hereby submit for your consideration the following product instead of the specified item for the above project:

<table>
<thead>
<tr>
<th>Section</th>
<th>Paragraph</th>
<th>Specified Item</th>
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Proposed Substitution: 

Attach complete technical data, including laboratory tests, if applicable. Include complete information on changes to Drawings and/or specifications which proposed substitutions will require for its proper installation.

Fill in Blanks Below:

A. Does the substitution affect dimensions shown on Drawings?
B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitutions?
C. What affect does substitution have on other trades?
D. Differences between proposed substitution and specified item?
E. Manufacturer's guarantees of the proposed and specified item are:

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<tr>
<th>Same</th>
<th>Different (explain on attachment)</th>
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The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Submitted By:

Signature: ____________________________
Firm: ________________________________
Address: ____________________________
Phone: ____________________________ Date: ________________

For Use By Design Consultant:

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<tr>
<th>Accepted</th>
<th>Accepted</th>
<th>As Noted</th>
<th>Not Accepted</th>
<th>Received Too Late</th>
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</table>

By: ____________________________ Date: ________________

Remarks:

END OF DOCUMENT 00440.
DOCUMENT 00700 - GENERAL CONDITIONS

RELATED REQUIREMENTS:

Document 00800 - Supplementary Conditions
Administrative and Procedural Items: Division 1.

GENERAL CONDITIONS:

The General Conditions of this Contract is the American Institute of Architects Document A201, "General Conditions of the Contract for Construction", 2007 Edition, hereinafter referred to as the "General Conditions".

A copy of the Document is included in this Project Manual, and additional copies may be purchased from the American Institute of Architects, Utah Society, 75 East Broadway, Salt Lake City, Utah, 84111 or Architectural Design West, P.C., 255 South 300 West, Logan, Utah 84321.

The General Conditions shall apply to each and every Section of the Work as though written in full herein.

END OF DOCUMENT 00700.
General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name and address)

THE ARCHITECT:
(Name and address)

TABLE OF ARTICLES
1  GENERAL PROVISIONS
2  OWNER
3  CONTRACTOR
4  ARCHITECT
5  SUBCONTRACTORS
6  CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7  CHANGES IN THE WORK
8  TIME
9  PAYMENTS AND COMPLETION
10 PROTECTION OF PERSONS AND PROPERTY
11 INSURANCE AND BONDS
12 UNCOVERING AND CORRECTION OF WORK
13 MISCELLANEOUS PROVISIONS
14 TERMINATION OR SUSPENSION OF THE CONTRACT
15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.
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ARTICLE 1  GENERAL PROVISIONS

§ 1.1  BASIC DEFINITIONS

§ 1.1.1  THE CONTRACT DOCUMENTS
The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor’s bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2  THE CONTRACT
The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect’s consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect’s duties.

§ 1.1.3  THE WORK
The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4  THE PROJECT
The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5  THE DRAWINGS
The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6  THE SPECIFICATIONS
The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7  INSTRUMENTS OF SERVICE
Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect’s consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8  INITIAL DECISION MAKER
The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2  CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1  The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.
§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION
In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE
§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM
If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER
§ 2.1 GENERAL
§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic’s lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner’s interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or
the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner’s control and relevant to the Contractor’s performance of the Work with reasonable promptness after receiving the Contractor’s written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER’S RIGHT TO STOP THE WORK
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER’S RIGHT TO CARRY OUT THE WORK
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner’s expenses and compensation for the Architect’s additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3  CONTRACTOR
§ 3.1 GENERAL
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor’s authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.
§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall make field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other
facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY
The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor’s warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES
The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS
§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect’s determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume
the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES
§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,
   .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
   .2 Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
   .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT
§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner’s consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR’S CONSTRUCTION SCHEDULES
§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner’s and Architect’s information a Contractor’s construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect’s approval. The Architect’s approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor’s construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.
§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE
The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect’s approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect’s approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be
required to provide professional services in violation of applicable law. If professional design services or
certifications by a design professional related to systems, materials or equipment are specifically required of the
Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria
that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a
properly licensed design professional, whose signature and seal shall appear on all drawings, calculations,
specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings
and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear
such professional’s written approval when submitted to the Architect. The Owner and the Architect shall be entitled
to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or
provided by such design professionals, provided the Owner and Architect have specified to the Contractor all
performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will
review, approve or take other appropriate action on submittals only for the limited purpose of checking for
conformance with information given and the design concept expressed in the Contract Documents. The Contractor
shall not be responsible for the adequacy of the performance and design criteria specified in the Contract
Documents.

§ 3.13 USE OF SITE
The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes,
rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably
cumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING
§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make
its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition
existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed
construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by
excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor
except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably
withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor’s
consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP
§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or
rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste
materials, rubbish, the Contractor’s tools, construction equipment, machinery and surplus materials from and about
the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may so do and Owner
shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK
The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever
located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS
The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement
of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but
shall not be responsible for such defense or loss when a particular design, process or product of a particular
manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are
contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the
Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a
patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the
Architect.
§ 3.18 INDEMNIFICATION
§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect’s consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT
§ 4.1 GENERAL
§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT
§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner’s representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor’s rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor’s failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.
§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect’s evaluations of the Contractor’s Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor’s submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect’s action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect’s professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect’s review of the Contractor’s submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect’s review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect’s approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner’s review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect’s responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect’s response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect’s decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

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§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS
§ 5.1 DEFINITIONS
§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK
§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS
By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may
be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS
§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor’s compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor’s obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
§ 6.1 OWNER’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS
§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner’s own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY
§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that
the Owner’s or separate contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor’s delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor’s delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER’S RIGHT TO CLEAN UP
If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK
§ 7.1 GENERAL
§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS
§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES
§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

1. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers’ compensation insurance;

2. Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

4. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

5. Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect’s professional judgment, to be reasonably justified. The Architect’s interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK
The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.
ARTICLE 8 TIME
§ 8.1 DEFINITIONS
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME
§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION
§ 9.1 CONTRACT SUM
The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES
Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT
§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor’s right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.
§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others with whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor’s knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor’s Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect’s reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect’s evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect’s knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor’s right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect’s opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect’s opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

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failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
damage to the Owner or a separate contractor;
reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS
§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor’s portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT
If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days’ written notice to the Owner and Architect,
stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor’s reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION
§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor’s list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the Contractor’s list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE
§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT
§ 9.10.1 Upon receipt of the Contractor’s written notice that the Work is ready for final inspection and acceptance and receipt of a final Application for payment, the Architect will promptly make such inspection and, when the
Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

1. liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
2. failure of the Work to comply with the requirements of the Contract Documents; or
3. terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY
§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS
The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY
§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

1. employees on the Work and other persons who may be affected thereby;
2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor’s obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor’s organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor’s superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor’s written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and the Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor’s reasonable additional costs of shut-down, delay and start-up.
§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES
In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS
§ 11.1 CONTRACTOR'S LIABILITY INSURANCE
§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

   .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
   .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
   .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
   .4 Claims for damages incurred by usual personal injury liability coverage;
   .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
   .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
   .7 Claims for bodily injury or property damage arising out of completed operations; and
   .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction

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of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE
The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE
§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable therefor.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or
otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE
The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE
The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days’ prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION
The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect’s consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner’s property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner’s duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the

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Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND
§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK
§ 12.1 UNCOVERING OF WORK
§ 12.1.1 If a portion of the Work is covered contrary to the Architect’s request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect’s examination and be replaced at the Contractor’s expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner’s expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor’s expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK
§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION
The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect’s services and expenses made necessary thereby, shall be at the Contractor’s expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION
§ 12.2.2.1 In addition to the Contractor’s obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.
§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK
If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS
§ 13.1 GOVERNING LAW
The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS
§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE
Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES
§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.
§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner’s expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect’s services and expenses shall be at the Contractor’s expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST
Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS
The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR
§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

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.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of
the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not
made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable
evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor,
Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work
under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work
by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of
days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days’
written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work
executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a
Subcontractor or their agents or employees or any other persons performing portions of the Work under contract
with the Contractor because the Owner has repeatedly failed to fulfill the Owner’s obligations under the Contract
Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional
days’ written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided
in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective
agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful
orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that
sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and
after giving the Contractor and the Contractor’s surety, if any, seven days’ written notice, terminate employment of
the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and
construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written
request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs
incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall
not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for
the Architect’s services and expenses made necessary thereby, and other damages incurred by the Owner and not
expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance,
the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case
may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall
survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in
whole or in part for such period of time as the Owner may determine.
§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

1. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

2. that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner’s convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner’s convenience, the Contractor shall

1. cease operations as directed by the Owner in the notice;

2. take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

3. except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor’s Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.
§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES
The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

1. damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
2. damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker’s sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner’s expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.
§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor’s default, the Owner may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic’s lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION
§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION
§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER
§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an
additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.
Additions and Deletions Report for
AIA® Document A201™ – 2007

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

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There are no differences.
Certification of Document’s Authenticity

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I, scott theobald, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:34:28 on 05/28/2010 under Order No. 759/7062570_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007 - General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

>Title

(Dated)
DOCUMENT 00810 - MODIFICATIONS TO GENERAL CONDITIONS

RELATED REQUIREMENTS:

Document 00700 - General Conditions
Administrative and Procedural Items: Division 1.

MODIFICATIONS TO GENERAL CONDITIONS:

Modifications to General Conditions contain changes and additions to the General Conditions and shall apply to each and every Section of work as though written in full therein.

The following paragraphs and subparagraphs take precedence over the General Conditions. Where any part of the General Conditions is changed or voided by the modifications to General Conditions, the unaltered provisions remain in effect.

ARTICLE 1 - GENERAL PROVISIONS

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following paragraphs:

1.2.4 Scope paragraphs placed at the beginning of the Sections present a brief indication of the principal Work included in that Section, but do not limit Work to subject mentioned nor purport to itemize Work that may be included.

1.2.5 In case of disagreement between drawings and specifications, or between different specification requirements, or between different drawings, the Contractor is to notify the Architect, who will interpret the intent of the Contract Documents. Interpretations will be based on the following priorities:

1. The Agreement
2. Addenda, with those of later date having precedence over those of earlier date.
3. The Supplementary Conditions.
4. The General Conditions of the Contract for Construction
5. Drawings and Specifications.

In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect’s interpretation. Failure to report a conflict in the Contract Documents shall be deemed evidence that the Contractor has elected to proceed in the more expensive manner.

1.2.6 The words "approved", "inspected", "directed", "selected", and similar words and phrases shall be presumed to be followed by "by Architect". The words "satisfactory", "submitted", "reported", and similar words and phrases shall be presumed to be followed by "by Architect". Words like "install", "provide", "furnish", and "supply" shall be construed to include complete furnishings and installing or construction.

1.2.7 Instructions, directions and requirements as specified shall be considered to be followed by the phrase "unless otherwise specified or indicated''.

1.2.8 A colon (:) following a material or item shall be used in place of the words, "shall be''.

ARTICLE 2 - OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
Delete paragraph 2.2.5 and substitute the following

2.2.5 The CM/GC will be furnished thirty (30) sets of Drawings and Specifications for use in construction of this Project. Additional Drawings and Specifications will be furnished to the CM/GC at the CM/GC’s expense, but shall remain the property of the Architect.

ARTICLE 3 - CONTRACTOR

Add to 3.1.1 the following paragraph

3.1.1 A CM/GC has been selected to perform certain responsibilities for the work and are outlined in the CM/GC services proposal dated January 27, 2009 and is hereby incorporated as part of these General Conditions.

3.4 LABOR AND MATERIALS

Add the following paragraphs:

3.4.4 All labor shall be performed in the best workmanlike manner by mechanics skilled in their respective trades. The standards of the Work required throughout shall be of such quality as will produce first-class results.

3.4.5 All materials shall be delivered in their original, unopened containers which shall bear the seal, trademark or hallmark of the respective associations or councils and the identification label of the manufacturer.

3.5 WARRANTY

Add the following paragraph:

3.5.2 The Contractor shall secure warranties and guarantees and deliver four (4) bound copies of same to the Owner upon completion of the work.

3.6 TAXES

Add the following paragraph:

3.6.2 The Contractor and subcontracts, and suppliers shall not include Utah State sales tax on any construction materials for this project. A tax ID # will be provided for the sole purpose of the purchase of material for this project only.

3.9 SUPERINTENDENT

Add the following paragraphs

3.9.2 The contractor shall endeavor to retain the same superintendent throughout the project and shall obtain the approval of the Owner prior to any change in Superintendent. Additional costs incurred by the Owner and or the Architect due to transitional errors or transition time due to changes in the Superintendent will be billed to the contractor at the said hourly rates.

3.10 CONTRACTOR’S CONSTRUCTION SCHEDULE

Add to the following paragraph:

3.10.2 A construction schedule shall be submitted by the contractor prior to submitting the 1st payment request.
3.12  **SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

Add the following subparagraphs to paragraph 3.12.4

.1  Submit two prints of all Shop Drawings and six copies of all brochures unless otherwise required by the Contract Documents.

.2  Each of the Shop Drawings and Sample shall be properly identified bearing the name and quality of the material, the manufacturer’s name, the Contractor’s name, the name of the Project and the date of submission.

.4  Architect's review of Shop Drawings or Samples which deviate from the Contract Documents does not authorize changes to the Contract Sum. Submit in writing at the time of submission of Shop Drawings and Samples any changes to the Contract Sum affected by such Shop Drawings or Samples, otherwise claim for extras will not be granted.

.5  Submit schedule of Shop Drawings and Sample Submittals within 30 days after award of the Contract.

.6  Shop drawings are defined as being the contractor’s means, method, technique and procedure of construction.

3.14  **CUTTING AND PATCHING**

Add the following paragraph:

3.14.3  After installation of the Work, carefully fit around, close up, repair, patch and/or point up all such work to match adjoining surface by use of proper tools and materials and by skilled workmen to which the work belongs.

3.15  **CLEANING UP**

Add the following paragraphs:

3.15.3  The Contractor shall clean all glass and all other finish surfaces, replace all broken and scratched glass; remove stains, spots, marks and dirt from decorated work; clean all hardware; remove paint spots and smears from all surfaces, clean all fixtures and wash all floors; leaving work in a clean and spotless condition.

3.15.4  Comply with cleaning instructions contained in the specifications. In absence of specific cleaning instruction, follow accepted cleaning practices or the recommendation of the manufacturer of the material to be cleaned.

3.18  **INDEMNIFICATION**

Add the following paragraph:

3.18.3  The Contractor agrees that it/he shall at all times protect and indemnify and save harmless, Cache County School District and Architectural Design West, P.C., and the Architect's consultants from any and all claims, demands, judgments, expenses, including reasonable attorney's fees and all other damages of every kind and nature made, rendered or incurred by or in behalf of any person or corporation whatsoever, including the parties hereto and their employees that may arise, occur or grow out of any acts, actions, work or other activity done by the said Contractor in the performance and execution of this Contract.

**ARTICLE 4 - ADMINISTRATION OF THE CONTRACT**

4.2  **ARCHITECT’S ADMINISTRATION OF THE CONTRACT**
Delete paragraph 4.2.4 and substitute the following:

4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall communicate through the Architect. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with Owner’s separate contractors shall be through the Owner.

4.2.4.1 Requests for Information Clause.

In the event that the contractor or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the architect, the contractor shall submit a Request for Information in writing to the architect. Requests for Information may only be submitted by the contractor and shall only be submitted on the Request for Information Forms provided by the architect. The contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the architect. In the Request for Information, the contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached. The contractor is encouraged to offer recommended solutions for review by the Architect.

The architect acknowledges that this is a complete project. Based upon the architect’s past experience with projects of similar complexity, the architect anticipates that there will probably be substantial, Requests for Information on this project.

The architect will review all Requests for Information to determine whether they are Requests for Information within the meaning of this term. If the architect determines that the document is not a Request for Information, it will be returned to the contractor, unreviewed as the content, for resubmittal on the proper form and in the proper manner.

Responses to Requests for Information shall be issued within five (5) working days of receipt of the request from the contractor unless the architect determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the architect, the architect will, within five (5) working days of receipt of the request, notify the contractor of the anticipated response time. If the contractor submits a Request for Information on an activity within five (5) working days or less of float on the current project schedule, the contractor shall not be entitled to any time extension due to the time it takes the architect to respond to the request provided that the architect responds within the five (5) working days set forth above.

Responses from the architect will not change any requirement of the contract documents. In the event that the contractor believes that a response to a Request for Information will cause a change to the requirements of the contract document, the contractor shall immediately give written notice to the architect stating that the contractor considers the response to be a Change Order. Failure to give such written notice immediately shall waive the contractor’s right to seek additional time or cost under the Changes article of these General Conditions.

Definitions relating to Request for Information Clause as follows:

Drawing/Plan Clarification: An answer from the architect, in response to an inquiry from the contractor, intended to make some requirement(s) of the drawings or plans clearly understood. Drawing/plan clarifications may be sketches, drawings, or in narrative form and will not change any requirements of the drawings or plans. Responses to contractor inquiries shall be as outlined in the Article “Requests for Information” of these General Conditions.

Non-Conformance Notice: A notice issued by the architect documenting that the work or some portion thereof has not been performed in accordance with the requirements of the contract documents. Payment shall not be made on any portion of the work for which a Non-
Conformance Notice has been issued and the work not corrected to the satisfaction of the architect. Upon receipt of a Non-Conformance Notice the contractor shall provide a written Response to a Non-Conformance Notice within five (5) working days after receipt of the Notice. The contractor’s response shall detail either (a) why they believe that the work was performed in accordance with the contract documents or (b) what corrective action they intend to take, at their sole expense, to correct the non-conforming work. If the contractor disputes issuance of the Notice, the architect has five (5) working days in which to respond by either (a) withdrawing the Notice of Non-Conformance or (b) directing the contractor to correct the work. Such determination by the architect shall be final and conclusive of the matter. If directed to correct the work, the contractor shall do so within five (5) working days after receipt of such direction from the architect, or such other time as may be agreed to with the architect.

Project Communications: Routine written communications between architect and the contractor shall be in letter, field memo, or fax format. Such communications shall not be identified as Requests for Information nor shall they substitute for any other written requirements pursuant to the provision of these contract documents.

Requests for Information: A request from the contractor or one of its subcontractors, to the architect, seeking an interpretation or a clarification of some requirement of the contract documents. The contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed from the architect. The contractor shall, in the written request, set forth its interpretation or understanding of the contractor’s requirements along with reasons why it has reached such an understanding. Responses from the architect will not change any requirements of the contract documents. Responses to contractor inquiries shall be as outlined in the Article “Request for Information” of these General Conditions.

Substitution/Or-Equivalent Submittals: A request from the contractor to substitute a material, article, device, product, fixture, form, type of construction, or process called for in the contract documents with another item that shall be substantially equivalent in all respects to that so indicated or supplied.

Submittal/Shop Drawings: When required by any technical specification included in these contract documents, the contractor shall transmit to the architect technical submittals, shop drawings, or samples, including supporting catalog cuts, manufacturer’s literature, sketches or drawings, calculations, and other pertinent data, in sufficient detail to enable the architect to review the information and determine that the contractor clearly understands the requirements of the contract documents.

Schedule Submittals: When required by the Construction Schedule Specification of these contract documents, the contractor shall submit required schedules, schedule updates, schedule revision, time impact analysis, etc., for review and acceptance.

4.3.1 Add these sentences to the end of Clause 4.3.1: A claim must contain the following explicit language in order to be recognized as a “Claim”: “THIS IS A CLAIM AS DEFINED BY CLAUSE 4.3.1 OF AIA DOCUMENT A201.”

4.5.1 Substitute the following paragraph in place of the existing paragraph 4.5.1.

4.5.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, may, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party. All claims and disputes between the Contractor and the Owner will be decided in a forum determined at the sole discretion of the Owner. If the Owner determines that a claim or dispute will be mediated, the guidelines set forth in Clause 4.5 will govern the mediation.

4.5.2 Substitute the word may for shall in the first sentence.
4.6.1 **Substitute the following paragraph in place of the existing paragraph 4.6.1.**

4.6.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, may, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. All claims and disputes between the Contractor and the Owner will be decided in a forum determined at the sole discretion of the Owner. If the Owner determines that a claim or dispute will be arbitrated, the guidelines set forth in Clause 4.6 will govern the arbitration.

4.6.2 **Substitute the following paragraph in place of the existing paragraph 4.6.2.**

4.6.2 Claims not resolved by mediation may be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

**ARTICLE 7 - CHANGES IN THE WORK**

7.2 **CHANGE ORDERS**

Add the following paragraph:

7.2.3 The CM/GC will include 0% overhead and profit on all additive or deductive change order costs. As the CM/GC agreement provides for OH & P in the GMP calculation which includes buyout, contingency allowance and change orders, except that items deemed to be a change in the scope of work may include:

A. Overhead and profit by the following liquidated formula which is not a penalty but a reasonable calculation agreed upon at the time of execution of the Contractor's Agreement, and provided by formula herein due to the fact that the actual amount due for said overhead and profit cannot easily be ascertained at the time of such execution. Each request for pricing shall stand on its own and not be combined with other requests for pricing in determining the allowed markup described below. A particular request for pricing shall include all items reasonably related together and determinable at the time of the request. If several unrelated requests for pricing are grouped together in a single Change Order each request for pricing will be considered separately for purposes of calculating the markup under the following formula:

B. A markup of 15% may be applied to the cost of each individual change up to $10,000 in cost, but in no case shall the markup be less than $150;

C. A markup of 10% may be applied to the portion of the cost of each individual change in excess of $10,000;

D. The markups in 7.2.3 (b) and (c) above are to cover the Contractor's additional payment and performance bond premiums, insurance premiums not specified above, home office overhead and profit unless there is a compensable Owner-caused hereinbelow in which event the Contractor is entitled to compensation for extended home office overhead costs based on the final result of the following formula: Contract Sum divided by Contract Time (in calendar days ); the result of which is then multiplied by 0.05; and the result of which is multiplied by the number of calendar days of compensable days under Paragraph 8.3 hereinbelow that are beyond the Contract Time; and

E. Subcontractors at any tier shall be entitled to markup their costs related to a Change Order with the same percentages as specified in 7.2.3 (b) and (c) above, except that the minimum markup shall be $50 for any individual change.

7.2.5 **CREDITS.** Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as
confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

Add the following:

7.2.6 In processing Change Orders, the General Contractor and each subcontractor shall submit to the Architect a detailed breakdown of costs or credits resulting from a Change in the Work. In addition to General Contractor’s costs, the breakdown shall include the costs of work performed by Subcontractors and Sub-Subcontractors as applicable for the Change order. The costs or credits as applicable shall be properly itemized to include the following:

A. Quantities and unit costs or lump sum costs or materials supplied and delivered to the site.
B. Man hours of labor and hourly rates for each trade classification of labor involved, including trade foreman.
C. Direct costs, including purchase and rental value of fuel, supplies, scaffolding, construction equipment, power tools, insurance, bond premiums and taxes.
D. Profit and Overhead as identified in 7.2.3.
E. Overhead expenses shall include: supervision, superintendence, wages of time keepers and clerks, hand tools, field office expense, and all other incidental expenses not included in “Direct Cost”.

7.4 MINOR CHANGES IN THE WORK

Delete paragraph 7.4.1 and substitute the following:

7.4.1 The Architect will have authority to order changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.3 APPLICATIONS FOR PAYMENT

Add the following sentence to Subparagraph 9.3.1:

The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

Add the following Clause 9.3.1.3 to 9.3.1:

9.3.1.3 Until Substantial Completion the Owner shall pay 95 percent of the amount due the Contractor on account of progress payments. Upon Substantial Completion retainage shall be reduced to approximate value of work times 2.

Add: The following shall be added under 9.8.3: The Architect shall verify the completion of all punch list items. In the event subsequent review(s) are required because of punch list items not complete, the Contractor agrees to pay the greater of $250.00 or actual cost of each follow up visit by the Architect or Engineer.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Add the following subparagraphs to paragraph 10.1.2:
.1 ASBESTOS: It is the intent of these specifications that the use of asbestos is prohibited. The Contractor and suppliers shall warrant that all products used are asbestos free. In the event that a specified product contains asbestos, it shall be the responsibility of the supplier and contractor to notify the Owner and Architect so that an appropriate substitute can be made.

.2 SPECIAL NOTE: In the event that Contractor uncovers asbestos, or believes that he has uncovered asbestos, he shall immediately cease work in that area and notify the Owner or Owner's Representative, so that appropriate action can be taken to minimize risk of exposure. Workmen shall be notified of this action.

ARTICLE 11 - INSURANCE AND BONDS

11.4 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

Add the following paragraphs:

11.4.3 The Contractor shall furnish a Surety Company Bond in the amount of 100% of the Contract Price covering 100% performance and maintenance and 100% payment with such sureties and/or agency as selected or approved by the Owner.

11.4.4 The Bond shall include maintenance provisions covering workmanship and materials for a period of one year or for longer periods where so specified, from and after the Date of Substantial Completion. The Contractor shall include the cost of the Bond as part of the Contract Price.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.5 TESTS AND INSPECTIONS

Add the following paragraphs:

13.5.7 If a proposed substitution requires investigation, testing or approval to determine its suitability for incorporation into the Work, the testing of the proposed substitution shall be as determined by the Architect. The Contractor shall bear all costs of such investigations or tests.

13.5.8 If Work installed is found to be deficient or defected, the investigation, testing and any subsequent re-testing of the Work arising out of such deficiencies or defects shall be performed by the Contractor. The type and nature of the inspections and tests shall be as determined by the Architect. The Contractor shall bear all cost of such investigations, testing and re-testing.
SUPPLEMENTARY CONDITIONS

RELATED REQUIREMENTS:

Document 00100 - Instructions to Bidders
Document 00300 - Bid Forms
Document 00500 - Agreement Forms
Document 00700 - General Conditions
Administrative and Procedural Items: Division 1.

SUPPLEMENTARY CONDITIONS:

Time of Completion:

The General Contractor shall begin work upon notice to proceed. The work shall be completed no later than June 30, 2018.

Contractor also agrees to pay liquidated damages in accordance with Supplementary Conditions and Bid Proposal if contractors delay makes the damages applicable.

Liquidated Damages:

Time is of the essence. Should the Contractor fail to complete the work within the specified times, or within such additional time as may been allowed by extension, there shall be deducted from any monies due to the Contractor the sum of $1,000.00 per day, for each and every calendar day beyond the agreed date of substantial completion or extended completion day that the work remains uncompleted in each individual trade contract. Such sum is fixed and agreed upon by the Owner and Contractor (and his surety) as liquidated damages due the Owner by reason of the inconvenience and added costs of administration, engineering and supervision resulting from the Contractor's default, and not as a penalty.

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the Owner of any of his rights under the Contract.

END OF DOCUMENT 00820.
DOCUMENT 00900 - ADDENDA AND MODIFICATIONS

RELATED REQUIREMENTS:

Document 00100 - Instructions to Bidders
Administrative and Procedural Items: Division 1.

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work specified in this document.

DEFINITION:

Addenda are written or graphic instruments issued prior to opening of bids which clarify, revise, add to, or delete from the original bidding documents or previous addenda.

Modifications are written or graphic instruments issued after the execution of the Agreement, including but not limited to proposal requests, Architect's supplemental instructions, and change orders.

PROCEDURES:

Addenda, if any will be identified by the title: Document 00900 - Addenda - and will comply with requirements of Document 00100: Instructions to Bidders.

END OF DOCUMENT 00900.
DIVISION 01 - GENERAL REQUIREMENTS
01010 Summary of the Work
01027 Measurement and Payment
01035 Modification Procedures
01045 Cutting and Patching
01049 Supporting From Structure
01050 Field Engineering
01095 Reference Standards and Definitions
01200 Project Meetings
01230 Alternates
01250 Contract Modification Procedures
01310 Project Management & Coordination
01320 Construction Progress Documentation
01330 Submittal Procedures
01400 Quality Control
01500 Temporary Facilities & Controls
01600 Product Requirements
01700 Project Closeout
01740 Warranties and Bonds
01810 General Commissioning Requirements
PART 1 - GENERAL

RELATED REQUIREMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

PROJECT/WORK IDENTIFICATION:

General: This package consists of site improvements, structural, architectural, mechanical, plumbing, and electrical work for the School.

Contract Documents: These documents indicate the work of the Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

Existing site conditions & restrictions on use of the site.

Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, Drawings, addenda and modifications to the contract documents issued subsequent to the initial printing of this project manual and including but not necessarily limited to printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions and other forces outside contract documents.

CONTRACTOR USE OF PREMISES:

General: The Contractor shall limit his use of the premises to the work indicated.

Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

Keep driveways and entrances serving the premises clear.

Keep all public areas free from accumulation of waste material, rubbish or construction debris.

Smoking or open fires will not be permitted on the premises.

Maintain Fire Department access to the site at all times.

Provide safety protection as required to maintain the existing school in use.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01010.
SECTION 01027 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

Document 01700 - Project Closeout.

PAYMENT REQUESTS:

General: Except as otherwise indicated, sequence of progress payments is to be regular, and each must be consistent with previous applications and payments. It is recognized that certain applications involve extra requirements, including initial application, application at times of substantial completion, and final payment application.

Payment Application Times: The "date" for each progress payment is indicated in the Owner-Contractor Agreement or, if none is indicated therein, it is the 15th day of each month. The period of construction work covered by each payment request is period indicated in Owner-Contractor Agreement or, if none is indicated therein, it is period ending 15 days prior to date for each progress payment, and starting day following end of preceding period.

APPLICATION AND CERTIFICATE FOR PAYMENT FORM:

The "Application and Certificate for Payment", A.I.A. Document G702 Pay Request Spreadsheet Form included in Specification Section 01300, will be the form used as an Application and Certificate for Payment for this Project.

A copy of the Standard A.I.A. Documents may be examined at the office of the Architect.

Application Preparation: Except as otherwise indicated, complete every entry provided for on the form, including notarization and execution by authorized persons. Incomplete applications will be returned by Architect/Engineer without action. Entries must match current data of schedule of values and progress schedule and report. Listing must include amounts of change orders issued prior to last day of the "period of construction" covered by application.

Initial Payment Application: The principal administrative actions and submittals which must precede or coincide with submittal of first payment application can be summarized as follows, but not necessarily by way of limitation:

- Listing of subcontractors and principal suppliers and fabricators. (Final list).
- Schedule of values.
- Progress schedule (preliminary if not final).
- Schedule of unit prices.
- Schedule of submittals (preliminary if not final).
- Listing of Contractor’s staff assignments and principal consultants.

Copies of acquired building permits and similar authorizations and licenses from governing authorities for current performance of the work.

Performance and/or payment bonds (unless required sooner).

Evidence satisfactory to Owner that Contractor’s insurance coverages have been secured.
Data needed to acquire Owner's insurance coverages.
Initial progress report, including report of pre-construction meeting.

Application at Time of Substantial Completion: Following issuance of Architect's or Engineer's final "Certificate of Substantial Completion", and also in part as applicable to prior certificates on portions of completed work as designated, a "special" payment application may be prepared and submitted by Contractor. The principal administrative actions and submittals which must proceed or coincide with such special applications are summarized in Section 01700 - Project Closeout.

Final Payment Application: The administrative actions and submittals which must precede or coincide with submittal of final payment application can be summarized as follows, but not necessarily by way of limitation:

- Completion of project closeout requirements.
- Completion of items specified for completion beyond time of substantial completion (regardless of whether special payment application was previously made).
- Assurance, satisfactory to Owner, that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.

Application Transmittal: Submit 5 executed copies of each payment application, one copy of which is completed with waivers of lien and similar attachments. Transmit each copy with a transmittal form listing those attachments, and recording appropriate information related to application in a manner acceptable to Architect/Engineer. Transmit to Architect/Engineer by means ensuring receipt within 24 hours.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01027.
SECTION 01035 - MODIFICATION PROCEDURES

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract including General and Supplementary Conditions and Division-1 Specification sections apply to work specified in this section.

Instructions to Bidders – provided by CMGC
Bid Forms – provided by CMGC

END OF SECTION 01035.
SECTION 01045 - CUTTING AND PATCHING

Refer to other Sections of these Specifications, including Divisions-15 and -16, for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

Cutting and Patching Proposal: Where approval of procedures is required before proceeding, submit a proposal describing procedures in advance of the time cutting and patching will be performed. Include the following information, as applicable:

Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.

Describe anticipated results; include changes to structural elements and operating components and changes in the building's appearance and other visual elements.

List products to be used and entities that will perform Work.

Indicate dates when cutting and patching is to be performed.

List utilities that will be disturbed, including those that will be relocated and those that will be temporarily out-of service. Indicate how long service will be disrupted.

Approval by the Architect to proceed does not waive the Architect's right to later require complete removal and replacement of Work found to be unsatisfactory.

Structural Work: Do not cut and patch structural elements in a manner that would reduce the load-carrying capacity or load deflection ratio. Obtain approval of the cutting and patching proposal before cutting and patching structural elements.

Operational and Safety Limitations: Do not cut and patch operating elements or safety components in a manner that would reduce their capacity to perform as intended, or would increase maintenance, or decrease operational life or safety. Obtain approval of the cutting and patching proposal before cutting and patching operating elements or safety related systems:

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

Retain the original installer or fabricator to cut and patch the following categories of exposed Work, or if it is not possible engage a recognized experienced and specialized firm:

- Roof Membranes
- Concrete Masonry

Materials: Use materials identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible. Use materials whose performance will equal or surpass of existing materials.

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

Temporary Support: Provide temporary support of Work to be cut.
Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions that might be exposed during cutting and patching operations.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Take all precautions to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

Performance: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

Cut existing construction to provide for the installation of other components or the performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review procedures with the original installer; comply with the original installer’s recommendations.

Where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.

Comply with requirements of applicable sections of Division-2 where cutting and patching requires excavating and backfilling.

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

Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

Where the removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.

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

Cleaning: Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove paint, mortar, oils, putty and similar items. Thoroughly clean piping, conduit and similar features before painting or finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045.
SECTION 01049 - SUPPORTING FROM STRUCTURE

PART 1 - GENERAL

General Requirements: Requirements of Division 1 apply to all Work in this Section

SCOPE:

Work Included:

This section provides guidelines and limitations for supporting all mechanical, electrical, plumbing, or architectural items from the building structure, and for seismic bracing for all such items.

Install and coordinate all support and bracing systems as indicated in the contract documents. Provide for attachment only to the portions of the building, structure indicated. Coordinate the installation of the various systems to avoid exceeding the loads to the structure specified in this section.

Design and submit for approval any support systems which are different from those shown stamped by a Utah Professional Engineer.

Work not Included:

The contractor is not required to design support and bracing for items for which the contract documents provide specific attachment, support, and bracing. Seismic bracing is not required for the following items:

- Gas piping less than 1 inch inside diameter.
- Piping for boilers and mechanical equipment less than 1.25 inches inside diameter.
- All other piping less than 2.5 inches inside diameter, unless racked together.
- All piping and duct suspended by individual hangers 12 inches or less in length.
- All rectangular air handling ducts less than 6 square feet in cross sectional area.
- All round air handling ducts less than 28 inches in diameter.
- All electrical conduits less than 2.5 inches inside diameter, unless racked together.

RELATED WORK

Structural Steel: Section 05120
Metal Fabrications: Section 05500
Information relating solely to mechanical or electrical work are included under those divisions, except as specifically indicated herein.

QUALITY ASSURANCE

General:

Design and install any support systems not shown to comply with the requirements of the Uniform Building Code as adopted by the State of Utah and stamped by a Utah professional engineer.

For seismic bracing design engage the services of a structural engineer licensed in the State of Utah.

For guidelines regarding seismic bracing for mechanical, electrical and plumbing systems, refer to the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), “Guidelines
Standards and References: (Latest Edition unless specified otherwise)

The General Conditions, Supplementary Conditions, and applicable portions of Division 1 apply to the work of this Section as if printed herein.

If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual or test designation in effect the date of Notice to Proceed with the Work given.

Submittals: (submit under provisions of Section 01300)

Submit shop drawings for all substructures and attachment methods.

For all proposed alternative support systems, submit structural calculations and details prepared and signed by the Contractor’s licensed engineer which include all resultant forces applied to the building structure. Do not overstress building structure. Calculations will be reviewed for compliance with design criteria, not for arithmetic. Calculations and details which deviate from the contract documents must be reviewed by the Structural Engineer of Record and the Building Official. Allow four (4) weeks for review.

PART 2 - PRODUCTS

MATERIALS

Furnish all substructures and fasteners required to comply with the limitations given below. Use materials as specified in the various sections and as appropriate to the use.

All exterior materials: hot dipped galvanized or stainless steel.

PART 3 - EXECUTION

GUIDELINES AND LIMITATIONS

The General Contractor shall coordinate the load requirements from all subcontractors so that no combination of loads exceeds the limitations given below without written approval.

Maximum Loading: Attach no loads greater than the following without specific approval of the Structural Engineer.

- Metal deck without concrete fill - acoustical tile and gypsum board ceilings only; no piping, ducting or conduit. Maximum ceiling weight - 3.5 psf. Maximum wire hanger load = 60 #.

- Metal deck with concrete fill - ceilings as indicated for metal deck without concrete fill above, plus electrical conduits, gas piping and ducting not exceeding 3.0 psf. Maximum point load from trapeze = 200 lbs. At 8’-0” cc each way. Mechanical units hung from concrete filled deck shall not exceed 500 lbs.

- Steel beams and girders: water and gas piping, electrical conduits, ducting and trapeze of same not to exceed 3.0 psf. Maximum load on a single span = 600#. Mechanical units hung from beams shall not exceed 1000# unless specifically indicated on structural plans.

- Cast In Place concrete slabs - ceilings, piping, conduit and ducts shall not exceed 10 psf. Maximum hanger load 600#. Mechanical units hung from slabs shall not exceed 800#.

- Steel Joists - Loads from ceiling, piping, conduit and ducting shall not exceed 8 psf. Maximum
concentrated load = 500 lbs. Per joist.

SEISMIC BRACING

Contractor should coordinate the location with joist supplier.
Design and install seismic bracing so as not to ground out vibration and sound isolation items.

END OF SECTION 01049.
SECTION 01050 - FIELD ENGINEERING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

SUMMARY

General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:

- Layout of the Project.
- Shoring and Bracing Engineering.
- Construction Equipment.
- Support from Structure.
- Storm Water Runoff Protection Plan.
- Other Field Engineering

Except for engineering work to be provided by the owner relative to existing conditions, all grade lines, levels and bench marks shall be established and maintained by the Contractor.

AS-BUILT RECORD DRAWINGS:

The Contractor shall engage a professional surveyor registered with the State of Utah, approved by the Architect, to perform a certified site survey, topography as-built record drawing of the completed Elementary School. These drawings shall be drawn at the same scale as the working drawings and shall precisely locate all utility line/stub-out locations, survey marks used during construction (including bench marks), building corners, exact property line locations, and a legal property description.

This certified as-built survey drawing is required to be submitted to the Architect immediately upon completion of the Elementary School.

PART 2 - PRODUCTS:

Not applicable.

PART 3 - EXECUTION:

Not applicable.

END OF SECTION 01050.
SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

SCHEDULE OF STANDARDS:

American Materials Association - AMA
American Concrete Institute - ACI
American Institute of Architects - AIA
American Institute of Electrical Engineers - AIEE
American Institute of Steel Construction - AISC
American National Standards Institute - ANSI
American Standards Association - ASA
American Society of Mechanical Engineers - ASME
American Society of Testing and Materials - ASTM
American Welding Society - AWS
Concrete Reinforcing Steel Institute - CRSI
Manual of Accident Prevention in Construction
Associated General Contractors of America - AGC
National Board of Fire Underwriters - NBFO
American Insurance Association - AIA
National Concrete Masonry Association - NCMA
National Electric Code
National Fire Protection Association - NFPA
Occupational Safety and Health Act - OSHA
Sheet Metal and Air Conditioning Contractors National Association,
Inc. - SMACNA
Steel Joist Institute - SJI
Tile Council of American - TCI
Underwriter's Laboratory - UL

STANDARDS AND DEFINITIONS:

References to standards, codes, Specifications, recommendations and regulations refer to the latest edition or printing prior to the date of issue of the Contract Documents.

Applicable portions of standards listed that are not in conflict with Contract Documents are hereby made a part of the Specifications.

Modifications or exceptions to Standards shall be considered as amendments and unmodified portions shall remain in full effect. In cases of discrepancies between standards, the more stringent requirements shall govern.

Definitions: Basic Contract definitions are included in the General Conditions.

Indicated refers to graphic representations, notes, or schedules on Drawings; Paragraphs or Schedules in Specifications; and similar requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference.
Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.

Approve, used in conjunction with action on submittals, applications, and requests, is limited to the Architect's duties and responsibilities stated in General and Supplementary Conditions.

Regulation includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

Furnish means "supply and deliver, ready for unloading, unpacking, assembly, installation, and similar operations."

Install describes operations at the site including "unloading, unpacking, assembly, erection, anchoring, applying, working to dimension, protecting, cleaning, and similar operations."

Provide means "furnish and install, complete and ready for use."

Installer: "Installer" is the Contractor or an entity engaged by the Contractor as employee, subcontractor, or sub- subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

The term "experienced" when used with "Installer" means having a minimum of 5 previous Projects similar in size to this Project and being familiar with the precautions required and with requirements of the authority having jurisdiction.

Project Site is the space available for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.

Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERFORMAT numbering system.

Language used in the Specifications is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the context so indicates.

Imperative language is used generally. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.

Abbreviations and Names: Where acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards- generating organization, authority having jurisdiction, or other entity applicable. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents; correspondence and records established in conjunction with compliance with standards; and regulations bearing upon performance of the Work.
SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

PRE-BID CONFERENCE:

Pre-bid conferences between the CM/GC, Owner, Architect and bidders shall be held prior to bid. This meeting is for the purpose of further orienting the bidders to requirements of the Contract Documents, and informing the bidders of the Architect's responsibility to the Owner. Date and Time to be announced by the CM/GC.

PRE-CONSTRUCTION CONFERENCE:

Preconstruction conferences between the CM/GC & Architect and Subcontractors shall be held at the site prior to commencement of the work. This meeting is to be for the purpose of resolving current problems, further orienting Contractor to requirements of the Contract Documents, informing Contractor of Architect's responsibility to Owner for construction observation, and working out with the Contractor a general schedule of construction observation.

PROGRESS MEETINGS

Periodic job site progress meetings will be held by the CM/GC & the Architect to insure all activities are being coordinated properly on the project and to assist in staying on schedule. Status of submittals, changes, progress payments, material delivery, and other matters will be reviewed. The CM/GC will conduct such meetings and will require subcontractors currently involved in the construction progress and those anticipated to begin work in the following period to attend, without exception.

The Architect shall attend these job site progress meetings not less than once every week while construction work is in progress to observe and familiarize himself with the progress and compliance of the work; and to determine for the Owner's benefit if the work is proceeding in accordance with the intent of the Contract Documents. The CM/GC & Architect shall determine if, in their opinion, the construction is proceeding according to schedule. The Architect’s opinion shall be based on bi-weekly updated critical path construction schedules provided by the CM/GC and Architect’s observations. The CM/GC & Architect shall keep the Owner informed of the progress and compliance of the work and inform the Owner of any failure by the Contractor to carry out work in accordance with the intent of the Contract Documents.

PART 2 - PRODUCTS: Not Used.

PART 3 - EXECUTION: Not Used.

END OF SECTION 01200.
SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for alternates.

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

   1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
   2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

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

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

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

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

   D. Schedule: A schedule of alternates is included with the bid form. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

1.5 ALTERNATE SCHEDULE - NONE

END OF SECTION 01230
SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. See Section 00820 Specific Project Requirements.

1.2 SUMMARY

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

B. Related Requirements:

1. Section 01631 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue through CMGC supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

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

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

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

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts (this is a tax exempt project).

4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Section 01635 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 01210 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 01270 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, CMGC will issue a Change Order for signatures of Owner and Contractor.

1.7 CONSTRUCTION CHANGE DIRECTIVE


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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250
PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. Coordination drawings.
   3. Requests for Information (RFIs).
   4. Project Web site.
   5. Project meetings.
B. Related Requirements:
   1. Section 01320 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
   2. Section 01770 "Closeout Procedures" for coordinating closeout of the Contract.
   3. Section 01810 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS
A. RFI: Request from Owner, General Contractor, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS
A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.
B. Key Personnel Names: Within [15] days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
   1. Post copies of list in project meeting room, in temporary field office, on Project Web site, and by each temporary telephone. Keep list current at all times.
1.5 GENERAL COORDINATION PROCEDURES

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

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

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

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

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

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

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect[ and General Contractor].
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
   a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 Software-generated form with substantially the same content as indicated above, acceptable to Architect.
   1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Architect's[ and CMGC's] Action: Architect[ and CMGC] will review each RFI, determine action required, and respond. Allow [seven] working days for Architect's response for each RFI. RFIs received by Architect[ or CMGC] after 1:00 p.m. will be considered as received the following working day.
   1. The following Contractor-generated RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for approval of Contractor's means and methods.
      d. Requests for coordination information already indicated in the Contract Documents.
      e. Requests for adjustments in the Contract Time or the Contract Sum.
      f. Requests for interpretation of Architect's actions on submittals.
      g. Incomplete RFIs or inaccurately prepared RFIs.
   2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
   3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01250 "Contract Modification Procedures."
      a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect[ and General Contractor] in writing within [10] days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of Project Web site. Include the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect[ and General Contractor].
   4. RFI number including RFIs that were returned without action or withdrawn.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date Architect's and CMGC's response was received.

F. On receipt of Architect's and CMGC's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and General Contractor within [seven] days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

A. General: CMGC will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, General Contractor, and Architect, within [three] days of the meeting.

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

C. Project Closeout Conference: CMGC will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than [90] days prior to the scheduled date of Substantial Completion.

D. Progress Meetings: CMGC will conduct progress meetings at weekly intervals.
   1. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
      a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
         1) Review schedule for next period.
      b. Review present and future needs of each entity present.
   2. Minutes: CMGC will record and distribute the meeting minutes to each party present and to parties requiring information.
      a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Coordination Meetings: CMGC will conduct project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01310
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Special reports.

B. Related Requirements:

1. Section 01330 "Submittal Procedures" for submitting schedules and reports.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

PART 2 - PRODUCTS

2.1 CONTRACTOR’S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work the Notice to Proceed to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

2.2 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.3 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within [one] day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of
results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320
SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. See Section 00820 Specific Project Requirements.

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.


1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.


a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

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

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

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

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

   1. Initial Review: Allow [10] working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. [Architect] [Construction Manager] will advise Contractor when a submittal being processed must be delayed for coordination.

   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.


   4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow [15] working days for initial review of each submittal.

   5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow [15] days for review of each submittal. Submittal will be returned to CMGC, through Architect, before being returned to Contractor.

D. Submittals: Place a permanent label or title block on each submittal item for identification.

   1. Indicate name of firm or entity that prepared each submittal on label or title block.

   2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect and CMGC.

   3. Include the following information for processing and recording action taken:

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

         1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).

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

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Construction Manager on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

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

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's and Construction Manager's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's and Construction Manager's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Electronic submittals via general contractor's electronic tracking system.
2. Submit actual samples for items requiring color selections.

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

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams showing factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.

D. Samples: Submit actual samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
   e. Specification paragraph number and generic name of each item.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

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

a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

b. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least [three] sets of paired units that show approximate limits of variations.

E. Coordination Drawing Submittals: Comply with requirements specified in Section 01310 "Project Management and Coordination."

F. Contractor's Construction Schedule: Comply with requirements specified in Section 01320 "Construction Progress Documentation."

G. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01290 "Payment Procedures."

H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01400 "Quality Requirements."

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01770 "Closeout Procedures."

J. Maintenance Data: Comply with requirements specified in Section 01782 "Operation and Maintenance Data."

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

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

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

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

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

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

Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on
evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

T. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

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

V. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

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

2.2 DELEGATED-DESIGN SERVICES

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

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

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

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
PART 3 - EXECUTION

3.1 CMGC’s REVIEW

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

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01770 "Closeout Procedures."

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

3.2 ARCHITECT’S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

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

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01330
SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The testing and inspection requirements specified herein will be provided and paid for by the Owner, unless noted otherwise. These requirements are indicated for the Contractor's information, and also to indicate the cooperation and assistance which the contractor will be required to extend to both the Contractor's and Owner's testing/inspection agencies.

The Owner will select and retain an independent testing agency to provide inspections/tests as listed below and as required by the specification sections and drawings for this project. The testing and inspection work shall not relieve the Contractor from the responsibility for correctness, completeness, and quality of the General Contractor's work and it is still the Contractor's responsibility to provide work that conforms to the indicated/specified criteria within the Contract Documents.

Before work which may require inspection or testing is started, the Contractor shall give the Architect, Engineer and Agency at least 48 hours advance notice. The Contractor shall cooperate with the Agency, Architect and Engineer at all times and shall provide facilities for such access in order that the Agency may properly perform its function.

Inspections or tests required by codes or ordinances, or by plan approval authority and made by a legally constituted authority shall be paid for by the Contractor. Inspection or testing performed exclusively for the Contractor's convenience shall be paid for by the Contractor. Also, costs for other additional inspections and tests required because of defective work or ill-timed notices shall be at the Contractor's expense. Architectural, Engineering and Administrative Services incurred as a result of failure of materials/work to meet specified tests shall also be borne by the Contractor per the following rates (at no additional expense to the Owner):

- Principal In Charge 160 $/hr.
- Project Architect: 135 $/hr.
- Engineer: 150 $/hr.

Services to be performed by the testing and inspection agencies are as indicated in the specification sections and drawings.

The General Contractor and the testing agency shall familiarize themselves with all applicable portions of the contract documents pertaining to areas requiring testing and inspection prior to performing these services.

Refer to individual sections for specific requirements for field quality control.

Architect as Owner's Representative:

The Architect shall be a representative of and shall advise and consult with the Owner (1) during construction until final payment to the contractor is due (2) from time to time during the correction period described in the Standard Form of Agreement Between Owner and Contractor and (3) during warranty periods of all construction till end of statute of limitations period. The Contractor shall reimburse the Architect for services listed in items (1), (2), and (3) above if Architect is required to represent the Owner for resolving construction deficiencies caused by the Contractor's failure to perform construction according to contract documents per the following rates:

QUALITY CONTROL
CACHE HIGH SCHOOL

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Principal-in-Charge: 160 $/hr.
Project Architect: 135 $/hr.
Project Engineer: 150 $/hr.

END OF SECTION 01400.
SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes requirements for temporary utilities, support facilities, and security and
      protection facilities.
   B. See 00820 Specific Project Requirements for temporary facilities and controls.

1.3 USE CHARGES – See Specific Project Requirements.

1.4 QUALITY ASSURANCE
   A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary
      electric service. Install service to comply with NFPA 70.
   B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each
      temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. Chain-Link Fencing: Galvanized-steel, chain-link fabric fencing; minimum 6 feet high with
      galvanized-steel pipe posts; line posts and corner and pull posts and top rails.
   B. Portable Chain-Link Fencing: Galvanized-steel, chain-link fabric fencing; minimum 6 feet high
      with galvanized-steel pipe posts; line posts and corner and pull posts and top rails.

2.2 EQUIPMENT
   A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by
      locations and classes of fire exposures.
   B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented,
      self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
      1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating
         units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of [8] at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01770 "Closeout Procedures".

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

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

G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
   1. Install electric power service overhead unless otherwise indicated.
   2. Connect temporary service to Owner's existing power source, as directed by Owner.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
   2. Telephone Service: Post a list of important telephone numbers.
      a. Police and fire departments.
      b. Ambulance service.
      c. Contractor's home office.
      d. Contractor's emergency after-hours telephone number.
      e. Architect's office.
      f. Engineers' offices.
      g. Owner's office.
      h. Principal subcontractors' field and home offices.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Provide construction for temporary offices, shops, and sheds located within construction area.
   2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

E. Project Signs: Provide Project signs as indicated.
   1. Maintain and touchup signs so they are legible at all times.

F. Waste Disposal Facilities: Comply with requirements specified in Section 01524 "Construction Waste Management."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 02230 "Site Clearing."

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
   1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
   2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
   3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
   4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

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

F. Tree and Plant Protection: Protect tree and plant areas indicated to remain or which are outside the limits of construction.

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

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

I. Site Enclosure Fence: Furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As approved by Owner.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

K. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

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

   1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

M. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
   4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL


B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

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

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

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

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer’s written instructions for temperature, relative humidity, and exposure to water limits.
   a. Remove materials that can not be completely restored to their manufactured moisture level within [48] hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

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

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

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

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

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

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01770 “Closeout Procedures.”

3.7 SAFETY PROTECTION

A. Provide and maintain safety protection measures as required by Owner for the protection of faculty, students and other users of the site by the school when in use. Provide safety plan for review by Owner.

END OF SECTION 01500
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

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

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words “equivalent” “basis-of-design product,” including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

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

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of
proposed comparable product request within [15] days of receipt of request, or [seven]
days of receipt of additional information or documentation, whichever is later.

a. Form of Approval: As specified in Section 01330 “Submittal Procedures.”
b. Use product specified if Architect does not issue a decision on use of a
comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01330
“Submittal Procedures.” Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more
products for use on Project, select product compatible with products previously selected, even if
previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods
compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible
products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent
overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that
are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other
losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original
sealed container or other packaging system, complete with labels and instructions for
handling, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and
to determine that products are undamaged and properly protected.

C. Storage:

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

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

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

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

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

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," or "or equivalent" comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01635 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

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

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600
SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions: Closeout is hereby defined to include general requirements near end of Contract Time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in sections of Division 2 through 16.

B. Submit Project Closeout Documents to Architect at time of Substantial Completion inspection unless otherwise noted.

PART 2 - PRODUCTS – Not used

PART 3 - EXECUTION

3.1 RECORD DOCUMENT SUBMITTALS:

A. General: Specific requirements for record documents are indicated in individual sections of these specifications. Other requirements are indicated in General Conditions. General submittal requirements are indicated in "Submittals" sections. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire resistive location; provide access to record documents for Architect's/Engineer's reference during normal working hours.

3.2 RECORD DRAWINGS:

A. Maintain a separate print set of contract drawings and shop drawings in clean, undamaged condition, marked to record all changes made during construction. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other categories of work. Mark-up new information which is recognized to be of importance to Owner, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work, which would be difficult to measure and record at a later date. Note related change-order numbers where applicable. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.

B. Contractor shall maintain a set of prints in good condition in his field office. Installation of any work in locations or in a manner other than shown on the drawings shall be recorded daily by the Contractor on the drawings. The Contractor shall see that all subcontractors shall do likewise. Dimensions shall be given to permanent objects such as building columns, buildings, sidewalls, curbs and driveways and/or grids.

C. Whenever necessary to complete the record drawings in a neat, legible manner, Contractor shall employ a competent draftsman, satisfactory to Architect, to make new drawings or to indicate changes on the prints.

D. On or before the date of final inspection, the Contractor shall deliver the corrected and completed prints to the Architect as a record of construction. Delivery of the prints to the Architect will not relieve Contractor of the responsibility of furnishing required information that may be omitted from
the prints. Delivery of the prints must be made before payment of the final retained percentage.

E. Refer to Section 01050 for As-Built Survey Drawing requirements.

3.3 FINAL CLEANING:

A. General: Special cleaning for specific units of work is specified in sections of Divisions 2 through 16. General cleaning during progress of work is specified in General Conditions. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, for cleaning levels required.

B. Remove labels which are not required as permanent labels.

C. Clean exposed exterior hard-surfaced finishes, to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.

D. Clean light fixtures and lamps so as to function with full efficiency.

E. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.

F. Removal of Protection: Except as otherwise indicated or requested by Architect/Engineer, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.

G. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner’s property, or discharge volatile or other harmful or dangerous material into drainage systems; remove waste materials from site and dispose of in a legal manner.

3.4 PREFINAL AND FINAL INSPECTIONS:

A. The CM/GC will prepare a written punch list of items to be completed or repaired and affixed to each room to be signed off by the affected subcontractor and CM/GC prior to requesting a pre-final inspection by the Architect.

B. Upon Contractor’s request, Architect (and his consultants as appropriate) will make a prefinal inspection and furnish to Contractor a list of items to be corrected by Contractor. Upon correction of these items, and receipt of written request that work is ready for final inspection, Architect will arrange a substantial completion inspection to include Owner’s Representatives at which time Architect will furnish final list of items to be corrected. Architect will execute Certificate of Substantial Completion according to Article 9.8 of the General Conditions and for voiding the liquidated damages requirement contained in Document 00820 - Supplementary Conditions.

3.5 MAINTENANCE MANUALS:

A. Organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed). Include emergency instructions, spare parts listing, extra stock receipts, copies of warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data, and similar applicable information. Bind each manual of each set in a heavy-duty 2", 3-ring vinyl covered binder, and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder. Provide (1) manual.

3.6 PROJECT CLOSEOUT DOCUMENTS

PROJECT CLOSEOUT
CACHE HIGH SCHOOL
A. Submit the following closeout forms:
   Certificate of Substantial Completion
   Maintenance Manuals
   Contractor’s One-year Guarantee
   Record Drawings

3.9 WARRANTIES, GUARANTEES, and CERTIFICATIONS: (If Applicable)

Minimum 1 year warranty from Date of Substantial completion and specified warranties as follows:

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>02900</td>
<td>Landscaping</td>
<td>1 year</td>
</tr>
<tr>
<td>07180</td>
<td>Water repellant</td>
<td>5 year written warranty</td>
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<tr>
<td>07540</td>
<td>Flexible Sheet Membrane Roofing</td>
<td>20 year manufacturer written warranty</td>
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<td></td>
<td>2 year installer’s written warranty</td>
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<tr>
<td>07821</td>
<td>Metal Wall Panels</td>
<td>5 year panel finish</td>
</tr>
<tr>
<td>07920</td>
<td>Joint Sealants</td>
<td>Manufacturer’s standard</td>
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<td></td>
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<td>2 year installers</td>
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<tr>
<td>08211</td>
<td>Flush Wood Doors</td>
<td>Manufacturer lifetime of installation</td>
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<tr>
<td>08711</td>
<td>Door Hardware</td>
<td>Manufacturer 3 year general</td>
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<td></td>
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<td>Cylinder locks 10 years</td>
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<td>Exit devices 5 years</td>
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<td>Closers 30 years</td>
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<td>Gymnasium Flooring Wood</td>
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<td>09680</td>
<td>Carpet</td>
<td>25 year</td>
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<td>09841</td>
<td>Tackable Panels &amp; Acoustic Sound Panels</td>
<td>2 year manufacturer written warranty</td>
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<tr>
<td>10100</td>
<td>Visual Display Surfaces</td>
<td>Life of building</td>
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<tr>
<td>10801</td>
<td>Toilet and Bath Accessories</td>
<td>15 year manufacturers written</td>
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<tr>
<td>12494</td>
<td>Roller Shades</td>
<td>10 year hardware &amp; shade cloth</td>
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<td>5 year on motors</td>
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<td>2 year on electric controls</td>
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<tr>
<td>12500</td>
<td>Window Coverings</td>
<td>5 year</td>
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<td>Voice/Data (LAN) Distribution System</td>
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<td>15547</td>
<td>Water Softener</td>
<td>3 year</td>
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<td>15460</td>
<td>Water Heater</td>
<td>5 year manufacturer written warranty</td>
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<td>15784</td>
<td>Rooftop Make-up Air Heating and Cooling Units</td>
<td>5 year manufacturer written warranty</td>
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<td>15786</td>
<td>Water Source Heat Pump</td>
<td>1 year parts, 5 year compressor</td>
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<td>15971</td>
<td>Automatic Temperature Controls</td>
<td>1 year</td>
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<td>16481</td>
<td>Motor Controllers</td>
<td>Manufacturer standard plus 1 year</td>
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<td>16515</td>
<td>Interior Lighting</td>
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<td>16525</td>
<td>Exterior Lighting</td>
<td>5 year</td>
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<td></td>
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<td>1 year all parts</td>
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<tr>
<td>16820</td>
<td>Lighting Controls</td>
<td>10 years</td>
</tr>
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</table>

END OF SECTION 01700.
SECTION 01740 - WARRANTIES AND BONDS

Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

Special Warranties are written warranties required by or incorporated in Contract Documents, to extend time limits provided by standard warranties or to provide greater rights for the Owner.

Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.

Requirements for warranties for products and installations that are specified to be warranted, are included in the individual Sections of Divisions-2 through -16.

Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors required to countersign special warranties with the Contractor.

Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

Replacement Cost: On determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through part of its useful service life.

Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

Rejection of Warranties: The Owner reserves the right to reject warranties and limit selections to products with warranties not in conflict with requirements of the Contract Documents.

The Owner reserves the right to refuse to accept Work where a special warranty, or similar commitment is required, until evidence is presented that entities required to countersign commitments are willing to do so.

Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion, submit written warranties on the Architect's request. When a designated portion of the Work is completed and occupied or used, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.

When a special warranty is to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
Special warranty forms are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the Owner through the Architect for approval prior to final execution.

Refer to individual Sections of Divisions-2 through -16 for specific content, and particular requirements for submittal of special warranties.

Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.

Provide heavy paper dividers with celluloid covered tabs for each warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.

Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.

When operating and maintenance manuals are required for warranted construction, provide additional copies of each warranty, as necessary, for inclusion in each required manual.

END OF SECTION 01740
SECTION 01810 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Prepared by Owner and Architect contains requirements that apply to this Section.

B. This Section includes:
   1. Commissioning of HVAC systems as a part of building close out and acceptance by Owner.
      a. Controls Verification
      b. Functional Performance Testing

1.3 DEFINITIONS

A. BoD: Basis of Design.

B. CxA: Commissioning Authority.

C. OPR: Owner's Project Requirements.

1.4 DESCRIPTION

A. The owner has elected to Commission HVAC systems as part of their quality process to construct and operate this building.
   1. Scope of commissioning is a part of building closeout and acceptance by owner to ensure that the final building meets the design intent of the design team and the owner.

B. Commissioning is the verification of the operation of systems, including heating and cooling systems in all modes of operation to ensure the building is ready for year-round occupancy.

C. The owner is financially responsible for contracting the services of the CxA to perform the CxA duties as specified in this section.

D. Systems to be commissioned:
   1. Mechanical Systems
      a. Building HVAC System and Controls

1.5 COMMISSIONING TEAM

A. Members Appointed by Contractor(s):
1. Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions.

2. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner.
   1. CxA: Company that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
   2. Representatives of the Owner’s facility user and operation and maintenance personnel.
   3. Architect and engineering design professionals.

1.6 OWNER’S RESPONSIBILITIES

A. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to the following:
   1. Training in operation and maintenance of systems, subsystems, and equipment
   2. On-Site Inspections
   3. Demonstration of operation of systems, subsystems, and equipment.

1.7 CONTRACTOR’S RESPONSIBILITIES

A. Provide utility services required for the commissioning process.

B. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
   1. Provide scheduling input to the CMGC.
   2. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA.
   3. Participate in training sessions for Owner’s operation and maintenance personnel.
   4. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA as specified in Division 01 Section “Operation and Maintenance Data.”
   5. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

1.8 CxA’S RESPONSIBILITIES

A. Attend, witness, and document tests, inspections, and systems startup.

B. Prepare commissioning report.

1.9 COMMISSIONING DOCUMENTATION

A. Test and Inspection Reports:
   1. CxA shall record test date, observe.

B. Corrective Action Documents:
1. CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any.
2. Retest systems and equipment requiring corrective action and document retest results.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested. For example, the mechanical contractor shall ultimately be responsible for all standard testing equipment for the HVAC system and controls system, except for equipment specific to and used by TAB in their commissioning responsibilities.

PART 3 - EXECUTION

3.1 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. Training:
   1. Construction Manager shall conduct training to include Owner’s operation and maintenance personnel, Contractor, subcontractors, architect, engineers.

3.2 DEFERRED TESTING

A. Unforeseen Deferred Tests. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the Contractor. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.

B. Seasonal Testing. During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system’s design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate Subs, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-builds due to the testing will be made by the contractor.

END OF SECTION 01810
DIVISION 02 - SITE WORK
02213  Sanitary Sewerage Systems
02221  Selective Structure Demolition
02230  Site Clearing
02250  Site Excavation & Rough Grading
02300  Earthwork
02325  Excavation Support and Protection
02350  Erosion Control
02360  Topsoil Placement & Grading
02510  Potable Water Systems
02630  Storm Drainage
02740  Asphalt Paving
02750  Concrete Paving
02763  Pavement Markings
02800  Site Accessories
02810  Irrigation Systems
02821  Chain-Link Fences & Gates
02900  Landscaping
SECTION 02213 - SANITARY SEWAGE SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY.

A. Section includes sanitary sewage systems.

B. Related Sections: Related Sections include the following:
   1. 02213  Sanitary Sewage Systems
   2. 02230  Site Clearing
   3. 02250  Site Excavation & Rough Grading
   4. 02300  Earthwork
   5. 02350  Erosion Control
   6. 02360  Topsoil Placement & Grading
   7. 02630  Storm Drainage
   8. 02740  Asphalt Paving
   9. 02810  Irrigation
   10. 02900  Landscaping

1.2 QUALITY ASSURANCE:

A. Codes and Standards:
   2. Local Regulations: Comply with governing regulations and standards of local government having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

A. Acceptable Manufacturer: Subject to compliance with requirements, provide products of one of the following:
   1. Line Markers:
      a. Allen Systems, Inc.
      b. Emed Co., Inc.
      c. Northtown Company

2.2 IDENTIFICATION:

A. Underground-Type Detectable Warning Tape: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green tape with black printing reading "CAUTION SEWER LINE BURIED BELOW".

2.3 PIPES AND PIPE FITTINGS:
A. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
   1. Cast-Iron Soil Pipe: ASTM A 74, hub and spigot ends, service weight unless otherwise indicated.
      a. Fittings: Cast-iron hub and spigot ends, standard strength unless otherwise indicated.
   2. Concrete Pipe: ASTM C 14, Class III non-reinforced concrete pipe, unless otherwise indicated.
      a. Fittings: Concrete, same strength as adjoining pipe, tongue and groove gasketed joints complying with ASTM C 443.
   3. Polyvinyl Chloride (PVC) Sewer Pipe: ASTM D 3034, Type PSM, SDR 35.
      a. Fittings: ASTM 3034, bell and spigot joints.

2.4 SANITARY SEWER MANHOLES:

A. Provide precast reinforced concrete sanitary manholes as indicated, and complying with ASTM C 478.
   1. Top: Precast concrete, of concentric cone, eccentric cone, or flat slab top type, as indicated.
   2. Base: Precast concrete, with base riser section and separate base slab, or base riser section with integral floor, as indicated.
   3. Steps: Ductile-iron or aluminum, integrally cast into manhole sidewalls.
   4. Frame and Cover: Ductile-iron, 21-3/4" diameter cover, heavy-duty, indented top design, with lettering cast into top reading "SANITARY SEWER".
   5. Pipe Connectors: Resilient, complying with ASTM C 923.

2.5 CLEANOUTS:

A. Pipe extension to grade with ferrule and countersunk cleanout plug. Round cast-iron access frame over cleanout, with heavy-duty secured scoriated cover with lifting device.

PART 3 - EXECUTION

3.1 INSTALLATION OF IDENTIFICATION:

A. During back-filling/top-soiling of sanitary sewage systems, install continuous underground-type detectable warning tape, located directly over buried line at 6" to 8" below finished grade.

3.2 INSTALLATION OF PIPE AND FITTINGS:

A. Install piping in accordance with governing authorities having jurisdiction, except where more stringent requirements are indicated.
   1. Inspect piping before installation to detect apparent defects. Mark defective materials with white paint and promptly remove from site.
   2. Lay piping beginning at low point of system, true to grades and alignment indicated, with unbroken continuity of invert.
   3. Place bell ends or groove ends of piping facing upstream.
   4. Install gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements.
   5. Runs shall be as close as possible to those shown on drawings.

B. Pipe:
1. **Cast-Iron Pipe:** Install in accordance with applicable provisions of CISPI "Cast Iron Soil Pipe and Fittings Handbook".

2. **Concrete Pipe:** Install in accordance with applicable provisions of ACPA "Concrete Pipe Installation Manual".

3. **Plastic Pipe:** Install in accordance with manufacturer’s installation recommendations, and in accordance with ASTM D 2321.

**C. Cleaning Pipe:** Clear interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.

   1. In large, accessible piping, brushes and brooms may be used for cleaning.
   2. Place plugs in ends of uncompleted conduit at end of day or whenever work stops.
   3. Flush lines between manholes if required to remove collected debris.

**D. Joint Adapters:** Make joints between different types of pipe with standard manufactured adapters and fittings intended for that purpose.

**E. Interior Inspection:** Inspect piping to determine whether line displacement or other damage has occurred.

   1. Make inspections after lines between manholes, or manhole locations, have been installed and approximately 2-ft of backfill is in place, and again at completion of project.
   2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects, and reinspect.

**3.3 SANITARY MANHOLES:**

**A.** Place precast concrete sections as indicated. Where manholes occur in pavements, set tops of frames and covers flush with finish surface. Elsewhere, set tops 3” above T.O. soil surface, unless otherwise indicated.

   1. Install in accordance with ASTM C 891.
   2. Apply bituminous mastic coating at joints of sections.

**3.4 TAP CONNECTIONS:**

**A.** Make connections to existing piping and underground structures, so that finished work will conform as nearly as practicable to requirements specified for new work.

**B.** Use commercially manufactured wyes for branch connections. Field cutting into piping will not be permitted. Spring wyes into existing line and encase entire wye, plus 6” overlap, with not less than 6” of 4,000 psi 28-day compressive strength concrete.

**C.** Take care while making tap connections to prevent concrete or debris from entering existing piping or structure. Remove debris, concrete, or other extraneous material which may accumulate.

**3.5 BACKFILLING:**

**A.** Conduct backfilling operations of open-cut trenches closely following laying, jointing, and bedding or pipe, and after initial inspection and testing are completed.

**3.6 FIELD QUALITY CONTROL:**

**A.** Testing Agency: The Owner will employ and pay a qualified independent testing agency to
perform field quality-control testing services specified in this section. Retesting of materials failing to meet specified requirements shall be done at Contractor’s expense.

B. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction.
SECTION 02221 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of building or structure.
   2. Demolition and removal of selected site elements.
   3. Salvage of existing items to be reused or recycled.

B. See Section 02230 "Site Clearing" for site clearing and removal of above- and below-grade improvements.

1.2 DEFINITIONS

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

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

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

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

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

B. Predemolition Photographs or Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Comply with Division 01 requirements "Submit before Work begins.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

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

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

E. Predemolition Conference: Conduct conference at Project site.

F. LEED Requirements for Building Reuse:
   1. Credit MR 1.1 and 1.2: Maintain existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and nonstructural roofing material) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.
   2. Credit MR 1.3: Maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.
   3. Credit MR 1.2 and 1.3: Maintain existing nonshell, nonstructural components (walls, flooring, and ceilings) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.

1.5 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

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

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

D. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

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

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

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

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

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

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
   1. Comply with requirements specified in Division 01 Section "Photographic Documentation."

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

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

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

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Reuse of Building Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish building elements beyond what is indicated on Drawings without Architect's approval.

C. Removed and Salvaged Items:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be [recycled,] reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.
C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

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

END OF DOCUMENT 02221
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Removing trees and other vegetation.
2. Tree Protection
3. Clearing and grubbing.
4. Topsoil stripping.
5. Removing above-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities.

B. Related Sections include the following:
1. 02213  Sanitary Sewage Systems
2. 02230  Site Clearing
3. 02250  Site Excavation & Rough Grading
4. 02300  Earthwork
5. 02350  Erosion Control
6. 02360  Topsoil Placement & Grading
7. 02630  Storm Drainage
8. 02740  Asphalt Paving
9. 02810  Irrigation
10. 02900  Landscaping

1.3 DEFINITIONS

A. Topsoil:  Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

A. Materials indicated to be stockpiled or to remain are the Owner's property. Cleared materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS

A. Photographs, DVD or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
B. Record drawings:
   1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

A. Pre-installation Conference: Conduct conference at Project Site

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing indicated removal and/or access on property adjoining Owner's property will be obtained by Owner before award of Contract.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

D. Notification: Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TREE PROTECTION

A. Erect and maintain a 6’ tall temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Minimum distance of fence from trunk of tree to remain shall be 10’. Remove fence only as necessary for daily construction, fence shall remain in place during the course of construction to prevent unintended impacts.
   1. Do not store construction materials, debris, or excavated material within drip line of
remaining trees.
2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-line spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Landscape Architect.
1. Submit details of proposed repairs and to repair damage to trees and shrubs.
2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified arborist.

3.3 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
1. Arrange to shut off indicated utilities with utility companies.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Engineer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Engineer’s written permission.

C. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

A. Remove obstructions, asphalt & concrete paving, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed sub grade.
4. Use only hand methods for grubbing within drip line of remaining trees.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth,
and compact each layer to a density equal to adjacent original ground.

### 3.5 TOPSOIL STRIPPING

A. Remove sod, grass, asphalt and concrete paving before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
   1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil.
   Grade and shape topsoil stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
   2. Do not stockpile topsoil within drip line of remaining trees.
   3. Dispose of excess topsoil as specified for waste material disposal.
   4. Stockpile surplus topsoil and allow for respreading deeper topsoil.

### 3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
   1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

### 3.7 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

END OF DOCUMENT 02230
1.1 DESCRIPTION

A. Definitions:
   1. Unsuitable material: Debris and/or soil material judged unsuitable by Engineer for support of slabs or other site improvements.
   2. Engineer: Soils Engineer employed by Owner, empowered to conduct inspections and make approvals.

1.2 RELATED SECTIONS

Related Sections include the following:

1. 02213 Sanitary Sewage Systems
2. 02230 Site Clearing
3. 02250 Site Excavation & Rough Grading
4. 02300 Earthwork
5. 02350 Erosion Control
6. 02360 Topsoil Placement & Grading
7. 02740 Asphalt Paving
8. 02630 Storm Drainage
9. 02810 Irrigation
10. 02900 Landscaping

1.3 QUALITY ASSURANCE

A. Compaction density test:
   1. Modified Proctor, ASTM-D 1557.

B. Layout work by Surveyor or Civil Engineer registered in the State of Utah. Identify benchmark to be used in establishing grades.

C. Owner will hire an independent soils laboratory to conduct in place moisture and density tests.

D. Tolerances of sub-grade:
   1. Unsurfaced areas: Plus/minus 0.20 FT from required elevations.
   2. Paved areas: Plus/minus 0.10 FT from required elevations.

1.4 JOB CONDITIONS

A. Protect existing facilities, utilities (overhead and underground), sidewalks, pavement.
   1. Repair damaged items.
   2. Notify Owner and make emergency repair as directed.

B. Protect graded areas against erosion.
   1. Re-establish grade where settlement or washing occurs at no extra cost.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Fill materials:
   1. Reasonably free of roots, organic material, trash, frozen matter, and stones larger than 6 IN.
   2. Add water to dry material, as required.
   3. Allow wet material to dry, as required.
   4. Fill can only be obtained on site where removed from excavating and grading.
   5. Provide additional off-site borrow or fill as required.

B. Surplus material:
   1. Remove from site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Layout units, structures, piping, roads, parking areas and walks and establish their elevations.
B. Perform other layout work required.
C. Preparation for embankments and fills:
   1. Remove topsoil over areas to be cut and filled that was not previously removed by stripping and grubbing.
   2. Remove all unconsolidated fill and topsoil contact Engineer for inspection of subsoils.
   3. Before fill is started, scarify to a minimum depth of 6 IN under new roads, parking lots, or streets.
   4. Before fill is started, scarify to a minimum depth of 6 IN under all infiltration trenches.
   5. Bring to optimum moisture content.
   6. Compact to a minimum 95 percent.
   7. In areas where existing ground surface is steeper than one vertical to four horizontal, bench surface in order to spread fill horizontally so that fill material will bond with existing surface.

3.2 GENERAL

A. Excavate and grade materials to design elevations.
B. Excavate and grade site to subgrades of paved and unpaved areas as indicated.
C. Excavate for miscellaneous footings, slabs, walks and other structures.
D. Cut and fill as required to bring existing grades to rough grades.
E. Furnish and place additional approved material required to bring subgrade to proper line and grade.
F. During construction, shape and drain embankments and excavation.
G. Maintain ditches and drains to provide drainage.
H. Provide pumping if required.
I. Remove unsuitable materials which cannot be compacted as specified and replace with suitable material.
   1. Dispose material on site as directed.
   2. Dispose material off site as directed.
J. Remove materials unsuitable to receive fill and replace with suitable material.

3.3 CONSTRUCTION OF EMBANKMENTS AND FILLS

A. Construct embankments and fills to lines and grades.
B. Make completed fill correspond to shape of typical cross section or contour indicated regardless of method used to indicate shape, size, and extent of line and grade of work.
C. Insure that cobbles larger than 4 IN, are not placed in upper 6 IN of fill or embankment.
D. Place material in lifts, maximum 8 IN loose thickness.

E. Place layers horizontally and compact each layer to specified density prior to placing additional fill.

F. Compact using suitable equipment.
   1. Control moisture to meet requirements of compaction.
   2. Place materials within 3 percent above to 3 percent below optimum moisture content.

G. Under roadways and parking areas and extending 1 FT beyond proposed curb line measured perpendicular from centerline, compact to 95 percent maximum dry density.

H. Under walk paving, compact to 95 percent maximum dry density.

I. For other embankments and fills not listed, compact to 90 percent of maximum dry density.

J. Under proposed building and structures, compact to density as specified in Section 03300.

END OF DOCUMENT 02250
SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for slabs-on-grade.
4. Sub-base course for concrete walks and pavements.
5. Base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling trenches within building lines.
8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

B. Related Sections include the following:
1. 02213 Sanitary Sewage Systems
2. 02230 Site Clearing
3. 02250 Site Excavation & Rough Grading
4. 02300 Earthwork
5. 02350 Erosion Control
6. 02360 Topsoil Placement & Grading
7. 02740 Asphalt Paving
8. 02630 Storm Drainage
9. 02810 Irrigation
10. 02900 Landscaping

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Layer placed between the subbase course and asphalt paving.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
F. Excavation: Removal of material encountered above subgrade elevations.
   1. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
   2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Sub-base Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.

K. Utilities: Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

1.5 PROJECT CONDITIONS

A. Site Information: A site topographic survey and demolition plan have been prepared to represent the existing site conditions. It is up to the Contractor to verify the actual on-site conditions. It shall be the Contractor’s responsibility to identify all elements necessary for demolition in order to prepare the site for the new installation.

B. No additional moneys for exporting or importing of soil.
   1. As part of the Construction Documents, Owner may have provided Contractor with a Topographic Survey performed by manual or aerial means. Such Survey was prepared for project design purposes and is provided to the Contractor as a courtesy. It is expressly understood that such survey may not accurately reflect existing topographical conditions and typically will vary from actual conditions by a significant degree. It is the Contractor’s responsibility to verify actual existing conditions by whatever means the Contractor deems appropriate. The Contractor shall be responsible for determining their own earthwork quantities and not rely on any estimate prepared by the Owner, its Agents or outside parties. The Contractor is responsible as part of its lump sum bid price for the project, for importing or exporting soils to achieve final sub-grades with suitable soils per the plans and specifications. No additional moneys will be allowed beyond the Contractor’s Lump Sum Bid Price for the project, for the exporting or importing of soils.

C. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to
remain in place, provide adequate means of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated:

3. Notify Engineer not less than seven (7) days in advance of proposed utility interruptions.

4. Do not proceed with utility interruptions without Engineer’s written permission.

5. Contact utility-locator service for area where Project is located before excavating.

D. Utilities to be removed: Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

E. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 4 inches (100 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Backfill and Fill: Satisfactory soil materials.

E. Subbase: Naturally or artificially well graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 70 percent passing a 3/4-inch (18-mm) sieve and not more than 25 percent passing a No. 200 (0.075-mm) sieve.

F. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; conforming to the 1 inch gradation requirements of Section 301 of the UDOT Standard Specification for Road and Bridge Construction.

G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 70 percent passing a 3/4-inch (18-mm) sieve and not more than 25 percent passing a No. 200 (0.075-mm) sieve.
H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

I. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone and other communications.
   4. Blue: Water systems.
   5. Green: Sewer systems.

C. Trace Wire: Insulated 10 gage copper, suitable for direct bury.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
   2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES
A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL
A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES
A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
   1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. If required to not disturb bottom of excavation, excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
   2. Excavation for Underground Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended for bearing surface.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS
A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES
A. Trench Excavation: Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
B. Trench Clearance: Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 12 inches (300 mm) on each side of pipe or conduit.
C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
1. For pipes and conduit less than 6 inches (150 mm) in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 TRENCH SUPPORT SYSTEMS

A. Trench support system shall be suitable for the soil structure, depth of cut, water content of soil, weather conditions, superimposed loads and vibration. Contractor may select one of the following methods of ensuring the safety of workers in the trench, as approved by the Utah State Industrial Commission or its safety inspectors:
1. Sloping the sides of the trench to the angle of repose at which the soil will remain safely at rest.
2. Shoring trench sides by placing sheeting, timber shores, trench jacks, bracing, piles, or other materials to resist pressures surrounding the excavation.
3. Using a movable trench box built-up of steel plates and heavy steel frame of sufficient strength to resist the pressures surrounding the excavation.

3.9 APPROVAL OF SUBGRADE

A. Notify Engineer when excavations have reached required subgrade.
B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Engineer.
1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Inspecting and testing underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.13 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings; fill with concrete to elevation of bottom of footings.

C. Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.

D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.
   1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

E. Coordinate backfilling with utilities testing.

F. Place and compact final backfill of satisfactory soil material to final subgrade.

G. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.14 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

3.15 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.16 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
   1. Under structures, building slabs, steps, and pavements, scarify and recompact top 6 inches (150 mm) of existing subgrade and each layer of backfill or fill material at 95 percent. Compact to 98 percent for fills thicker than 6 feet deep.
   2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 95 percent.
   3. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 90 percent.

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).
   2. Walks: Plus or minus 1 inch (25 mm).
   3. Pavements: Plus or minus 1/2 inch (13 mm).

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.18 SUBBASE AND BASE COURSES
A. Under pavements and walks, place subbase course on prepared subgrade and as follows:
   1. Place base course material over subbase.
   2. Compact subbase and base courses at optimum moisture content to required
      grades, lines, cross sections, and thickness to not less than 95 percent of
      maximum dry unit weight according to ASTM D 1557.
   3. Shape subbase and base to required crown elevations and cross-slope grades.
   4. When thickness of compacted subbase or base course is 6 inches (150 mm) or
      less, place materials in a single layer.
   5. When thickness of compacted subbase or base course exceeds 6 inches (150
      mm), place materials in equal layers, with no layer more than 6 inches (150 mm)
      thick or less than 3 inches (75 mm) thick when compacted.

B. Pavement Shoulders: Place shoulders along edges of subbase and base course to
   prevent lateral movement. Construct shoulders, at least 12 inches (300 mm) wide, of
   satisfactory soil materials and compact simultaneously with each subbase and base layer
   to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.19 DRAINAGE COURSE

A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
   1. Compact drainage course to required cross sections and thickness to not less than
      95 percent of maximum dry unit weight according to ASTM D 698.
   2. When compacted thickness of drainage course is 6 inches (150 mm) or less, place
      materials in a single layer.
   3. When compacted thickness of drainage course exceeds 6 inches (150 mm), place
      materials in equal layers, with no layer more than 6 inches (150 mm) thick or less
      than 3 inches (75 mm) thick when compacted.

3.20 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering
   testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed
   with subsequent earthwork only after test results for previously completed work comply
   with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be
   performed to verify design bearing capacities. Subsequent verification and approval of
   other footing subgrades may be based on a visual comparison of subgrade with tested
   subgrade when approved by Engineer.

D. Testing agency will test compaction of soils in place according to ASTM D 1556,
   ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed
   at the following locations and frequencies:
   1. Paved and Building Slab Areas: At subgrade and at each compacted fill and
      backfill layer, at least one test for every 1000 sq. ft. (186 sq. m) or less of paved
      area or building slab, but in no case fewer than three tests.
   2. Foundation Wall/Continuous Footing Backfill: At each compacted backfill layer, at
      least one test for each 15 linear feet or less of wall length, but no fewer than two
      tests.
   3. Trench Backfill: At each compacted initial and final backfill layer, at least one test
      for each 40 feet or less of trench length, but no fewer than two tests.
   4. Spot Footings: Minimum of 1 compaction test for each lift for each spot footing.
5. Sidewalks, Curbs, Gutters, Pads: Minimum of 1 test for each lift for each 40 lineal feet or 1 test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.21 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF DOCUMENT 02300
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 temporary excavation support and protection systems.
B. Related Requirements:
C. 1. Section 02300 "Earthwork" for excavating and backfilling and for controlling surface-water runoff and ponding.

1.3 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Project site.
   1. Review geotechnical report.
   2. Review existing utilities and subsurface conditions.
   3. Review coordination for interruption, shutoff, capping, and continuation of utility services.
   4. Review proposed excavations.
   5. Review proposed equipment.
   6. Review monitoring of excavation support and protection system.
   7. Review coordination with waterproofing.
   8. Review abandonment or removal of excavation support and protection system.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
   1. Include construction details, material descriptions, performance properties, and dimensions of individual components and profiles, and calculations for excavation support and protection system.
B. Shop Drawings: For excavation support and protection system, prepared by or under the supervision of a qualified professional engineer.
   1. Include plans, elevations, sections, and details.
2. Show arrangement, locations, and details of soldier piles, piling, lagging, tiebacks, bracing, and other components of excavation support and protection system according to engineering design.
3. Indicate type and location of waterproofing.
4. Include a written plan for excavation support and protection, including sequence of construction of support and protection coordinated with progress of excavation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor and professional engineer.

B. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Existing Conditions: Using photographs and/or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

D. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.6 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Construction Manager, and Owner no fewer than (two) 2 days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Construction Manager's, Owner's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection according to the performance requirements.
2. The geotechnical report is included elsewhere in Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.

1. Contractor Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

2.2 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/, ASTM A 690, or ASTM A 992.

C. Steel Sheet Piling: ASTM A 328, ASTM A 572, or ASTM A 690; with continuous interlocks.

1. Corners: [Site-fabricated mechanical interlock] [Roll-formed corner shape with continuous interlock].

D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application

E. Shotcrete: Comply with ACI Specifications for shotcrete materials and mixes, reinforcement, and shotcrete application.

F. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

G. Reinforcing Bars: ASTM A 615, Grade 60 deformed.

H. Tiebacks: Steel bars, ASTM A 722.

I. Tiebacks: Steel strand, ASTM A 416.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.
B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.2 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 36 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

A. Drill, install, grout, and tension tiebacks.

B. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.

C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.
3.5 BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

   1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.
   2. Install internal bracing if required to prevent spreading or distortion of braced frames.
   3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks weekly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.7 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

   1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
   2. Fill voids immediately with approved backfill compacted to density specified in Section 02300 "Earthwork."
   3. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000
SECTION 02350 - EROSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section covers the work required for erosion control during construction. Any local or State Agency requirements will be considered part of these specifications.

B. Related Sections include the following:
   1. 02213 Sanitary Sewage Systems
   2. 02230 Site Clearing
   3. 02250 Site Excavation & Rough Grading
   4. 02300 Earthwork
   5. 02350 Erosion Control
   6. 02360 Topsoil Placement & Grading
   7. 02740 Asphalt Paving
   8. 02630 Storm Drainage
   9. 02810 Irrigation
   10. 02900 Landscaping

C. Obtain the National Pollution Discharge Elimination System (NPDES) Permit for storm water discharge associated with construction activity.

D. Obtain a UPDES Storm Water General Permit for Construction Activities (Permit #UTR100000) or an alternate individual permit. Applications are available online at www.waterquality.utah.gov/UPDES/stormwater.

PART 2 - PRODUCTS

2.1 SILT FENCE

A. Silt fence shall be a woven fabric that meets the following criteria:

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<th>Property</th>
<th>Unit</th>
<th>Test Method</th>
<th>Values</th>
</tr>
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<td>Grab Strength</td>
<td>lbs</td>
<td>ASTM-D-4632</td>
<td>90 min</td>
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<tr>
<td>Grab Elongation</td>
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<td>%</td>
<td>ASTM-D-4355</td>
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</tbody>
</table>

PART 3 - EXECUTION

3.1 EXECUTION

A. Silt fence shall be placed at or near the project limit line or limit of impact line as shown on the demolition plan. The placement of silt fence shall consider drainage paths and intercept drainage prior to leaving the site or entering a storm sewer system. Removal of collected sediment and replacement of silt fence shall be ongoing through the duration of the project to maintain an effective silt removing barrier.
B. Temporary sedimentation basins and/or sinks shall be constructed as necessary for accumulated runoff to deposit sediment prior to leaving site. Contractor shall place basin where they deem necessary based upon construction sequencing/access, etc. The temporary sedimentation basin shall collect any runoff from the stabilized construction entrance/vehicle washdown area. The basins and/or sinks shall be cleaned as required to maintain adequate size and depth.

C. Stabilized Construction Entrance & Vehicle Washdown Area shall be provided at all construction entrances to the site. The stabilized construction entrance shall consist of a minimum 8” gravel & cobble pad large enough to accommodate the largest vehicles entering and exiting the site. The pad shall provide opportunity for dust to settle of the vehicle tires and shall be large enough that a vehicle may be parked and washed down with water to prevent tracking of dust and mud off-site.

D. All temporary grading of drainage channels, slopes or fills shall be in accordance with Section 02300 Earthwork.

END OF DOCUMENT 02350
PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform topsoil placement and grading work required to prepare site for installation of landscaping as described in Contract Documents.
   2. Furnish and apply soil additives as described in Contract Documents.

Related Sections include the following:
1. 02213 Sanitary Sewage Systems
2. 02230 Site Clearing
3. 02250 Site Excavation & Rough Grading
4. 02300 Earthwork
5. 02350 Erosion Control
6. 02360 Topsoil Placement & Grading
7. 02740 Asphalt Paving
8. 02630 Storm Drainage
9. 02810 Irrigation
10. 02900 Landscaping

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM D1557-07, ‘Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).’

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Product literature and chemical / nutrient analysis of soil amendments and fertilizers.
   2. Samples:
      a. Sample of soil conditioner for approval before delivery to site. Include product analysis list.

B. Informational Submittals:
   1. Field Quality Control Submittals:
      a. Submit tests on imported, inplace and stockpiled topsoil that are to be used by a licensed laboratory before use, submit results to Landscape Architect.
      1) Before use, topsoil shall meet minimum specified requirements and be approved by Landscape Architect.
2) If necessary, submit proposed amendments and application rates necessary to bring topsoil up to minimum specified requirements.

b. Submit report stating location of source of imported topsoil and account of recent use.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil:
   1. Topsoil used in landscaped areas, whether imported or from site, shall be fertile, loose, friable soil meeting following criteria:
      a. Chemical Characteristics:
         1) Acidity / alkalinity range: pH 5.5 to 8.0.
         2) Soluble Salts: less than 3.0 mmhos/cm.
         3) Sodium Absorption Ratio (SAR): less than 6.0.
         4) Organic Matter: greater than one percent.
      b. Physical Characteristics:
         1) Gradation as defined by USDA triangle of physical characteristics as measured by hydrometer.
            a) Sand: 15 to 60 percent.
            b) Silt: 10 to 60 percent.
            c) Clay: 5 to 30 percent.
         2) Clean and free from toxic minerals and chemicals, noxious weeds, rocks larger than 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.
         3) Soil shall not contain more than 2 percent by volume of rocks measuring over 3/32 inch (2 mm) in largest size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Contractor to conduct topsoil test of existing site topsoil by licensed laboratory.
      Contractor to provide testing results to Landscape Architect.

3.2 PREPARATION

A. Protection Of In-Place Conditions:
   1. Protect utilities and site elements from damage.

B. Surface Preparation:
   1. Disk, till, or aerate with approved agricultural aerator to depth of 6 inches (150 mm).
   2. Seven days maximum before beginning seeding and planting:
      a. Loosen area 4 inches (100 mm) deep, dampen thoroughly, and cultivate to properly break up clods and lumps.
      b. Rake area to remove clods, rocks, weeds, roots, and debris.
      c. Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope to catch basins.
   3. Limit use of heavy equipment to areas no closer than 6 feet (1.80 m) from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet (1.80 m).
3.3 PERFORMANCE

A. Tolerances:
   1. Total topsoil depth of 4 inches (125 mm) minimum in lawn areas
   2. Total topsoil depth of 8 inches minimum in groundcover, perennials, shrub and tree
      planting beds.
   3. Finish grade of planting areas before planting and after addition of soil additives shall be
      specified distances below top of adjacent pavement of any kind:
      a. Sodded Lawn Areas: 1 1/2 inches below.
      b. Seeded Lawn Areas: 1 inch.
      c. Planter Bed Areas: 2 inches below to topsoil or one inch to the top of mulch.

B. Do not expose or damage existing shrub or tree roots for all trees that are to remain.

C. Place Topsoil:
   1. Remove organic material, rocks and clods greater than 1-1/2 inch (38 mm) in any
      dimension, and other objectionable materials.
   2. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of
      loosened sub grade to create a transition layer and then place remainder of planting soil
      mixture.
   3. Spread planting soil mixture to the final depth required to meet thickness, grades, and
      elevations shown. Roll and rake, remove ridges, and fill depressions to meet finish
      grades. Limit fine grading to areas that can be planted in the immediate future
   4. Do not place topsoil whose moisture content makes it prone to compaction during
      placement process.
   5. Slope grad Restore prepared areas if eroded or otherwise disturbed after fine grading
      and before planting.

D. Slope grade away from building for 12 feet (3.60 m) minimum from walls at slope of 1/2 inch in
   12 inches (13 mm in 300 mm) minimum unless otherwise noted.
   1. High point of finish grade at building foundations shall be 6 inches (150 mm) minimum
      below finish floor level.
   2. Direct surface drainage in manner indicated on Drawings by molding surface to facilitate
      natural run-off of water.
   3. Fill low spots and pockets with topsoil and grade to drain properly.

E. After landscape areas have been prepared, take no heavy objects over them except lawn
   rollers.

F. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to
   receive lawn in two directions at approximately right angles with water ballast roller weighing
   100 to 300 lbs (45 to 135 kg), depending on soil type.
   1. Rake or scarify and cut or fill irregularities that develop as required until area is true and
      uniform, free from lumps, depressions, and irregularities.

END OF DOCUMENT 02360
SECTION 02510 - POTABLE WATER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes potable water systems work.

B. Related Sections:
   1. Division 2 Section "Earthwork" for excavation and backfill required for potable water systems; not work of this section.
   2. Division 3 Sections for concrete work required for potable water systems; not work of this section.
   3. Division 2 Section "Potable Water Systems" for interior building systems including interior piping, fixtures, and equipment; not work of this section.

1.3 QUALITY ASSURANCE

A. Codes and Standards:
   1. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of potable water system materials and products.
   2. Water Purveyor Compliance: Comply with requirements of Purveyor supplying water to project, obtain required permits and inspections.
   3. Local Regulations: Comply with governing regulations and standards of local government having jurisdiction.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instructions for potable water system materials and products.

B. Maintenance Data: Submit maintenance data and parts list for potable water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers: Subject to compliance with requirements, provide products of one of the following:
   1. Plastic Line Markers
      a. Allen Systems Inc:
b. Seton Name Plate Corp.
c. Equal product as approved by Architect.

2. Gate Valves:
a. Clow Corp; Valve Div.
b. Dresser Mfg.; Div. of Dresser Industries.
c. Fairbanks Co.
d. Kennedy Valve; Div. of ITT Grinnell Valve Co. Inc.
e. Stockham Valves and Fittings Inc.
f. Waterous Co.

2.2 IDENTIFICATION

A. Underground-Type Detectable Warning Tape (refer to Specification 02300): Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide blue tape with black printing reading "CAUTION WATER LINE BURIED BELOW".

B. Nonmetallic Piping Label: If nonmetallic piping is used for water service, provide engraved plastic laminate, label permanently affixed to main electrical meter panel stating "THIS STRUCTURE HAS A NONMETALLIC WATER SERVICE".

2.3 PIPES AND PIPE FITTINGS

A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in potable water systems. Where more than one type of materials or products are indicated, selection is Installer's option.

B. Piping: Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
   1. PVC Pipe: Schedule 40 PVC, ASTM 1785 (1-1/2" to 2" pipe diameter). AWWA Pipe: C-900 class 150 (over 2" pipe diameter).
   2. Copper Tube: ASTM B 88; type K, soft-annealed temper (for 3/4" to 2" diameter pipe).
   3. Ductile Iron Pipe: AWWA C151, with cement mortar lining complying with AWWA C104; Class 51 unless otherwise indicated.
      a. Fittings: Ductile-Iron complying with AWWA C110, cement lined, with rubber gaskets conforming to AWWA C111.

2.4 VALVES

A. Gate Valves: AWWA C509, resilient seated 175 psi working pressure, threaded, flanged, hub, or other end configurations to suit size of value and piping connection. Provide inside screw type for use with curb valve box, iron body, bronze-mounted, double disc, parallel seat, non-rising stem.
2.5 ACCESSORIES

A. Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.
2. Rods: Steel, ASTM A 575.
6. Thrust Blocks: Concrete, 2,500 psi.
7. Yard Hydrants: Non-freeze yard hydrants, 3/4" inlet, 3/4" hose outlet, bronze casing, cast-iron or cast-aluminum casing guard, key-operated, and tapped drain port in valve housing.
8. Valve Pits: Valve pits as indicated, constructed of poured-in-place or precast concrete. Construct of dimensions indicated with manhole access, ladder, and drain. Provide sleeves for pipe entry and exit, provide waterproof sleeve seals.

2.6 METERS

A. Meters and meter boxes shall be of the local Water District standards having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which potable water system's materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF IDENTIFICATION

A. During back-filling/top-soiling of underground potable water piping, install continuous underground-type detectable warning tape (refer to Specification 02300), located directly over buried lines at 6" to 8" below finished grade.

3.3 INSTALLATION OF PIPE AND PIPE FITTINGS

A. Pipe:
1. PVC Pipe: Install in accordance with manufacturers recommendations and sand bedding as required by authority having jurisdiction.
2. Ductile Iron Pipe: Install in accordance with AWWA C600 "standard for installation of ductile-iron water mains and their appurtenances".
3. Copper Tube: Install in accordance with CDA "Copper Tube Handbook".

B. Depth of Cover: Provide minimum cover over piping of 12" below average local frost depth or 60" below finished grade, whichever is greater.

C. Water Main Connection: Arrange and pay for tap in water main, of size and in location as indicated, from water Purveyor.

D. Water Service Termination: Terminate potable water piping 5'-0" from building foundation in location and invert as indicated. Provide temporary pipe plug for piping
extension into building, by work of Division 15.
1. Mark location with surface marker.

E. Runs shall be as close as possible to those shown on drawings.

F. Backfill only after pipe lines have been tested, inspected, and approved by the Architect.

3.4 INSTALLATION OF VALVES

A. Install valves with stems pointing up. Provide valve box over underground valves.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: The Owner will employ and pay a qualified independent testing agency to perform field quality-control testing services specified in this section. Retesting of materials failing to meet specified requirements shall be done at Contractor’s expense.

B. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline 24-hrs. prior to testing, and apply test pressure to stabilize system. Use only potable water.

C. Hydrostatic Tests: Test at not less than 200 pounds per square inch for 2-hrs.
1. Test fails if leakage exceeds 2-qts per hour per 100 gaskets or joints, irrespective of pipe diameter.
2. Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

3.6 ADJUSTING AND CLEANING

A. Disinfection of Potable Water System: Flush pipe system with clean potable water until no dirty water appears at point of outlet. Fill system with water-chlorine solution containing at least 50 ppm of chlorine. Valve off system and let stand for 24-hrs minimum. Flush with clean potable water until no chlorine remains in water coming from system.
1. Repeat procedure if contamination is present in bacteriological examination.

B. Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C652 "Standard for Disinfecting Water Mains".
1. Contractor shall submit written verification to Project Manager stating, Disinfection has been completed in strict compliance with specification for this project and with jurisdiction having authority over water system.

END OF SECTION 02510
SECTION 02630 - STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes storm drainage throughout all site work outside the building.

B. Related Sections include the following:
   1. 02213 Sanitary Sewage Systems
   2. 02230 Site Clearing
   3. 02250 Site Excavation & Rough Grading
   4. 02300 Earthwork
   5. 02350 Erosion Control
   6. 02360 Topsoil Placement & Grading
   7. 02740 Asphalt Paving
   8. 02630 Storm Drainage
   9. 02810 Irrigation
   10. 02900 Landscaping

1.3 PROJECT CONDITIONS

A. Site Information: Perform site survey, and verify existing utility locations.

B. Existing Structures: Locate existing structures and piping to be closed and abandoned.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Engineer not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Engineer's written permission.

1.4 QUALITY ASSURANCE

A. Codes and Standards:
   1. Local Regulations: Comply with governing regulations and standards of local City having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Stormwater Disposal Systems:
   a. Advanced Drainage Systems, Inc.
   b. Cultec, Inc.
   c. Hancor, Inc.
   d. Infiltrator Systems, Inc.
   e. PSA, Inc.
   f. JM Eagle

2.2 PIPES AND FITTINGS

A. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

B. Corrugated PE Drainage Tubing and Fittings: AASHTO M 252, Type S, with smooth waterway for coupling joints.
   1. Soiltight Couplings: AASHTO M 252, corrugated, matching tube and fittings to form soiltight joints.

C. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
   1. Soiltight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soiltight joints.

D. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 (ASTM C 76M), Class III, Wall B, for gasketed joints.

E. Polyvinyl Chloride (PVC) Sewer Pipe: ASTM D 3034, Type PSM, SDR 35.
   1. Fittings: ASTM 3034, bell and spigot joints. 12" diameter and smaller.

2.3 MANHOLES

A. Provide precast reinforced concrete storm drain manholes as indicated, complying with ASTM C 478.
   1. Top: Precast concrete, of concentric cone, eccentric cone, or flat slab top type, as indicated.
   2. Base: Precast concrete, with base riser section and separate base slab, or base riser section with integral floor, as indicated.
   3. Steps: Ductile-iron or aluminum, integrally cast into manhole sidewalls.
   4. Frame and Cover: Ductile-iron, 21-3/4" diameter cover, heavy-duty, indented top design, with lettering cast into top reading "STORM SEWER", conforming to ASTM A-48, unless otherwise specified on the plans.

2.4 CATCH BASINS

A. Precast or cast in place reinforced concrete catch basins as indicated.
   1. Basin: Precast or cast in place reinforced concrete, flat slab top.
   2. Frame and Grate: Ductile-iron or galvanized steel grate, heavy-duty, bicycle proof.
2.5 PIPE OUTLETS

A. Head Walls: Robertson Precast Flared End Section or Equivalent.

B. Riprap Basins: Broken, irregular size and shape, graded stone.
   1. Average Size: NSA No. R-5, screen opening 5 inches (127 mm).

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

D. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
   1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.

3.3 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated.

B. PE Pipe and Fittings: As follows:
   1. Join pipe, tubing, and fittings with couplings for soiltight joints according to manufacturer's written instructions.
   2. Install according to ASTM D 2321 and manufacturer's written instructions.
   3. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."

C. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:

3.4 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.
B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, unless otherwise indicated.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

3.5 CATCH-BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.6 STORM DRAINAGE OUTLET INSTALLATION

A. Construct riprap of broken stone, as indicated.

B. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

3.7 DRAIN INSTALLATION

A. Install type of drains in locations indicated.

B. Fasten grates to drains if indicated.

C. Set drain frames and covers with tops flush with pavement surface.

3.8 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
   1. In large, accessible piping, brushes and brooms may be used for cleaning.
   2. Place plug in end of incomplete piping at end of day and when work stops.
   3. Flush piping between manholes and other structures to remove collected debris.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Crushed, broken, cracked, or otherwise damaged piping.
      c. Infiltration: Water leakage into piping.
      d. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

END OF DOCUMENT 02630
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Cold milling of existing asphalt pavement.
      2. Hot-mix asphalt patching.
      3. Hot-mix asphalt paving.
      4. Hot-mix asphalt overlay.
      5. Asphalt curbs.
      6. Asphalt traffic-calming devices.
      7. Asphalt surface treatments.

   B. Related Requirements:

   Related Sections include the following:
   1. 02213 Sanitary Sewage Systems
   2. 02230 Site Clearing
   3. 02250 Site Excavation & Rough Grading
   4. 02300 Earthwork
   5. 02350 Erosion Control
   6. 02360 Topsoil Placement & Grading
   7. 02740 Asphalt Paving
   8. 02630 Storm Drainage
   9. 02810 Irrigation
   10. 02900 Landscaping

1.3 PREINSTALLATION MEETINGS
   A. Pre-installation Conference: Conduct conference project location

   B. Review the following agenda items at the pre-installation conference

   1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

      a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
      b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include technical data and tested physical and performance properties.
   2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

B. LEED Submittals:
   1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Samples for Verification: For the following product, in manufacturer’s standard sizes unless otherwise indicated:

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and testing agency.
B. Material Certificates: For each paving material. Certificate shall include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.
C. Material Test Reports: For each paving material, by a qualified testing agency.
D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or UDOT
B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the local jurisdiction for asphalt paving work.
   1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
   1. Prime Coat: Minimum surface temperature of 60 deg F.
   2. Tack Coat: Minimum surface temperature of 60 deg F.
   4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D 242/D 242M or AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320, PG 58-28

B. Asphalt Cement: ASTM D 3381/D 3381M for viscosity-graded material or ASTM D 946/D 946M for penetration-graded material.


D. Emulsified Asphalt Prime Coat: ASTM D 977 or AASHTO M 140 for emulsified asphalt, or ASTM D 2397 or AASHTO M 208 for cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

E. Tack Coat: ASTM D 977 or AASHTO M 140 for emulsified asphalt, or ASTM D 2397 or AASHTO M 208 for cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

F. Fog Seal: ASTM D 977 or AASHTO M 140 for emulsified asphalt, or ASTM D 2397 or AASHTO M 208 for cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

G. Water: Potable.


2.3 AUXILIARY MATERIALS

A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled [tires] [asphalt shingles] [or] [glass] from
sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.

B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

C. Sand: ASTM D 1073 or AASHTO M 29, Grade No. 2 or No. 3.

D. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

E. Joint Sealant: ASTM D 6690 or AASHTO M 324, Type II or III, hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

A. Recycled Content of Hot-Mix Asphalt: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [40] percent or more than [50] percent by weight.

1. Surface Course Limit: Recycled content no more than [50] percent by weight.

B. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes [approved by authorities having jurisdiction] ; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: See Details
3. Surface Course: See Details

C. Emulsified-Asphalt Slurry: ASTM D 3910, Type 2.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.
3.2 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of 2 inches (50 mm)
2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
3. Control rate of milling to prevent tearing of existing asphalt course.
4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
6. Patch surface depressions deeper than 1 inch (25 mm) after milling, before wearing course is laid.
7. Handle milled asphalt material according to approved waste management plan.
8. Keep milled pavement surface free of loose material and dust.
9. Do not allow milled materials to accumulate on-site.

3.3 PATCHING & ASPHALT TIE-INS

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch (6 mm).
   1. Clean cracks and joints in existing hot-mix asphalt pavement.
   2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
   3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
   1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Cutback Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

D. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth (0.5 to 1.40 L/sq. m per 25 mm depth). Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

E. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6 PAVING GEOTEXTILE INSTALLATION

A. Apply asphalt binder uniformly to existing pavement surfaces at a rate of 0.20 to 0.30 gal./sq. yd. (0.8 to 1.2 L/sq. m).
B. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches (100 mm) and transverse joints 6 inches (150 mm).

C. Protect paving geotextile from traffic and other damage, and place hot-mix asphalt overlay the same day.

3.7 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at a minimum temperature of 250 deg F (121 deg C).
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement 1 to 1-1/2 inches (25 to 38 mm) from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints [using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."]
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.
3.9 COMPACtion

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927 or AASHTO T 245, but not less than 94 percent or greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.10 ASPHALT CURBS

A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F (121 deg C).

1. Asphalt Mix: Same as pavement surface-course mix.

B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.11 ASPHALT TRAFFIC-CALMING DEVICES

A. Construct hot-mix asphalt speed humps over compacted pavement surfaces. Apply a tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F (121 deg C).
1. Tack Coat Application: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m.)
2. Asphalt Mix: Same as pavement surface-course mix.
3. Before installation, mill pavement that will be in contact with bottom of traffic-calming device. Mill to a depth of 1 inch (25 mm) from top of pavement to a clean, rough profile.

B. Place and compact hot-mix asphalt to cross section indicated, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.12 INSTALLATION TOLERANCES
A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
   1. Base Course: Plus or minus 1/2 inch (13 mm).
   2. Surface Course: Plus 1/4 inch (6 mm), no minus.
B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:
   1. Base Course: 1/4 inch (6 mm)
   2. Surface Course: 1/8 inch (3 mm)
   3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).
C. Asphalt Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch (3 mm) of height indicated above pavement surface.

3.13 SURFACE TREATMENTS
A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. (0.45 to 0.7 L/sq. m) to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.
B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D 3910 and allow to cure.
   1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.

3.14 FIELD QUALITY CONTROL
A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
D. Asphalt Traffic-Calming Devices: Finished height of traffic-calming devices above pavement will be measured for compliance with tolerances.

E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.

2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

   a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.

   b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

F. Replace and compact hot-mix asphalt where core tests were taken.

G. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.15 WASTE HANDLING

A. General: Handle asphalt-paving waste according to approved waste management plan.

END OF DOCUMENT 02740
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Concrete sidewalks.
2. Concrete stair steps.
3. Concrete curbs and gutters.
4. Concrete parking areas and roads.
5. Stamped concrete including stain finish.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

B. ASTM International:
1. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

1.3 PERFORMANCE REQUIREMENTS

A. Paving: Designed for movement of trucks up to 60,000 lbs.

1.4 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on joint filler, admixtures, and curing compounds.

C. Submit samples of colored and stamp concrete for approval by Architect and owner.
1.5 QUALITY ASSURANCE
A. Perform Work in accordance with ACI 301.
B. Perform Work in accordance with State of Utah Department of Transportation standards.
C. Maintain one copy copies of each document on site.
D. Obtain cementitious materials from same source throughout.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
B. Do not place concrete when base surface temperature is less than 40 degrees F or surface is wet or frozen.

PART 2 PRODUCTS

2.1 FORM MATERIALS
A. Steel form material, profiled to suit conditions.
B. Joint Filler: ASTM D1751 or ASTM D1752 type; 1/2 inch thick.
C. Concrete stamp forms basket weave brick paver pattern or as selected by Architect.

2.2 REINFORCEMENT
A. Reinforcing Steel: ASTM A615/A615M; 60 yield grade; deformed billet steel bars; unfinished.
B. Welded Steel Wire Fabric: Plain type, ASTM A185 in coiled rolls; unfinished.
C. Dowels: ASTM A615/A615M; 60ksi yield grade, plain steel, unfinished.

2.3 CONCRETE MATERIALS
A. Cement: ASTM C150 Air Entraining - Type IA Portland type, gray color.
C. Water: Potable, not detrimental to concrete.
E. Chemical Admixture: Submit chemical admixtures for approval prior to use; comply with manufactures recommendations. ASTM C494/C494M, Type A - Water Reducing, [Type B - Retarding, Type C - Accelerating, Type D - Water Reducing and Retarding, Type E - Water Reducing and Accelerating, Type F - Water Reducing, High Range Admixtures, Type G - Water Reducing, High Range, and Retarding Admixtures.

2.4 ACCESSORIES
A. Curing Compound: ASTM C309, Type 1.
B. Membrane Curing Compound: ASTM C1315.
2.5 CONCRETE MIX - BY PERFORMANCE CRITERIA

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94/C94M.

B. Provide concrete to the following criteria:
   1. Compressive Strength: 4000 psi at 28 days.
   2. Slump: 4 inches
   4. Air Entrained: 4 percent.

C. Use accelerating admixtures in cold weather only when approved by the Architect/Engineer in writing. Use of admixtures will not relax cold weather placement requirements.

D. Use calcium chloride only when approved by the Architect/Engineer in writing.

E. Use set retarding admixtures during hot weather only when approved by the Architect/Engineer in writing.

2.6 COLOR AND STAMPED CONCRETE

A. Concrete color shall be integral through out the slab. The color to be selected by the Architect and Owner

B. Stamp shall be an Ashlar Slate pattern.

C. Provide all recommended manufacturer’s accessories, including color, hardener, release agent, air-entraining mixtures, sealers, etc..

2.7 SOURCE QUALITY CONTROL AND TESTS

A. Section 01400 - Quality Requirements: Testing and Inspection Services: Provide mix design.

B. Submit proposed mix design to appointed firm for review prior to commencement of Work.

C. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.

D. Test samples in accordance with ACI 301.

2.8 DETECTABLE WARNING SURFACE

A. Detectable Warning Surface – In-line truncated dome pattern that meets ADA requirements height, spacing, size and durability. Provide a color that contrasts visually with the adjoining surfaces (either light-on-dark or dark-on-light). Acceptable products for installation are as follows:
   1. Polymer Composite Panel – Polymer Composite, homogenous integral color (UV stable), skid resistant, non-glare finished panel. Use for new construction or retrofit construction.
   2. Precast Concrete Panel – High strength concrete with high tensile stainless steel tendons, homogeneous integral color (UV stable), skid resistant panel. Use for new construction, or retrofit construction.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

C. Verify gradients and elevations of base are correct.

3.2 SUBBASE

A. Aggregate Subbase: Install as specified in Section 02300.

3.3 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 REINFORCEMENT

A. Place reinforcement as indicated.

B. Interrupt reinforcement at contraction and expansion joints.

C. Place dowels and reinforcement to achieve pavement and curb alignment as detailed.

3.5 PLACING CONCRETE

A. Coordinate installation of snow melting components.

B. Place concrete in accordance with ACI 301.

C. Place concrete using the slip form technique.

D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

E. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

F. Place concrete to pattern indicated.

3.6 DETECTABLE WARNING SURFACE

A. Polymer Composite Panel Installation:

1. Install cast-in-place detectable warning panel directly into the finished plastic concrete surface in accordance with manufacturer recommendations. Provide a smooth transition between the panel and the surrounding concrete surface.

2. Install surface applied detectable warning panel directly on existing concrete surface in accordance with manufacturer’s recommendations and installation
procedures. Use mechanical fasteners to secure the panel to the existing surface. Caulk a smooth transition bead along beveled panel edge and surrounding concrete surface.

B. Precast Concrete Panel Installation:

1. Place as shown on drawings. Install per manufacturer recommendations for cast-in-place or thin set method. Provide a smooth transition between the panel and the surrounding concrete surface.

3.7 JOINTS

A. Place expansion and contraction joints as shown on the drawings. Align curb, gutter, and sidewalk joints.

B. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1/4 inch.

3.8 FINISHING

A. Paving: Light broom.

B. Sidewalk Paving: Light broom.

C. Curbs and Gutters: Light broom.

D. Direction of Texturing: Transverse to pavement direction.

E. Place curing compound on exposed concrete surfaces immediately after finishing.

3.9 COLORED AND STAMPED CONCRETE

A. Install colored and stamped concrete paving as recommended by manufacturer for area’s climate

3.10 JOINT SEALING

A. Separate pavement from vertical surfaces with 1/2 inch thick joint filler.

B. Place joint filler in pavement pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

C. Extend joint filler from bottom of pavement to within 1/4 inch of finished surface.

3.11 TOLERANCES

A. Section 01400 - Quality Requirements: Tolerances.

B. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

C. Maximum Variation From True Position: 1/4 inch.

3.12 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements, 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Three concrete test cylinders will be taken for every 75 or less cu yds of concrete placed each day.
C. One additional test cylinder will be taken during cold weather and cured on site under same conditions as concrete it represents.

D. One slump test will be taken for each set of test cylinders taken.

E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.13 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit vehicular traffic over pavement until 100 percent design strength of concrete has been achieved.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Traffic lines and markings.
   2. Legends.
   3. Paint.
   4. Playground game lines & graphics

B. Related Sections:
   1. Section 02740 Asphalt Pavement.
   2. Section 02750 Concrete Pavement.

1.2 REFERENCES

A. American Society for Testing and Materials:
   2. ASTM D126 - Standard Test Methods for Analysis of Yellow, Orange, and Green
      Pigments Containing Lead Chromate and Chromium Oxide Green.
   3. ASTM D562 - Standard Test Method for Consistency of Paints Using the Stormer
      Viscometer.
   5. ASTM D713 - Standard Practice for Conducting Road Service Tests on Fluid
      Traffic Marking Materials.
   6. ASTM D969 - Standard Test Method for Laboratory Determination of Degree of
      Bleeding of Traffic Paint.
   7. ASTM D1301 - Standard Test Methods for Chemical Analysis of White Lead
      Pigments.
   8. ASTM D1394 - Standard Test Methods for Chemical Analysis of White Titanium
      Pigments.
   9. ASTM D1475 - Standard test Method for Density of Liquid Coatings, Inks, and
      Related Products.
   10. ASTM D1640 - Standard Test Methods for Drying, Curing, or Film Formation of
       Organic Coatings at Room Temperature.
   12. ASTM D2371 - Standard Test Method for Pigment Content of Solvent-Reducible
       Paints.
       From Solvent-Reducible Paints.
       by Spectroscopy and Gas Chromatography.

1.3 PERFORMANCE REQUIREMENTS

A. Paint Adhesion: Adhere to road surface forming smooth continuous film one minute after
   application.

B. Paint Drying: Tack free by touch so as not to require coning or other traffic control
   devices to prevent transfer by vehicle tires within two minutes after application.
1.4 SUBMITTALS
A. Section 01330 - Submittal Procedures: Requirements for submittals.
B. Product Data: Submit paint formulation for each type of paint.
C. Test Reports: Submit source and acceptance test results in accordance with AASHTO M247.

1.5 QUALITY ASSURANCE
A. Perform Work in accordance with State of Utah (UDOT) standard or as directed in this specification.
B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.
B. Applicator: Company specializing in performing work of this section with minimum 3 years experience.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
B. Invert containers several days prior to use when paint has been stored more than 2 months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.

1.8 ENVIRONMENTAL REQUIREMENTS
A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
D. Do not apply paint when temperatures are expected to fall below 60 degrees for 24 hours after application.
E. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

1.9 WARRANTY
A. Section 01700 - Execution Requirements: Requirements for warranties.
B. Furnish three year manufacturer’s warranty for traffic paints.
1.10 MAINTENANCE SERVICE

A. Section 01700 - Execution Requirements: Requirements for maintenance service.

B. Furnish service and maintenance of traffic paints for three years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 PAINTED PAVEMENT MARKINGS

A. Manufacturers:

B. Furnish materials in accordance with State of Utah (UDOT) standards.
   1. Paint: Ready mixed, conventional and fast dry waterborne traffic paints, lead-free, non-toxic, NASSHTO Test Deck, minimum retroreflectance of 100 mcds, durability rating of 6 or more after in place for 9 months.

2.2 EQUIPMENT

A. Continuous Longitudinal Line Application Machine: Use application equipment with following capabilities.
   1. Dual nozzle paint gun to simultaneously apply parallel lines of indicated width in solid or broken patterns or various combinations of those patterns.
   2. Measuring device to automatically and continuously measure length of each line placed, to nearest foot.
   3. Device to heat paint per manufacturer’s recommendations for fast dry applications.

B. Machine Calibration:
   1. Paint Guns: Calibrate to simultaneously apply paint binder at uniform rates as specified with an allowable tolerance of plus or minus 1 mil.

C. Other Equipment:
   1. For application of crosswalks, intersections, stop lines, legends and other miscellaneous items by walk behind stripers, hand spray or stencil trucks, apply with equipment meeting requirements of this section. Do not use hand brushes or rollers.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.

B. Do not apply paint to concrete surfaces until concrete has cured for 28 days.

3.2 PREPARATION

A. Maintenance and Protection of Traffic:
   1. Provide short term traffic control required.
   2. Prevent interference with marking operations and to prevent traffic on newly applied markings before markings dry.
B. Surface Preparation.
   1. Clean and dry paved surface prior to painting.
   2. Blow or sweep surface free of dirt, debris, oil, grease or gasoline.
   3. Spot location of final pavement markings as specified and as indicated on
      Drawings for review prior to painting.
   4. Notify Architect/Engineer after placing pavement spots and minimum 3 days prior
      to applying traffic lines.

3.3 APPLICATION

A. Agitate paint for 1-15 minutes prior to application to ensure even distribution of paint
   pigment.

B. Dispense paint at manufacturer’s recommended temperature to wet-film thickness of 15
   mils, except dispense edge markings to wet-film thickness of 12 mils.

C. Apply markings to indicated dimensions at indicated locations.

D. Prevent splattering and over spray when applying markings.

E. Unless material is track free at end of paint application, use traffic cones to protect
   markings from traffic until track free. When vehicle crosses a marking and tracks it or
   when splattering or over spray occurs, eradicate affected marking and resultant tracking
   and apply new markings.

F. Collect and legally dispose of residues from painting operations.

3.4 APPLICATION TOLERANCES

A. Maximum Variation from Wet Film Thickness: 1 mil.

B. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8 inch.

C. Maintain cycle length for skip lines at tolerance of plus or minus 6 inches per 40 feet and
   line length of plus or minus 3 inches per 10 feet.

D. Maximum Variation from Manufacturer Specified Application Temperature: Plus or minus
   5 degrees F.

3.5 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field
   inspecting, testing, adjusting, and balancing.

B. Inspect for incorrect location, insufficient thickness, line width, coverage, retention,
   uncured or discolored material, and insufficient bonding.

C. Repair lines and markings, which after application and curing do not meet following
   criteria:
   1. Incorrect Location: Remove and replace incorrectly placed patterns.
   2. Insufficient Thickness, Line Width, Paint Coverage, Glass Bead Coverage or
      Retention: Prepare defective material by acceptably grinding or blast cleaning to
      remove substantial amount of beads and to roughen marking surface. Remove
      loose particles and debris. Apply new markings on cleaned surface in
      accordance with this Section.
   3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings
      in accordance with this Section and clean pavement surface one foot beyond
affected area. Apply new markings on cleaned surface in accordance with this Section.

D. Replace defective pavement markings as specified throughout 3 year warranted period. Replace markings damaged by anti-skid materials, studded tires, tire chains, chemical deicers, snow plowing or other loss of marking material regardless of cause. When markings are damaged by pavement failure or by Owner’s painting, crack sealing, or pavement repair operations, Contractor is released from warranty requirements for damaged work.

E. Prepare list of defective areas and areas requiring additional inspection and evaluation to decide where material may need replaced. Provide traffic control as necessary if markings require more detailed evaluation.

F. Replace pavement marking material under warranty using original or better type material.

G. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus 1 inch on all sides. Prevent damage to transverse and longitudinal joint sealers, and repair any damage according to requirements in Section 02750 or Section 02740.

3.6 PROTECTION OF FINISHED WORK

A. Section 01700 - Execution Requirements: Requirements for protecting finished Work.

B. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow manufacturer’s recommendations or use minimum of 30 minutes. Consider barrier cones as satisfactory protection for materials requiring more than 2 minutes dry time.

3.7 SCHEDULES

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>A. 4 inch White</td>
<td>Roadway Edge</td>
</tr>
<tr>
<td>B. 24 inch White</td>
<td>Crosswalk</td>
</tr>
<tr>
<td>C. 4 inch White</td>
<td>Center Striping / Parking Line</td>
</tr>
<tr>
<td>D. Blue</td>
<td>ADA Pavement Markings</td>
</tr>
<tr>
<td>E. Red</td>
<td>Curb Edge</td>
</tr>
<tr>
<td>F. Game Lines and Graphics</td>
<td>As indicated on Drawings</td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 02800 - SITE ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF WORK

A. Site accessories and furnishings to include the following:

1. Bicycle Racks

1.3 SUBMITTALS

A. Shop Drawings:

1. 

B. Product Data:

1. Bicycle Racks

PART 2 - PRODUCTS

2.1 MATERIALS

Bike Racks: Circa 2000 by Madrax CIR – 8 or approved equal.

1. Surface mount installation.
2. Bike rack shall have powder stainless steel finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units per manufacturer's recommendations at locations shown on drawings or directed by Architect.

END OF SECTION 02840.
SECTION 02810 - IRRIGATION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Related Sections include the following:
   1. Division 2 Section "Earthwork" for rough grading.
   2. Division 2 Section "Landscaping" for finish grading, plant materials and lawn.

1.2 SUMMARY

A. This Section includes piping, valves, sprinklers, lawn sprinkler specialties, and wiring.

1.3 DEFINITIONS

A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain
   valves. Piping is under pressure during flow.

B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

C. Irrigation Main Piping: Downstream from point of connection to water distribution piping
   to and including control valves. Piping is under water distribution system pressure.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Contractor shall verify available pressure (psi) and flow (gpm.)

B. Minimum Water Coverage: Spacing at 90 percent of radius of throw for spray heads and
   85 percent of radius of throw for rotor heads in turf areas. In planter beds irrigation
   system shall have adequate water applied to the root zones to ensure plant health and
   development.

C. Location of Sprinklers and Specialties: Design location will be approximate. Make minor
   adjustments necessary to avoid plantings and obstructions such as signs and light
   standards.

D. Minimum Working Pressures: The following are minimum pressure requirements for
   piping, valves, and specialties, unless otherwise indicated:
   1. Irrigation Main Piping: 200 psig 1380 kPa.
   2. Circuit Piping: 150 psig 1035 kPa.
   3. Drain Piping: 100 psig 690 kPa.

1.5 GUARANTEE

A. Submit 1-year written guarantee signed by Underground Sprinkler Contractor, agreeing
   to repair or replace all defects in material, equipment and workmanship.
B. Guarantee shall also cover repair of damage to any part of the premises resulting from leaks or other defects in material, equipment and workmanship to the satisfaction of the Owner. Repairs, if required, shall be done promptly at no cost to the Owner.

1.6 SUBMITTALS

A. Product Data: Include pressure rating, rated capacity, settings, and electrical data of selected models for the following:
   
   1. Valves: Include aboveground and underground; general-duty, manual, and quick-coupler types.
   2. Valve boxes.
   4. Specialties.

B. Maintenance Data: To include in maintenance manuals specified in Division 1. Include data for the following:
   
   1. Submit three (4) copies of typewritten instructions, bound in suitable sized ring binders, recommending procedures to be established by the Owner for the maintenance of the system from year to year. This shall include complete instructions for system operation and maintenance including winterizing and complete instructions on how to drain entire backflow preventer to prevent freezing. Submit manuals with Record Drawings. The manual shall also contain:
      a. Identification readable from the outside of the cover stating by whom the information was compiled.
      b. Neatly typewritten index near the front of the manual, furnishing immediate information as to the location in the manual of all emergency data regarding the installation.
      c. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of the nearest vendor of replacement parts.
      d. Complete outline of future watering schedules and when they should be changed from the initial installation schedule. The initial schedule is calculated for a watering rate to establish new lawn.
      e. Copy of all guarantees and warranties issued on the installation, showing all dates of expiration.

C. Record Drawings:
   
   1. As installation occurs, prepare accurate record drawing to be submitted prior to final inspection, including:
      a. Detail and dimension changes made during construction.
      b. Significant details and dimensions not shown in the approved Contract Documents.
      c. Field dimensioned locations of valve boxes, manual drains, automatic drain valves, quick-coupler valves, control wire runs not in mainline ditch, and both ends of sleeves.
      d. Take dimensions from permanent constructed surfaces or edges located at or above finish grade.
      e. Take and record dimensions at time of installation.
   2. The Record Drawings shall be provided electronically in AutoCAD (or in software compatible with AutoCAD) and on reproducible material (i.e., sepia.)
   3. Provide reduced copy of record drawing at half-size with color key circuits, and laminate both sides with 5 mil thick or heavier plastic. Mount on 1/4 inch plywood board. Drill two 1/2-inch holes at top of board and hang on hooks in Custodial Room or as directed by Architect or Owner.
1.7 QUALITY ASSURANCE

A. Product Options: Drawings shall indicate size, profiles, and dimensional requirements of irrigation piping and components based on specific types and models indicated.

B. Work and materials shall be in accordance with latest rules and regulations, and other applicable state or local laws. Nothing in approved Contract Documents is to be construed to permit work not conforming to these codes.

C. Pre-Installation Meeting: Schedule meeting after excavation of trenches and installation of sleeves, but prior to installation of pipe.

1.8 PROJECT CONDITIONS

A. Investigate and determine available water supply, water pressure, water quality and flow characteristics. Report any discrepancies from design to architect.

1.9 SEQUENCING AND SCHEDULING

A. Maintain uninterrupted water service to building during normal working hours. Arrange for temporary water shutoff with Owner.

B. Coordinate irrigation piping with work specified in Division 2 Section "Landscaping."

C. Coordinate irrigation piping with utility work.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

1. Two valve box cover keys.
2. Two quick coupler keys with brass hose swivel.
3. Two manual drain valve keys.
4. Two sets of sprinkler wrenches for adjusting, cleaning or disassembly of each type of sprinkler.
5. Two each of any other tools required for any other equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. BACKFILL MATERIAL

1. Backfill material shall consist of sand, native material or topsoil with no rocks larger than 1/4 inch in any dimension. Architect shall approve on-site material for backfill operation.

2. Imported backfill material, as required, shall be clean soil, free from organic material, trash, debris, rubbish, broken cement, asphalt material, or other objectionable substances and approved by the Architect.

B. DRAINAGE FILL MATERIAL

1. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2" sieve and not more than 5% passing a No. 4 sieve.
2.2 COMPONENTS

A. Pipe and Fittings:
   1. Pipe shall be continuously and permanently marked with Manufacturer's name, size, schedule, type, and working pressure.
   2. All irrigation piping shall be Schedule 40 PVC for pipe sizes 1” through 3” and class 200 for pipe sizes 4” and larger.
   3. Mainlines shall have PVC schedule 40 fitting for pipe sizes 1” through 1-1/2”, PVC schedule 80 for pipe sizes 2” through 3” and push on ductile or Mechanical cast iron fittings on PVC mainline fitting 4” and larger.
   4. Remote Control Valve connection to mainline shall be PVC SST tee, epoxy coated double strap saddle, M.J. tee, or Hardco Ductile Irons Service tees.

B. Sleeves:
   1. Schedule 40 PVC pipe. Sleeve diameter shall be two times larger than pipe that is to be installed in sleeve. For sleeves under 4” diameter shall be PVC schedule 40. For sleeves 4” and larger shall be Class 200 PVC or PVC Sewer Pipe.
   2. Wire sleeves shall be PVC pipe or electrical tubing. Wire selves shall be 2” up to 40 wires and 2 ½ inch for 41 to 56 wires and 3” for 57 to 88 wires.

C. Sprinkler Heads:
   2. Rotors: Hunter I 20 and I 20, Radius Rotors and MP Rotators PRS40

D. Sprinkler Risers:
   1. Quick coupling valves shall have an adjustable riser, three ell swing joint assembly, unless detailed otherwise on the Drawings. These swing joint fittings shall be schedule 80 gray PVC for nipples and elbows unless otherwise approved. Horizontal nipple parallel to side of lateral line shall be 8 inches long minimum. All other nipples on swing joint riser shall be of length required for proper installation of quick coupling valve.
   2. Stationary spray pop-up sprinkler heads, shrub spray heads, stationary spray sprinkler heads and rotors heads shall have risers made up one of the following ways:
      a. Risers for irrigation spray heads with inlet size of 1/2 inch shall be swing pipe 14 inches long minimum and 24 inches maximum. Swing pipe with spiral barb fittings and street ell shall be assembled according to plan details. Equal as approved by Architect before bidding.
      b. Riser for irrigation rotor heads with 3/4 to 1 inch inlets shall have a swing joint assembly. Install according to details on drawings.

E. Valves:
   2. Manual Drain Valves: Nibco Brass Ball Gas Cock with Teflon seat or approved equal. Brass ball valve shall have “T” handle on main lines and shall be in valve boxes on lateral lines.
   3. Isolation Valves: Full port brass ball valve or approved equal as shown on drawings.
   4. Quick Coupling Valve: Hunter HQ-44LRC-R with corresponding HK44 locking key.
F. Drip Irrigation:

1. Drip Irrigation Valves: Rain Bird XCZ-100 PRB-COM.
2. Drip Tubing shall be:
   a. Rain Bird XT-700 distribution tubing or approved equal.
   b. Rain Bird 1/4 inch distribution tubing or approved equal.
3. Drip tubing fittings shall be:
   a. Rain Bird barbed insert fitting or Rain Bird compression fitting.
   b. Rain Bird 1/4 inch barb transfer fittings.
   c. Figure 8 closure for end of line.
   d. Rain Bird removable flush cap.
   e. Rain Bird diffuser bug cap.
   f. Rain Bird 1/4 inch tubing stake.
   g. Drip line tie downs stake shall be Rain Bird TDS-50 with bent 12 gauge galvanized steel staple or approved equal.
4. Drip emitter shall be Rain Bird Xeribug XB-05PC, XB-10PC and XB-20PC.

G. Control Wiring:

1. Control wire shall be UF-UL listed, color coded copper conductor direct burial size 14. Do not use green color coded wire.

H. Expansion Curls:

1. Expansion curls shall be provided within three (3) feet of each wire connection to solenoid and at least every three hundred (300) feet in length. (Expansion curls are formed by wrapping at least 5 turns of wire around a rod or pipe 1” or more in diameter, then withdrawing the rod.)

I. Valve Boxes:

1. For manual drain ball valve - 12” diameter valve box with appropriate lid. Larger size or square if required for access to valve handles.
2. For circuit and isolation valves - Carson Jumbo Box or approved equal.
3. Valve box supports - Standard size fired clay paving bricks without holes.
4. All valve boxes are to have locking lids.

J. Backflow Preventer: Wilkins 375 Reduced-pressure Backflow Assembly.

1. Submit other components recommended by Manufacturer for Architect’s review and acceptance prior to installation.
2. Provide components necessary to complete and make system operational.

K. Automatic Controller:

1. See Irrigation Schedule for Controller.

L. Flow Sensor:

M. Other Components:

1. Submit other components recommended by Manufacturer for Architect's review and acceptance prior to installation.
2. Provide components necessary to complete and make system operational.
3. If required, provide pressure booster pump and all associated equipment as required to make pump operational.

2.3 MIXES

A. Concrete for Thrust Blocks:

1. One cu. ft. cement, 2 cu. ft. sand, 4 cu. ft. gravel, and 5 gallons minimum to 6 gallons maximum water.
2. Mix thoroughly before placing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Perform pressure test at stub-out on main water line provided for irrigation system, or at nearby fire hydrant.

3.2 PREPARATION

A. During construction and storage, protect materials from damage and prolonged exposure to sunlight.

B. Work damaged during course of work of this Section shall be replaced or repaired at no additional cost to Owner. If damaged work is new, repair or replacement shall be performed by installer of original work.

C. All lateral lines shall run as is possible within planting areas and avoid conflict with the location of plant materials. Where trenching is required in proximity to plant materials care shall be taken to avoid damage to roots. Do not cut existing tree roots measuring over 2 inches in diameter.

3.4 INSTALLATION

B. TRENCHING AND BACKFILLING

1. Pulling of pipe is not permitted.
2. Over-excavate trenches 2 inches and bring back to indicated depth by filling with backfill material as specified under PART 2 - PRODUCTS. Separate out rocks larger than 1-1/2 inch in any direction uncovered in trenching operation from excavated material and remove from areas to receive landscaping.
3. Cover pipe both top and sides with 2 inches of backfill material as specified under PART 2 - PRODUCTS. Place and compact remainder of backfill to within 5 inches of finish grade shall be as specified in Related Sections. Top 5 inches of backfill shall be topsoil as specified in Related Section.
4. Do not cover pressure main, sprinkler pipe, or fittings until pressure test has been completed and Architect has inspected and approved the system.

C. EXCAVATION BEYOND EXCAVATION LIMITS
1. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove rock or other interfering objects, the void remaining after the removal of the object shall be backfilled with suitable material and compacted as per the "Earthwork" section and this specification section. The removal of all rock or other interfering objects and the backfilling of voids left by such removals shall be at the expense of the Contractor.

D. SLEEVING

1. Contractor is responsible to coordinate the installation of the sleeving with the work of other trades, (i.e., concrete, asphalt paving, etc.).
2. Sleeve water lines and control wires under walks and paving. Extend sleeves 6 inches minimum beyond walk or pavement edge. Cap sleeves until pipes and wires are installed to keep sleeve clean and free of dirt and debris.
3. Use one water pipe maximum per sleeve. Sleeve control wiring in separate sleeve.
4. Position sleeves with respect to buildings and other obstructions so pipe can be easily removed.

E. GRADES AND DRAINING

1. Grade piping so system can be completely drained.
   a. Slope mainline pipe to a minimum number of low points. Create a drainage low point within each mainline segment isolated by isolation valves. At these low points, install:
      1) 3/4 inch manual drain.
      2) Install 2 inch Class 200 PVC pipe over top of manual drain and cut at finish grade.
      3) Install rubber valve cap marker flush with finished grade.
      4) Provide pea gravel sump at outlet of each manual or automatic drain. Sump shall be 4 feet deep and one foot in diameter with top of gravel 6 inches below drain.
      5) Do not use automatic drain valves.
   b. Slope pipes under parking areas or driveways to drain outside these areas.

F. PIPE INSTALLATION

1. Install pipe in manner to provide for expansion and contraction as recommended by Manufacturer.
2. Unless otherwise indicated on approved Drawings, install main lines and lateral lines connecting rotor pop-up sprinklers with minimum cover of 18 inches based on finished grade. Install remaining lateral lines with minimum of 12 inches of cover based on finish grade.
3. Install pipe and wires under driveways or parking areas in specified sleeves 18 inches minimum below finish grade or as shown on approved Drawings.
4. Locate sprinkler heads no closer than 12 inches from building foundation. Heads immediately adjacent to mow strips, walks, or curbs shall be one inch below top of mow strip, walk, or curb and have one to 3 inches clearance between head and mow strip, walk, or curb.
5. Cut plastic pipe square. Remove burrs at cut ends prior to installation so unobstructed flow will result.
6. Make solvent weld joints as follows:
   a. Do not make solvent weld joints if ambient temperature is below 40 deg. F.
   b. Clean mating pipe and fitting with clean, dry cloth and apply one coat of P-70 primer to each.
   c. Apply uniform coat of 711 solvent to outside of pipe.
d. Apply solvent to fitting in a similar manner.
e. Re-apply light coat of solvent to pipe and quickly insert into fitting.
f. Give pipe or fitting a quarter turn to insure even distribution of solvent and make sure pipe is inserted to full depth of fitting socket.
g. Hold in position for 15 seconds minimum or long enough to secure joint.
h. Wipe off solvent appearing at outer shoulder of fitting.
i. Do not use excessive amount of solvent thereby causing obstruction to form on inside of pipe.
j. Allow joints to set at least 24 hours before applying pressure to PVC pipe.

7. Tape threaded connections with Teflon tape.
8. If pipe is larger than 2 inches, install concrete thrust blocks wherever change of direction occurs on PVC main pressure lines, unless otherwise detailed on approved Drawings.
9. If pipe is larger than 3 inches, install concrete thrust blocks wherever change of direction occurs on PVC main pressure main lines, unless otherwise detailed on approved drawings.

G. CIRCUIT MANUAL CONTROL VALVES AND VALVE BOXES

1. Install manual ball valve and run control wires into each irrigation box with a common for future expansion Wires to be non-connect with coiled 3’ extra lengths at the end of each wire run.
2. Install valves, in plastic boxes with locking reinforced heavy duty plastic covers. Locate valve box tops at finish grade. Do not install more than two valves in a single box.
3. Place pea gravel a minimum of 6 inches deep below valve for drainage. Extend pea gravel 3 inches minimum beyond limits of valve box and maintain 4 inches minimum between bottom of valve and top of pea gravel. Set valve boxes over valve so all parts of valve can be reached for service. Set cover of valve box even with finish grade. Valve box shall be reasonably free from dirt and debris.

H. WIRING

1. Tape control wire to side of main line every 10 feet. Where control wire leaves main or lateral line, enclose it in Schedule 40 PVC conduit.
2. Use white or gray color for common wire and other colors for all other wire. Each common wire may serve only one controller. Provide 24 inches of expansion loop slack wire inside valve box.
3. Run one extra control wire from panel continuously from valve to valve throughout system similar to common wire for use if a wire fails. Wire shall be different color than all other wires and shall be marked in control box as an extra wire. Extend extra control wires 24 inches and leave coiled in each valve box.

I. OTHER VALVES

1. Install quick coupling valves in appropriate locations in valve boxes as shown on plans.
2. Isolation valves, and any other equipment required by local authorities shall be installed according to local codes and requirements in order to make this system complete.
3. Install isolation valves to segment the system for maintenance.
4. Install any other equipment required by local authorities according to local codes and requirements in order to make this system complete.

J. SPRINKLER AND BUBBLER HEADS
Prior to installation of sprinkler or bubbler heads, open control valves and use full head of water to flush out system.

Set sprinkle, bubbler heads and quick-coupling valves perpendicular to finish grade.

Do not install sprinklers using side inlets; install using base inlets only.

Set sprinkler heads at a consistent distance from existing walks, curbs, and other paved areas and to grade. See "Pipe Installation" section.

K. DRIP IRRIGATION

1. Point source drip line tubing shall be installed to conform to the following:
   a. Place tubing on top of landscape fabric and under planting bed mulch.
   b. All drip line tubing shall be held in place by soil staples. Soil staples shall conform to the following:
      1) Sandy Soil: One staple every three (3) feet and two (2) staples on each change of direction (tee, elbow or cross).
      2) Loam Soil: one staple every four (4) feet and two (2) staples on each change of direction (tee, elbow or cross).
      3) Clay Soil: one staple every five (5) feet and two (2) staples on each change of direction (tee, elbow or cross).
   c. Join together all ends of tubing when possible. Install a removable flushing cap at points on the system to drain the tubing. At ends not used for flushing install a figure eight closure.

2. Point source drip line emitters installation shall conform to the following:
   a. All drip tubing shall have bug cap at end of 1/4 inch distribution tubing.
   b. All drip tubing shall be held above mulch by 1/4 inch tubing stake.
   c. The following emitters shall be installed for each plant:
      1) Perennial one (1) 0.5 gph emitters.
      2) 3'-0” shrub two (2) 0.5 gph emitters
      3) 4'-0” shrub two (2) 1.0 gph emitters
      4) 5'-0” shrub three(3) 1.0 gph emitters
      5) 6'-0” shrub four (4) 1.0 gph emitters
      6) 8'-0” shrub four (4) 2.0 gph emitters
   d. Space the point of water application evenly around the plants.
   e. For trees requiring emitter flows greater than 2 gph install a water well to hold the water so it can adequately soak in.

3. Inline drip tubing shall be installed according to manufacturers’ recommendations and project details.
   a. Place tubing under landscape fabric and planting bed mulch.
   b. Placing shall conform to the following:
      1) Sandy Soil: One staple every three (3) feet and two (2) staples on each change of direction (tee, elbow or cross).
      2) Loam Soil: one staple every four (4) feet and two (2) staples on each change of direction (tee, elbow or cross).
      3) Clay Soil: one staple every five (5) feet and two (2) staples on each change of direction (tee, elbow or cross).

L. TESTING
1. Notify Architect two working days minimum prior to testing.
2. Test pressure lines at 100 psi minimum for 6 hours minimum and make certain there are no leaks before backfilling.
3. After backfilling, perform an operating test of the entire system. Operate the entire system through one cycle of the controller for the purpose of checking coverage and assuring the absence of leaks. Repair water lines, valves, or connections which show evidence of leakage.
4. Any portion of the system which shows defects or leakage shall be repaired to the satisfaction of the Architect and the Owner or be replaced. After all repairs or replacements have been made and approved by the Architect, the above required test shall be made again.

M. IRRIGATION CONTROLLER

1. Install irrigation controller according to manufacturer’s recommendation and with proper grounding for surge and lightning protection.

N. BACKFLOW PREVENTER INSTALLATION

1. Install backflow preventer according to manufacturer’s recommendation and state and local codes.
2. Set the height of the backflow preventer to provide a minimum clearance of 12 inches between the bottom of the backflow preventer and the ground below and 4 inches of clearance between the top of the backflow preventer and the top of the backflow preventer enclosure.

O. FLOW SENSOR

1. Install flow sensor according to manufactures’ recommendations. Set flow sensor in a location where there is at least 10 upstream and 5 downstream diameters of pipe having a straight uninterrupted flow.

P. ADJUSTMENT

1. Adjust heads to proper grade when turf is sufficiently established to allow walking on it without appreciable harm. Such lowering or raising of heads shall be part of original contract with no additional cost to Owner.
2. Adjust sprinkler heads for proper distribution and trim so spray does not fall on building.
3. Adjust watering time of valves to provide proper amounts of water to all plants.

Q. SUBSTANTIAL COMPLETION

1. At the point of substantial completion of work outlined in these plans, the landscape contractor shall contact owner representative and arrange for a walk through, to verify the property installation of the system. A coverage test will be done and the system installation inspected and a punch list of final items needing completion made.

R. FINAL INSPECTION

1. Final inspection at the end of work shall be made with the owner's representative and irrigation contractor. A letter of acceptance shall be given by the owner to the contractor at the completion of the punch list and the delivery of as-built irrigation plans.
S. AS-BUILT

1. The Contractor shall keep as work is installed, an accurate record of exact dimensioned locations, grades, elevations, color of hot and spare wires, splice boxes and the size of all underground piping, valves and drains. Dimensions shall be indicated distances from columns, buildings, curbs and similar permanent features on the site. This information shall be recorded on a print as the work progresses, but shall be permanently recorded in an AutoCAD format, which shall be given to the Project Representative before the project is accepted along with two paper copies.

T. CLEAN-UP

1. Remove from site all debris resulting from work of this section.

END OF SECTION 02810
PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes trees, shrubs, lawns, topsoil, fertilizers and mulches

B. Related Sections include the following:

1. 02230 Site Clearing
2. 02250 Site Excavation & Rough Grading
3. 02300 Earthwork
4. 02350 Erosion Control
5. 02360 Topsoil Placement & Grading
6. 02630 Storm Drainage
7. 02810 Irrigation

1.2 SUBMITTALS

A. Provide samples of proposed mulch materials showing color, size range and texture including proposed source with the description of the material. Provide ½ cubic foot sample of each type.

B. Maintenance instructions recommending procedures to be established by Owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment.

B. Provide quality, size, genus, species, and variety of trees, shrubs and plants indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."

C. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

D. Substitutions: If specified Landscape Material is not obtainable, submit proof of non-availability from at least four sources to the Landscape Architect, together with a proposal for use of equivalent material for final approval.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association’s (ASPA) "Specifications for Turfgrass Sod Materials and
Transplanting/Installing."

C. Trees and Shrubs: Deliver freshly dug trees and shrubs. Do not prune before delivery, except as approved by Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery.

D. Handle balled and burlapped stock by the root ball.

E. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.

1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.5 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.

1.6 COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

1. Trees
2. Shrubs
3. Plants
4. Lawns

C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

D. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.8 TREE, SHRUB AND PLANT MAINTENANCE

A. Maintain trees, shrubs and plants by pruning, cultivating, watering, weeding, restoring planting saucers, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings. Maintain trees, shrubs and plants for the following period:

1. Maintenance Period: 60 days following Substantial Completion.

1.9 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Sodded Lawns: 30 days after date of Substantial Completion and second full mowing has been performed.

B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas to produce a uniformly smooth lawn.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4 inches.

1. Water lawn at the minimum rate of 1 inch per week.

D. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

E. Post-fertilization: Apply fertilizer to lawn after first mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb. per 1000 sq. ft. of lawn area.

PART 2 - PRODUCTS

2.1 TREE AND SHRUB MATERIAL

A. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Grade: Provide trees and shrubs of sizes and grades conforming to ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Label each tree and shrub with securely attached, waterproof tag bearing legible designation of botanical and common name.

D. Label at least 1 tree and 1 shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.
2.2 SHADE AND FLOWERING TREES
A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.
B. Small Trees: Small upright or spreading type, branched or pruned naturally according to species and type, and with relationship of caliper, height, and branching recommended by ANSI Z60.1.
C. Provide balled and burlapped trees.

2.3 CONIFEROUS EVERGREENS
A. Form & Size: Normal-quality, well balanced, coniferous evergreens, of type, height, spread and shape required, complying with ANSI Z60.1.

2.4 BROADLEAF EVERGREENS
A. Form & Size: Normal-quality well-balanced, broad leaf evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.

2.5 SHRUBS AND PERENNIALS
A. Form and Size: Shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.
B. Provide balled and burlapped or container shrubs/perennials.

2.6 SOD
A. Certified turfgrass sod complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses. Provide viable sod of uniform density, color, and texture of the following turfgrass species, strongly rooted, and capable of vigorous growth and development when planted.
   1. Species: Kentucky Bluegrass (poa poratensis), a minimum of three cultivars.

2.7 TOPSOIL
A. Provide approved imported topsoil required to bring surface to specified elevation relative to walk or curb.

2.8 FERTILIZER
A. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients:
   1. For trees and shrubs, provide fertilizer with not less than 20% nitrogen (of which 50% will be organic), 10% available phosphoric acid and 5% soluble potash.
   2. For lawns, provide fertilizer with not less than 16% nitrogen (of which 50% will be organic), 16% available phosphoric acid and 8% soluble potash. Provide nitrogen in a form that will be available to lawn during initial period of growth.

2.9 MULCHES
A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
1. Type: Long strand, shredded bark at tree, shrub and planter beds with ground cover, perennials and ornamental grasses.

2.10 WEED-CONTROL BARRIERS

A. Weed Control Barrier: 5 oz. woven, needle-punched polypropylene fabric. DeWitt Pro 5 Weed Barrier or Architect's approved equivalent:

2.11 MISCELLANEOUS MATERIALS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Layout individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.3 LAWN PLANTING PREPARATION

A. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Pits and Trenches: Excavate with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.

1. Balled and Burlapped Trees and Shrubs: Excavate approximately 3 times as wide as ball diameter and equal to ball depth.
2. Container-Grown Trees and Shrubs: Excavate as specified for balled and burlapped stock adjusted to size of container width and depth.

B. Dispose of subsoil removed from landscape excavations. Do not mix with planting soil or use as backfill.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits. Test drainage of tree and shrub planting pits by filling with water twice in succession. Conditions permitting the retention of water in planting pits for more than twenty-four hours shall be brought to the attention of the owners’ representative. Submit in writing a proposal for the correction to the owners’ representative for approval before proceeding with work.

E. Fill excavations with water and allow the water to percolate out, before placing setting layer and positioning trees and shrubs.
3.5 PLANTING TREES AND SHRUBS

A. Set balled and burlapped stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.
   1. Place stock on undisturbed or compacted topsoil.
   2. Remove burlap and wire baskets from tops of balls and partially from sides, but do not remove from under balls. Remove pallets, if any, before setting. Do not use planting stock if ball is cracked or broken before or during planting operation.
   3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. Backfill to consist of one (1) part topsoil and one (1) part native soil clean and free from toxic mineral and chemicals, noxious weeds, rocks larger than 1-1/2 inch in any dimension, and other objectionable materials. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

B. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.
   1. Carefully remove containers so as not to damage root balls.
   2. Place stock on undisturbed or compacted topsoil.
   3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. Backfill to consist of one (1) part topsoil and one (1) part native soil clean and free from toxic mineral and chemicals, noxious weeds, rocks larger than 1-1/2 inch in any dimension, and other objectionable materials. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

C. Dish and tamp top of backfill to form a 3-inch-high mound around the rim of the pit. Do not cover top of root ball with backfill.

3.6 TREE AND SHRUB PRUNING

A. Prune, thin, and shape trees and shrubs as directed by Architect.

B. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are size after pruning.

3.7 PLANTING PLANTS

A. Space plants as indicated.

B. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.8 MULCHING

A. Mulch backfilled surfaces of pits, trenches, planted areas, and other areas indicated.

B. Weed-Control Barriers: Install weed-control barriers according to manufacturer's recommendations, before mulching. Completely cover area to be mulched; lapping edges a minimum of 6 inches. Do not place weed-control barriers in perennial and surface-rooting ground cover locations.
C. Place shredded bark mulch at all tree location in turf areas and in planter beds with trees, shrubs, perennials and ornamental grasses.

D. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems.

1. Thickness: 3 inches.

3.9 SODDING NEW LAWNS

A. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to sub grade or sod during installation. Tamp and roll lightly to ensure contact with sub grade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below the sod.

3.10 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.

1. When deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting.

3.11 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.12 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner’s property.

END OF SECTION
DIVISION 3 - CONCRETE
03300 Cast-In-Place Concrete
03400 Architectural Precast Concrete Sills
SECTION 03300 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section specifies cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Footings.
   2. Slabs-on-grade.
   3. Underslab vapor barrier.
B. Related Sections include the following:
   1. Division 2 Section “Earthwork” for drainage fill under slabs-on-grade.
   2. Division 2 Section “Cement Concrete Pavement” for concrete pavement and walks.
   3. Division 3 Specification “Architectural Precast Concrete”.

1.3 DEFINITIONS
C. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS
A. Product Data: For each type of product indicated.
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.
   1. .
E. Samples: For waterstops, vapor retarder.
F. Welding certificates.
G. Qualification Data: For Installer.

H. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates.

I. 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.
10. Adhesives.
11. Semirigid joint filler.

J. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

K. Field quality-control test reports and inspection reports

1.5 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, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specification for Structural Concrete”.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials.”

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will 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.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

G. Architectural Concrete Form Ties: Cone tapered.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut bars 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. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

   a. Fly Ash: ASTM C 618, Class C or F
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 1S coarse aggregate or better, graded. Provide aggregates from a single.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.


2.5 ADMIXTURES


B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will 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.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.

1. Color: As selected by Architect from manufacturer's full range.

2.6 FIBER REINFORCEMENT

A. Synthetic Fiber: fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, [1/2 to 1-1/2 inches (13 to 38 mm)] long.

1. Available Products:
   a. Fibrillated Fibers:
      1) Axim Concrete Technologies; Fibrasol F.
      2) Euclid Chemical Company (The); Fiberstrand F.
      3) FORTA Corporation; Forta.
      5) SI Concrete Systems; Fibermesh.

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.7 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. (305 g/sq. m) 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, dissipating.

F. 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.
G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating[, certified by curing compound manufacturer to not interfere with bonding of floor covering].

H. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

I. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.8 RELATED MATERIALS


B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, 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, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 VAPOR BARRIER

A. Plastic Vapor Retarder: ASTM E 1745, Class A (or polyethylene sheet, not less than 15 mils thick. Install per ASTM E-164 3 & per manufacturers written instructions. Include manufacturer’s recommended adhesive or pressure-sensitive joint tape.

1. Products:
   a. W.R. Meadows, Inc. Perimeter
   b. Raven Industries Inc.; Vapor Block.
   d. Stego Industries, LLC; StegoWrap.

B. Vapor Retarder Accessories:
   1. Seam Tape:
      a. Water Vapor Transmission Rate ASTM E96/E96M, 0.1 perms or lower
      b. Stego Tape by Stego Industries
   2. Vapor Proofing Mastic:
      a. Water Vapor Transmission Rate ASTM E96/E96M, 0.1 perms or lower
   3. Pipe Boots:
      a. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer’s instructions.
   4. Perimeter Seal Accessories
      a. Stego Tack Tape by Stego Industries

2.10 REPAIR MATERIALS
A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than [4100 psi (29 MPa)] at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlay: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than [5000 psi (34.5 MPa)] 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: 20 percent.
2. Combined Fly Ash and Pozzolan: 20 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 20 percent.
5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 30 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. 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 water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:
   1. Per Structural Drawings.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
   1. Per Structural Drawings.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
   1. Per Structural Drawings.

D. Suspended Slabs: Proportion normal-weight concrete mixture as follows:
   1. Per Structural Drawings

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 (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
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.

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 ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
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 (10 deg C) for [24] <Insert number> hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports 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 will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing 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 would 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, 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.

3.5 VAPOR RETARDER

A. Installation shall be in accordance with manufacturer's instructions and most current version of ASTM E1643.

1. Unroll Vapor Barrier/Retarder with the longest dimension parallel with the direction of the pour.

2. Lap Vapor Barrier/Retarder over footings and seal to slab perimeter foundation walls using track tape termination bar or combination of both.

3. Overlap joints 6 inches and seal with manufacturer’s tape

4. Seal all penetrations (including pipes) per manufacturer’s instructions

5. No penetration of the Vapor Barrier/Retarder is allowed except for reinforcing steel and permanent utilities.

6. Repair damaged areas by cutting patches of Vapor Barrier/Retarder, overlapping damaged area 6 inches and taping all four sides with tape.

3.6 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 (38 mm) into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

6. 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 (3.2 mm). 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- (3.2-mm-) wide joints into concrete when cutting action will 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 (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 7 Section "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.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement 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 will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not 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 (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing 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.
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.

F. 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 (4.4 deg C) 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.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) 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.

3.8 FINISHING FORMED SURFACES

A. 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.

B. 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.

3.9 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 (6 mm) in 1 direction.

1. Apply scratch finish to surfaces 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 float. 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 to receive trowel finish.

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 exposed to view or to be covered with resilient flooring, carpet, ceramic tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

2. Carpeted Areas - Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 15; and of levelness, F(L) 12; for slabs-on-grade.

3. Thin Set Flooring including VCT, Gym Flooring, Thin Set Tile - Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.

4. Finish and measure surface so gap at any point between concrete surface and an un leveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch (6 mm).

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. 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, and 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.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete 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: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.11 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 301 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 (1 kg/sq. m 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 the remainder of the 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 (300-mm) 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 (300 mm), 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 will 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. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will 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.

3.12 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 joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 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 one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) 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 (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

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 (0.25 mm) 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 (6 mm) 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 (25 mm) 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 (19-mm) 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 (25 mm) 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.
3.14 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections: See structural plans for required inspections. At the minimum, inspect the following:

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 shall be performed as shown in the structural drawings and 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. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
   a. When frequency of testing will provide 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, 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 (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure sets of two standard cylinder specimens for each composite sample as required by the building official.
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 (3.4 MPa).

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 (ASTM E 1155) within [72] hours of finishing. Submit test reports.

1. If the overall values F(f) or F(L) are not met, remediation is required at no additional cost to the Owner or Architect. Remediation might include grinding, planning, surface repair, retopping or removal and replacement. Additional testing will be required to determine the entire area for remediation.

END OF SECTION 03300
PART 1 - GENERAL

1.1 SCOPE OF WORK
A. This Section includes precast concrete units including window sills, caps.

1.2 PERFORMANCE REQUIREMENTS
A. Structural Performance: Provide precast concrete units and connections capable of withstanding design loads within limits and under conditions indicated.
B. Provide precast structural concrete units and connections capable of withstanding the design loads within limits and under conditions indicated on drawings.

1.3 SUBMITTALS
A. Product Data: For each product indicated.
B. Shop Drawings: Detail fabrication and installation of precast concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, openings, and types of reinforcement, including special reinforcement.
C. Welding and Material Certifications.

1.4 QUALITY ASSURANCE
A. Fabricator Qualifications: A qualified fabricator who assumes responsibility for engineering precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer. Design Standards and Quality Control standards shall be in accordance with “PCI Design Handbook”.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so markings are visible.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Steel Reinforcing:
   1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Concrete:
   1. Portland Cement: ASTM C 150, Type I or Type III, match color sample, of same type, brand, and source.
   2. Normal-Weight Aggregates except as modified by PCI MNL.
   4. Maximum Water-Cementitious Materials Ratio: 0.40. Compressive Strength (28 days): 5000 psi (34.5 Mpa).
   5. Provide colored concrete to match architect supplied sample from manufacturer's standard colors.
   6. Provide white sand to accommodate white color finish.

C. Steel Connections:
   2. Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating.
   3. Shop-Primed Finish: Prepare surfaces of nongalvanized steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3.

D. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application.

2.2 FABRICATION

A. Anchorage Hardware: Fabricate with sufficient anchorage and/or embedment to comply with design requirements.

B. Fabricate precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 116 product tolerances as well as position tolerances for cast-in items.

C. Finish formed surfaces of precast structural concrete as indicated for each type of unit, and as follows: Grade A Finish. Screed finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections.

2.3 SOURCE QUALITY CONTROL

A. Owner will employ an independent testing agency to evaluate precast structural concrete fabricator’s quality-control and testing methods.

B. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 116 requirements.
C. Strength of precast concrete units will be considered deficient if units fail to comply with PCI MNL 116 requirements.

D. Defective Work: Precast concrete units that do not comply with requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

Supply precast concrete units to the site for installation by Division 4 Section. Obtain written approval from the Division 4 Contractor for acceptance of quality of units.

A. Install precast concrete. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.

B. Anchor precast concrete units in position by bolting, welding, grouting, or as otherwise indicated.

C. Install precast concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 127.

D. Repair exposed exterior surfaces of precast concrete units to match color, texture, and uniformity of surrounding precast concrete if permitted by Architect.

E. Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains.

END OF SECTION 03400
DIVISION 4 - MASONRY

04810  Unit Masonry Assemblies
SECTION 04810 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Structural general notes take precedence over specification notes if in conflict.

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units (CMUs) – integral color.
   2. Reinforcing steel.
   3. Masonry joint reinforcement.
   4. Embedded flashing.
   5. Miscellaneous masonry accessories.

B. Related Sections include the following:
   1. Division 7 Section “Building Insulation” for foamed in place masonry wall cells.
   2. Division 7 Section “Water Repellents” for water repellents applied to unit masonry assemblies.
   3. Division 7 Section “Sheet Metal Flashing and Trim” for exposed sheet metal flashing.
   4. Division 7 Section “Through-Penetration Firestop Systems” for firestopping at openings in masonry walls.
   5. Division 7 Section “Joint Sealants” for sealing control and expansion joints in unit masonry.

C. Products installed, but not furnished, under this Section include the following:
   1. Architectural pre-cast concrete sills and caps.
   2. Manufactured reglets in masonry joints for metal flashing, furnished under Division 7 Section “Sheet Metal Flashing and Trim.”

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths \( f'_{m} \) at 28 days.
B. Determine net-area compressive strength \( f'_{m} \) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
C. Determine net-area compressive strength \( (f'_{nm}) \) of masonry by testing masonry prisms according to ASTM C 1314.

1.5 SUBMITTALS

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

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Verification: For each type and color of the following:

1. Exposed concrete masonry units.
2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

D. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. Masonry units.
   a. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to.

F. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.6 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

C. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical wall area as required by Architect.
2. Build mockups for typical exterior in sizes approximately 72 inches (1800 mm) long by full height by full thickness, including face and accessories.
   a. Include a sealant-filled joint at least 16 inches (400 mm) long in exterior wall mockup.
   b. Include lower corner of window opening at upper corner of exterior wall mockup.
   c. Include range of color and mix of units in proportion of final anticipated range.
   d. Include exposed to view bottom of CMU headers.
3. Clean exposed faces of mockups with masonry cleaner as indicated.
4. Protect accepted mockups from the elements with weather-resistant membrane.
5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day’s work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry including any masonry cutting or drilling residue by other trades.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.


PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL (See masonry unit legend)

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.2 CONCRETE MASONRY UNITS (CMUs)

NOTE: Amcor Products manufactured by Old Castle in Idaho Falls are not acceptable products without approval of Architect prior to bidding. No Pumis block.

A. Shapes: Provide shapes indicated and as follows:

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. Concrete Masonry Units: ASTM C 90. See structural sheet notes. Provide medium weight units per structural.

1. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions
2. Exposed Faces: Provide integral color and texture matching the range represented by Architect's sample and approved in the mock up.

C. Concrete Masonry Units: ASTM C90. See structural sheet notes.

1. Size (width): Manufactured to dimensions specified in "Concrete masonry Units" paragraph above.
2. Pattern and Texture:
   a. Standard face
   b. Ground honed finish
   c. Split face finish

2.3 MASONRY LINTELS
A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from lintel block concrete masonry units and u-block units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured. Bond beam blocks will not be allowed. No exposed to view grout cells. Blocks which show telegraphing of cores will not be acceptable and will be required to be replaced at no expense to Owner or Owner’s Representative.

2.4 MORTAR AND GROUT MATERIALS – See structural notes

A. Mortar Cement: ASTM C 1329.

1. Available Products:

B. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar. Range of acceptable mortar color variation not to exceed approved mock up.

C. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.


E. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer’s colors.

F. Refractory Mortar Mix: Ground fireclay or non-water-soluble, calcium aluminate, medium-duty refractory mortar that passes ASTM C 199 test; or an equivalent product acceptable to authorities having jurisdiction.

G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units compatible with specified sealers, containing integral water repellent by same manufacturer.

I. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinfacring Bars: See structural notes.
2.6 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual At contractor's option, use one of the following:

1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.0 mm).

2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy as follows:

a. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch (1.0 mm) thick.

b. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch (0.6 mm) thick, with a 0.015-inch (0.4-mm-) thick coating of rubberized-asphalt adhesive.

c. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch (3.6-mm) steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
1. Available Products:
   a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
   c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
   d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.9 MASONRY CLEANERS

   A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.11 MORTAR AND GROUT MIXES

   A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

   1. Do not use calcium chloride in mortar or grout.
   2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
   3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement, mortar cement, and lime.
   4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

   B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

   C. Mortar for Unit Masonry: As noted on structural drawings, per structural notes, comply with ASTM C 270, BIA Technical Notes 8A Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

   1. For masonry below grade or in contact with earth, use Type S.

   D. Mortar for Unit Masonry: Comply with ASTM C 270, BIA Technical Notes 8A, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

   E. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

   1. Pigments shall not exceed 10 percent of portland cement by weight.
   2. Pigments shall not exceed 5 percent of [masonry cement] [or] [mortar cement] by weight.
   3. Mix to match Architect's sample.
F. Grout for Unit Masonry: Per structural notes.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
   2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

G. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

2.12 SOURCE QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:
   1. Payment for these services will be made by Owner.
   2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

B. Concrete Masonry Unit Test: For each type of unit furnished, per ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Sort out excessively chipped or damaged units and remove from site.

3.2 INSTALLATION, GENERAL

A. Thickness: Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.
7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

G. Where ceiling/soffits butt to masonry walls provide a smooth face CMU. Coordinate with architect for type.

H. Where appendages attach to CMU walls provide smooth face CMU. Coordinate with general contractor & architect for type.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal running bond 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that
are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

I. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

J. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

K. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated in the drawings.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section "Fire-Resistive Joint Systems."

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

3.7 LINTELS AND SILLS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

D. Install pre-cast concrete sills - supplied by other sections where indicated.

3.8 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar.
and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602. for cleanouts with requirements in [ACI 530.1/ASCE 6/TMS 602] and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 48 inches

3.9 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:

1. Payment for these services will be made by Owner.

2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

C. Testing Frequency: See Quality Assurance plan on structural drawings. As a minimum, provide one set of tests for each 5000 sq. ft. (465 sq. m) of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140.

F. Mortar Test (Property Specification): For each mix provided, per ASTM C 780.

G. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.

H. Prism Test: For each type of construction provided, per ASTM C 1314 at 28 days.

3.10 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, etched due to cleaning methods employed or otherwise damaged or that do not match adjoining units as determined by the Architect. Install new units to match adjoining units; install in fresh mortar (color matched), pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints. Spray pressure washing which damages CMU is not acceptable.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows: Do not use methods that visually etch or otherwise damage CMU or mortar.

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleared for comparison purposes. Let test area dry 3 to 7 days before inspection. Obtain Architect’s approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Use of a concentrated, general-purpose acidic cleaner that improves the color and uniformity of most custom masonry is recommended. Cleaner should remove concrete splashes, excess mortar, mud, retarders, heavy efflorescence, rust and surface soiling from textured custom masonry surfaces.
5. Before applying, read the manufacturer’s recommendation for cleaning. Refer to test area results for recommended dilution for intended use.
   a. Clean wall within 14 days of completion. Always pre-wet surface with clean water. On vertical surfaces, keep lower areas wet to avoid streaks. Start at bottom and work up.
   b. Apply the pre-diluted cleaning solution directly to surface using a masonry brush or low pressure spray.
   c. Let cleaner dwell for 2-3 minutes. Do not let cleaner dry into surface. If the surface begins to dry, reapply cleaner.
   d. Reapply cleaner. Scrub or scrape areas of heavy soiling using wood blocks or nonmetallic scrapers.
   e. Rinse thoroughly with fresh water. The best combination of rinsing pressure and water volume is provided by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip. Equipment should be adjustable to reduce water flow rate and rinsing pressure as required for controlling cleaning of more sensitive surfaces. If pressure-rinsing equipment is not available, brush the surface while rinsing.
6. Provide written acceptance of cleaning from masonry sealing contractor, Section 07180 and Architect immediately prior to sealing of masonry.

3.11 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor’s property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner’s property.
DIVISION 5 - METALS
05120  Structural Steel
05210  Steel Joists
05310  Steel Deck
05500  Metal Fabrications
SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY (See general structural notes) Notes take precedence over specification if in conflict.

A. This Section includes the following:

1. Structural steel.
2. Prefabricated building columns.

B. Related Sections include the following:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Steel Deck" for field installation of shear connectors.
3. Division 5 Section "Metal Fabrications" for not defined as structural steel.
4. Division 9 painting Sections for surface preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 SUBMITTALS

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

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.
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 certificates.

D. Qualification Data: For Installer fabricator.

E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Direct-tension indicators.
4. Tension-control, high-strength bolt-nut-washer assemblies.
5. Shear stud connectors.

F. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category.

C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

E. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC’s "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
4. AISC’s "Specification for the Design of Steel Hollow Structural Sections."
5. AISC’s "Specification for Allowable Stress Design of Single-Angle Members”
6. RCSC’s "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1.7 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.
B. Channels, Angles-Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Corrosion-Resisting Structural Steel: ASTM A 588/A 588M, Grade 50 (345).

E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

F. Corrosion-Resisting Cold-Formed Hollow Structural Sections: ASTM A 847, structural tubing.

G. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
   1. Weight Class: Per structural plans.
   2. Finish: Black.

H. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
   1. Finish: Plain.
   2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type.
      a. Finish: Plain.

B. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy hex steel structural; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers, plain.
   1. Direct-Tension Indicators: ASTM F 959, Type 490 (ASTM F 959M,) (Type 10.9), compressible-washer type, plain.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy hex head steel structural bolts with splined ends; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
   1. Finish: Plain.

D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

E. Unheaded Anchor Rods: Per structural plans.
   1. Configuration: [Straight] [Hooked].
   5. Finish: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].
F. Headed Anchor Rods: Per structural plans.

4. Finish: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].

G. Threaded Rods: ASTM A 36/A 36M.

3. Finish: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].


2.3 PRIMER

A. Primer: Fabricator’s standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

B. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION


1. Camber structural-steel members where indicated.
2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
3. Mark and match-mark materials for field assembly.
4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC’s "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.
1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, seam marks, roller marks, rolled trade names, and roughness.
2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

C. 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.

D. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

F. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, Hand Tool Cleaning."

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

H. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.

I. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) o.c., unless otherwise indicated.

J. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Base-Plate 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 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
   1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
   a. Grind butt welds flush.
   b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

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 (50 mm).
   2. Surfaces to be field welded.
   3. Surfaces to be high-strength bolted with slip-critical connections.
   4. Surfaces to receive sprayed fire-resistive materials.
   5. Galvanized surfaces.
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 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 dry film thickness of not less than 1.5 mils (0.038 mm). 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 inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.8 SOURCE QUALITY CONTROL
A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
   1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
4. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3- EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

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’s “Code of Standard Practice for Steel Buildings and Bridges” and “Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design.”


1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
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 base or bearing plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer’s written installation instructions for shrinkage-resistant grouts.
C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

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. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. Do not use thermal cutting during erection.

H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
   a. Grind butt welds flush.
   b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
   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 will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

E. See structural drawings for additional inspection & testing requirements.

3.6 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 05120
SECTION 05210 - STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY (See general structural notes) Notes take precedence over specification if in conflict.

A. This Section includes the following:
   2. LH-series long-span steel joists.

B. Related Sections include the following:
   1. Division 3 Section "Cast-in-Place Concrete" for installing bearing plates in concrete.
   2. Division 4 Section "Unit Masonry Assemblies" for installing bearing plates in unit masonry.
   3. Division 5 Section "Metal Fabrications" for furnishing steel bearing plates.

1.3 DEFINITIONS

A. Special Joists: Joists requiring modification by the manufacturer to support nonuniform, unequal, or special loading conditions that invalidate SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders."

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads within limits and under conditions indicated.

B. Structural Performance: Provide special joists and connections capable of withstanding the following design loads within limits and under conditions indicated on structural drawings:

C. Design joists to withstand design loads with total load deflections no greater than the following:


1.5 SUBMITTALS

A. Product Data: For each type of joist, accessory, and product indicated.
B. Shop Drawings: Show layout, mark, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, accessories; splice and connection locations and details; and attachments to other construction.

1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.
2. Comprehensive engineering analysis signed and sealed by the qualified professional engineer responsible for its preparation.

C. Welding Certificates: Copies of certificates for welding procedures and personnel.

D. Mill certificates signed by manufacturers of bolts certifying that their products comply with specified requirements.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Research/Evaluation Reports: Evidence of steel joists’ compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing joists similar to those indicated for this Project and with a record of successful in-service performance.

1. Manufacturer must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.
2. Assumes responsibility for engineering special joists to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
3. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of joists that are similar to those indicated for this Project in material, design, and extent.

B. SJI Specifications: Comply with SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, "Specifications"), applicable to types of joists indicated.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.3 "Structural Welding Code--Sheet Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.8 SEQUENCING
A. Deliver steel bearing plates and other devices to be built into concrete and masonry construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI's "Specifications" for chord and web members.
B. Steel Bearing Plates: ASTM A 36/A 36M.
C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
   1. Finish: Plain, uncoated.
D. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
   1. Finish: Plain, uncoated.
E. Welding Electrodes: Comply with AWS standards.
F. Galvanizing Repair Paint: ASTM A 780.

2.2 PRIMERS

A. Primer: SSPC-Paint 15, Type I, red oxide; FS TT-P-636, red oxide; or manufacturer's standard shop primer complying with performance requirements of either of these red-oxide primers.
B. Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements in FS TT-P-664.

2.3 OPEN-WEB K-SERIES STEEL JOISTS

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
C. Provide holes in chord members for connecting and securing other construction to joists.
D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
F. Camber joists according to SJI's "Specifications."

G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.4 LONG-SPAN STEEL JOISTS

A. Manufacture steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series," in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as follows:

2. End Arrangement: Underslung.
3. Top-Chord Arrangement: Parallel unless noted otherwise on structural plans.

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

C. Provide holes in chord members for connecting and securing other construction to joists.

D. Camber long-span steel joists according to SJI's "Specifications."

E. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.5 JOIST GIRDER

A. Manufacture joist girders according to "Standard Specifications for Joist Girders," in SJI's "Specifications," with steel-angle top- and bottom-chord members; with end and top-chord arrangements [as follows:] [as indicated.]

1. End Arrangement: Underslung with bottom-chord extensions.
2. Top-Chord Arrangement: Parallel unless otherwise noted on the plans.

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

C. Provide holes in chord members for connecting and securing other construction to joist girders.

D. Camber joist girders according to SJI's "Specifications."

E. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.6 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.

B. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications."
C. Bridging: Fabricate as indicated and according to SJI's "Specifications."
   1. Furnish additional erection bridging if required.

D. Fabricate steel bearing plates with integral anchorages of sizes and thicknesses indicated. Shop prime paint.

E. Steel bearing plates with integral anchorages are specified in Division 5 Section "Metal Fabrications."

F. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface, unless otherwise indicated.

G. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.7 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories to be primed by or power-tool cleaning, SSPC-SP 3.

B. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil (0.025 mm) thick.

C. Painting of joists and joist accessories is specified in Division 9 Section "Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
   1. Before installation, splice joists delivered to Project site in more than one piece.
   2. Space, adjust, and align joists accurately in location before permanently fastening.
   3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
   4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.
C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.

E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted connections will be visually inspected.

1. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's "Allowable Stress Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts."

C. Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.

D. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.3 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates and abutting structural steel.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 Section "Painting."

D. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05210
SECTION 05310 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY (See general structural notes) Notes take precedence over specifications if in conflict.

A. This Section includes the following:

1. Roof deck.
2. Acoustical roof deck w/insulation above flutes. Furnish insulation to Division 7 Section for installation by Division 7 – 07540 Flexible Sheet Roofing.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete fill and reinforcing steel.
2. Division 5 Section "Structural Steel" for shop-welded shear connectors.
3. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
4. Division 9 Section "Painting" for repair painting of painted deck.
5. Division 7 Section 07540 for installation of acoustic deck insulation.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

1. Acoustical roof deck with insulation.

F. Research/Evaluation Reports: Evidence of steel deck’s compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE
A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.


C. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

D. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."


1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Deck:
   a. BHP Steel Building Products USA Inc.
   b. Consolidated Systems, Inc.
   c. Epic Metals Corp.
   d. Marlyn Steel Products, Inc.
   e. Nucor Corp.; Vulcraft Div.
   f. Roof Deck, Inc.
   g. United Steel Deck, Inc.
   h. Verco Manufacturing Co.
   i. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

2.2 ROOF DECK
A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29, and the following (see structural plans for locations of various deck thicknesses and finishes):

1. Prime-Painted Steel Sheet: ASTM A 611, Grade C minimum, shop primed with gray or white baked-on, lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.
2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230), G60 (Z180) zinc coating.
3. Deck Profile: Per structural plans.
4. Profile Depth: Per structural plans.
5. Design Uncoated-Steel Thickness: Per structural plans.
6. Span Condition: Triple span or more.
7. Side Laps: Per structural plans.

2.3 ACOUSTICAL ROOF DECK – Gym

A. Acoustical Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with “SDI Specifications and Commentary for Steel Roof Deck,” in SDI Publication No. 29, and the following:

1. Prime-Painted Steel Sheet: ASTM A 611, Grade C minimum, shop primed with gray or white baked-on, lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.
2. Insulation Type 1.1 lb./cu. Ft. density. Profile to suit decking type to conform to manufacturers requirements to achieve NRC 0.80 rating per ASTM C 423.

2.5 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 12 (4.8 mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 29 for overhang and slab depth.

H. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

I. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
J. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, [0.0598 inch (1.52 mm)]
[0.0747 inch (1.90 mm)] thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum
diameter. Use these as required on 22 gauge deck.

K. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material
and finish as deck. For drains, cut holes in the field.

L. Shear Connectors: ASTM A 108, Grades 1010 through 1020 headed stud type, cold-
finished carbon steel, AWS D1.1, Type B, with arc shields.

M. Galvanizing Repair Paint: ASTM A 780.

N. Repair Paint: Lead- and chromate-free rust-inhibitive primer complying with performance
requirements of FS TT-P-664.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for
installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and
commentary in SDI Publication No. 29, manufacturer’s written instructions, and
requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection
limitations.

C. Locate decking bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately
aligned and bearing on supporting frame before being permanently fastened. Do not
stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or
deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work
projecting through or adjacent to decking.

G. Provide additional reinforcement and closure pieces at openings as required for strength,
continuity of decking, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding,
appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF DECK INSTALLATION

A. Fasten roof deck panels to steel supporting members per structural plans.
B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, per structural plans.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
   1. End Joints: Per structural plans.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least 1 weld at each corner.

E. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, insulation, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

G. Furnish acoustic deck insulation to Division 7 Section in a timely manner for installation by Division 7 Section.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.

B. Field welds will be subject to inspection.

C. Shear connector stud welds will be inspected and tested according to AWS D1.1 for stud welding and as follows:
   1. Shear connector stud welds will be visually inspected.
   2. Bend tests will be performed if visual inspections reveal less than a full 360-degree flash or welding repairs to any shear connector stud.
   3. Tests will be conducted on additional shear connector studs if weld fracture occurs on shear connector studs already tested according to AWS D1.1.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Remove and replace work that does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on top surface of prime-painted deck immediately after installation, and apply repair paint.

C. Repair Painting: Wire brushing, cleaning and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 9 Section.
D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310
SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

2. Guardrail
3. Steel ladders exterior and interior.
4. Loose bearing and leveling plates.
5. Steel framing and supports for ceiling mounted urinal posts.
6. Steel framing and supports for countertops.
7. Steel framing and supports for mechanical and electrical equipment.
8. Entrance canopy column
9. Steel framing and supports for applications where framing and supports are not specified in other Sections.

B. Related Sections include the following:

1. Division 5 Section "Structural Steel" for structural-steel framing system components.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Paint products.
2. Grout.

B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1. Provide templates for anchors and bolts specified for installation under other Sections.

1.4 QUALITY ASSURANCE

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

B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."
3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.
C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
D. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
E. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
F. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

G. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

A. Interior handrails, guardrails, ladders other exposed to view metal fabrications. Shop primer for ferrous metal that complies with Division 9 section “Painting”.

B. Powder coat exterior handrails, ladders & interior countertop support brackets. Thermosetting polyester 1.5 mils cured film thickness.

2.3 FASTENERS

E. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

F. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

G. Anchor Bolts: ASTM F 1554, Grade 36.


I. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).


L. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.


2. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

2.5 GROUT

A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

2.6 CONCRETE FILL

A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.7 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.
K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.8 STEEL LADDERS
A. General: Fabricate ladders for locations shown, with dimensions, spacings, details, and anchorages as indicated.
   1. Comply with ANSI A14.3, unless otherwise indicated.
   2. For elevator pit ladders, comply with ASME A17.1.
B. Siderails: Continuous, 1/2-by-2-1/2-inch (12-by-64-mm) steel flat bars, with eased edges, spaced 18 inches (457 mm) apart.
C. Bar Rungs: 3/4-inch- (19-mm-) diameter steel bars, spaced 12 inches (300 mm) o.c.
D. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
E. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets. Size brackets to support design loads specified in ANSI A14.3.
F. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung by a proprietary process.
G. Exterior Ladders to be powder coated.

2.9 LOOSE BEARING AND LEVELING PLATES
A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
B. Galvanize plates after fabrication.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS
A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
B. General: Provide steel framing and supports indicated and as necessary to complete the Work.
C. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
   1. Fabricate units from slotted channel framing where indicated.
   2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long at 24 inches (600 mm) o.c., unless otherwise indicated.
   3. Furnish inserts if units must be installed after concrete is placed.
D. Fabricate supports for operable partitions as follows:

1. Beams: Continuous steel shapes of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

2.12 STEEL COUNTER SUPPORT BRACKETS – POWDER COAT

2.13 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches (150 mm) from each end, 6 inches (150 mm) from corners, and 24 inches (600 mm) o.c., unless otherwise indicated.

2.14 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.15 STEEL AND IRON FINISHES

A. Provide powder coat finish of exterior metal fabrications & interior countertop support brackets, color as selected by Architect.

B. Interior miscellaneous metal fabrications prime paint in preparation for final painting per Division 9 Section Paint.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 SETTING BEARING AND LEVELING PLATES


B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
   1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
   2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
   1. Where grout space under bearing plates is indicated at girders supported on concrete or masonry, install as specified above for setting and grouting bearing and leveling plates.
D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified above for setting and grouting bearing and leveling plates.

   1. Do not grout baseplates of columns supporting steel girders until girders are installed and leveled.

3.4 ADJUSTING AND CLEANING

   A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

      1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness minimum – match factory finish.

END OF SECTION 05500
DIVISION 6 - WOOD & PLASTICS
06100 Rough Carpentry
06165 Sheathing
06173 Wood I-Joists
06402 Interior Architectural Woodwork
SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL: See structural drawings general notes.

1.10 RELATED DOCUMENTS

A. The general provisions of the contract, including General and Supplementary Conditions and General Requirements and all codes and standards referenced, apply to the work specified in this section.

1.1 SCOPE OF WORK

A. Dimensional lumber
B. Laminated veneer lumber
C. Engineered Products
D. Rough Hardware
E. Rubberized asphalt flashings.
F. Blocking
G. Plywood Backing Panels & Parapet Caps
H. Coordinate Stud Layouts w/Division 9 Tackable Wall System Panel Layouts

1.2 SECTION REQUIREMENTS

A. Submittals: Submit the following:
   1. Product data for engineered wood products, underlayment, metal framing anchors, and construction adhesives.
   2. Material certificates for dimension lumber indicated for compliance with selected minimum design values.
   3. Wood treatment data including treatment plant’s certification of compliance with indicated for compliance of engineered wood products and metal framing anchors.

1.3 QUALITY ASSURANCE

A. Reference Standards:

B. Grade Stamps: (All lumber to be grade stamped).
   1. Lumber: Each piece shall be WWPA grade stamped.
   2. Redwood: Each piece shall be RIS grade stamped.

C. Delivery, Storage and Handling
   1. Stack all material minimum of 6” above ground to insure proper ventilation and cover with waterproof covering.
PART 2 - PRODUCTS:

2.1 FRAMING LUMBER

A. Sound, thoroughly seasoned, surfaces four sides, well manufactured and free from warp not correctable by bridging, blocking or nailing.

B. Moisture Content: Maximum of 19 percent

C. General Framing: As per structural drawings.

D. Blocking: Hem-Fir, Utility grade or better.

E. Furring: Hem-Fir, Standard grade or better.

F. Composite Lumber, LSL or LVL as per plans.

2.2 WOOD-PRESERVATIVE TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:
   a. Chromated copper arsenate (CCA) – HIM Fir

2.3 METAL FRAMING ANCHORS

A. Acceptable Manufacturers:

1. Timber Engineering Co.
2. Simpson Co.
3. Or approved equal

B. General: Provide nails and bolts according to manufacturer’s requirements.

C. Types: Use the following types unless indicated otherwise:

1. All purpose Framing Anchors: Simpson “A35N” or teco “All Purpose”.

2.4 ROUGH HARDWARE

A. Nails: Use common wire nail lengths and diameters unless noted. Threaded, hardened steel nails may be substituted for common size nails of corresponding size. Use annular-ring, common-wire, galvanized nails for plywood. Galvanized nails shall be hot-dip galvanized, ASTM A307.


C. Washers: Provide steel washers under all heads and nuts bearing against wood. Surface areas of washer to be minimum of 16 times the shank area of the receiving bolt or lag screw. Thickness not less than 1/10 of the washer diameter or length of longest side.

D. Steel Plates, Straps and Weldments: ASTM A36, size as indicated. Where welded, provide minimum of 3/16” fillet welds all sides and full length of contact surfaces unless noted. Use E60 or E70 welding electrodes. Prime with shop paint.
2.5 POWER-DRIVEN ANCHORS

A. Ramset or equivalent low velocity power driven fasteners, minimum 1/8" shank diameter. Length as required to penetrate receiving member and back-up material an accordance with manufacturer’s recommendations.

2.6 ENGINEERED WOOD PRODUCTS:

A. Provide the following products, in sizes indicated, for which current model code organization evaluation research reports exist that evidence compliance with specified requirements for application indicated and building code in effect for this Project.
   1. Allowable Design Stresses: As published by manufacturer, determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

B. Products: Subject to compliance with requirements, provide one of the following:
   1. Laminated Veneer Lumber:
   3. Pre-fabricated ‘I’ joists: Trus Joist or Nascor, or approved equal.

2.7 RUBBERIZED ASPHALT FLASHINGS

PART 3 - EXECUTION:

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb and true and cut to fit.

B. Securely attach carpentry work to substrates and supporting members using fasteners of size that will not penetrate members where opposite side will be exposed to view or receive finish materials.

C. Install fasteners without splitting wood; fasten panel products to allow for expansion at joints unless otherwise indicated.

D. Provide wood framing members of size and spacing indicated; do not splice structural members between supports.

E. Provide wood blocking for all wall-mounted toilet accessories, and adaptable ADA toilet room accessories, window treatment items, cabinets, and future ADA adaptable grab bars, wall-hung sinks, toilet partitions and millwork. Rough carpentry to coordinate with door hardware provider for required blocking in walls behind door stops.

F. Install rubberized asphalt flashings at perimeters of all exterior window and door openings to prevent water penetration.

END OF SECTION 06100
SECTION 06165 – SHEATHING

PART 1 - GENERAL – See structural general notes drawing sheets.

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions and General requirements, as well as all codes and standards referenced, apply to the work specified in this section.

1.2 DESCRIPTION OF THE WORK

A. Includes but not limited to:

1. Furnish and install sheathing required for walls, roofs, and floors as described in the Contract Documents.

1.3 SUBMITTALS

A. Quality Assurance / Control – Submittal technical and engineering data on fasteners to be set by pneumatic devices for Architect’s approval of types proposed to be used as equivalents to specified hand set nails.

B. Submit technical and engineering data from manufacturer furnishing the products.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect sheathing and keep under cover in transit and at job site.

B. Do not deliver material unduly long before it is required.

C. Store sheathing on level racks and keep free of ground. Stack to insure proper ventilation and drainage.

1.5 REFERENCES

A. American Society for Testing and Materials


PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheathing:

1. Plywood or OSB shall not exceed 18 percent moisture content when fabricated nor more than 19 percent when installed.

2. Every sheet of sheathing shall be stamped as follows:
   a. Appropriate APA grade stamp identifying species and span rating.
   b. Sheathing shall be stamped “Sized for Spacing”

3. Sheathing used for same purpose shall be of same thickness.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General:
   1. Top of nail heads shall be flush with sheathing surface.
   2. Use of edge clips to provide spacing between sheathing panels is acceptable.

B. Wall Sheathing:
   1. Spacing-
      a. Stagger panel and end joints.
   2. Edge Bearing and Blocking-
      a. Panel edges shall bear on framing members and butt along their center-lines.
      b. Back block panel edges which do not bear on framing members with 2 inch nominal spacing.
      c. Nailing- Place nails not less than 3/8 inch from edge and 12 inches on center along intermediate supports and 4 inches on center along panel edge unless shown otherwise on Drawings.
      d. Thickness- ½ inch actual minimum.

C. Roof Sheathing:
   1. Placing-
      a. Lay face grain at right angles to supports. Provide blocking for support where framing turns at roof overhang.
      b. Provide 1/8 inch space between sheets at end and side joints.
      c. Stagger panel end joints.
      d. Sheathing shall be continuous of two spans minimum.
      e. Nailing- as noted on drawings.
      f. Thickness- as indicated on drawings.

D. Protection
   1. Protect roof sheathing from moisture until roof is installed.

END OF SECTION 06165
SECTION 06173 - WOOD I-JOISTS

PART 1  GENERAL

SECTION INCLUDES
Wood I-joists for roof and floor framing.
Bridging, bracing, and anchorage.
Framing for openings.

RELATED REQUIREMENTS:
Section 06105 - Rough Carpentry: Installation requirements for miscellaneous framing.
Section 06105 - Rough Carpentry: Material requirements for blocking, plates, and miscellaneous framing.

REFERENCE STANDARDS:
PS 1 - Structural Plywood; 2009.
S 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.

DESIGN REQUIREMENTS:
Design Roof Live and Dead Load: [See Structural General Note_] with deflection limited to 1/240 of span.

SUBMITTALS:
See Section 01 3000 - Administrative Requirements, for submittal procedures.
Product Data: Manufacturer's literature describing materials, dimensions, allowable spans and spacings, bearing and anchor details, bridging and bracing requirements, and installation instructions; identify independent inspection agency.

Shop Drawings: Indicate sizes and spacing of joists, bracing and bridging, bearing stiffeners, holes to be cut (if any), and framed openings between joists.

Certificate: Certification by joist manufacturer that products delivered are of the same design and construction as those evaluated by the independent inspection agency.

QUALITY ASSURANCE:
Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

DELIVERY, STORAGE, AND HANDLING:
Deliver products to site in manufacturer's original packaging with manufacturer's name and product identification intact and legible.
Protect products from damage due to weather and breakage.
Protect joists from warping or other distortion by stacking in upright position, braced to
resist movement, with air circulation under coverings and around stacks. Handle individual joists in the upright position.

PART 2 PRODUCTS:

MANUFACTURERS:
Wood I-Joists:
LP Building Products; [____]: www.lpcorp.com.
[____]; [____].
Substitutions: See Section 01 6000 - Product Requirements.

MATERIALS:

Wood I-Joists: Solid lumber top and bottom flanges and oriented strand board (OSB) webs bonded together with structural adhesive, with published span rating to meet project requirements.

Span Rating: Established and monitored in accordance with ASTM D5055 by independent inspection agency.

Oriented Strand Board: Comply with PS 2.

Plywood: Comply with PS 1.

Adhesive: Tested for wet/exterior service in accordance with ASTM D2559.

Depth: As indicated on drawings.

Fabrication Tolerances:
    Flange Width: Plus/minus 1/32 inch.
    Flange Thickness: Minus 1/16 inch.
    Joist Depth: Plus 0, minus 1/8 inch.
    Marking: Mark each piece with depth, joist spacing, and allowable span for joist spacing.
    Provide bearing stiffeners if required by span rating or joist hanger manufacturer.

Wood-Based Components:
Wood fabricated from old growth timber is not permitted.
Provide sustainably harvested wood, certified or labeled as specified in Section 01 6000.
Lumber Standard Committee, Inc.

Joist Hangers: [as recommended by joist manufacturer_].
Joist Bridging: Type, size and spacing recommended by joist manufacturer.

Wood Blocking, Plates, and Miscellaneous Framing:
    Softwood lumber, any species, construction grade, maximum moisture content of 19 percent.

Wood Blocking, Plates, and Miscellaneous Framing: As specified in Section 06 1000.

Fasteners: Electrogalvanized steel, type to suit application.
Bearing Plates: Electrogalvanized steel, unfinished.

PART 3 EXECUTION:

EXAMINATION:

Verify that supports and openings are ready to receive joists.
Verify that field measurements are as indicated on shop drawings.

PREPARATION:

Coordinate placement of bearing items.
ERECTION:

Install joists in accordance with manufacturer's instructions.

Set structural members level and plumb, in correct position.

Make provisions for erection loads and for sufficient temporary bracing to maintain structure plumb and in true alignment until completion of erection and installation of permanent bracing.

Do not field cut or alter structural members without approval of Architect.

Install permanent bridging and bracing.

Install headers and supports to frame openings required.

Frame openings between joists with lumber in accordance with Section 06100

Coordinate installation of sheathing/decking with work of this section.

TOLERANCES:

Framing Members: 1/2 inch maximum, from true position.

SCHEDULES:

Main Roof: joists depth as indicated on drawings, 6 inch end bearing plates for masonry supporting wall.

END OF SECTION 06173
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Plastic-laminate cabinets.
2. Plastic-laminate countertops.
5. Solid surface countertops.

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
2. Division 8 Section "Flush Wood Doors."

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, and other items installed in architectural woodwork.
C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
   1. Plastic laminates.
   2. Thermoset decorative overlays.

D. Samples for Verification: For the following:
   1. Plastic-laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish.
   2. Thermoset decorative-overlay surfaced panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish.
   3. Solid surface materials, 6 inches square.
   4. Exposed cabinet hardware and accessories, one unit for each type and finish.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

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

C. Quality Standard: Unless otherwise indicated, comply with AWS "Architectural Woodwork Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and will maintaining temperature and relative humidity during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWS quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. All shelves to be min. 1” thick including bottom of wall mounted cabinets.
2. Panels Nauf/MDF Cors

C. Melamine finish for semi-exposed and exposed interiors U.N.O.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.

1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
   a. Formica Corporation.
   b. Nevamar
2. Adhesive for bonding plastic laminate: Unpigmented contact cement.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware".

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. European Hinges: 170° snap on hinges.

D. Pulls: Back mounted, as manufactured by Berenson & Bow #69-32-115P or approved equivalent satin nickel.

E. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:

1. Box Drawer Slides: 100 lbf.
3. Pencil Drawer Slides: 45 lbf.

F. Shelf Supports: Use 32 mm holes/support system with K & V 345 NP Supports.

G. File Drawer Inserts: Provide file drawer metal inserts to accommodate “letter” and “legal” size hanging files.

H. Coat Hooks: Provide equivalent to EFCO CH201-ZC.

I. Closet Bars: Extension closet rods with forged end brackets; size and wall thickness as required to support full continuous hanging of clothing. Equivalent to K & V KV-2 or EFCO 860, 850, 890, 731 ANO..

J. Mirrors: Glass, as shown attached to cabinets, are work of this sections.

K. Locks: BHMA A156.11, E07121. Provide locks, National #8053, keying as directed by the Owner. All keys to be turned over to the Owner.

L. Grommets for Cable Passage through Countertops: Provide 25 - 2 inch, molded-plastic grommets and matching plastic caps with slot for wire passage to be installed as directed by Owner. Color selected by Architect – Moldrite 3000 series or equivalent.

M. Name Plates – ⅜” x 1-3/4” brass name slots. Midori brass label plates.

N. Slide bolt latch at double doors.

2.3 Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

A. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

2.4 For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.6 FABRICATION, GENERAL

A. Complete fabrication, including assembly, [finishing,] and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use
templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. All shelves to be min. 1" thick including bottom of wall mounted cabinets.

2.7 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWS Section 10 requirements for laminate cabinets.

B. Grade: Custom.

C. AWS Type of Cabinet Construction: Flush overlay type A. All shelving to be minimum of 1" thick.

D. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: HGS .048.
3. Edges: PVC 3mm minimum thickness, color, pattern, and finish as selected by Architect.

E. Materials for Semiexposed Surfaces: Provide surface materials indicated below:

1. Type finish: Melamine

F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Provide Architect's selections from laminate manufacturer's full range of colors and finishes in the following categories:
   a. Solid colors.

G. Fillers at top and bottom of corners of upper cabinets.

2.8 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWS Section 10 requirements for high-pressure decorative laminate countertops.

B. Grade: Custom.

C. High-Pressure Decorative Laminate Grade: HGP.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:
   a. Solid colors.

E. Edge Treatment: Same as laminate cladding on horizontal surfaces.

F. Core Material: NAUF/MDF or NAUF/PB made with exterior glue.

G. Core Material at Sinks: NAUF/MDF with exterior glue, or exterior-grade plywood.
2.9 SOLID SURFACE COUNTERTOPS

A. Quality Standard: Comply with AWS Section 4 requirements for countertops.

B. Grade: Premium.

C. Solid-Surfacing Material Thickness: ¾ inch.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing materials complying with the following requirements:

1. Provide Architect’s selections from manufacturer’s full range of colors and finishes.

E. Fabricate tops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer’s written recommendations for adhesives, sealers, fabrication, and finishing.

2.10 STAINLESS STEEL COUNTERTOPS AND APRON

A. Type 302 or 204 with number 4 finish. Mill finish not less than 180 grit. Stretcher leveled. Content chromium 18% min. nickel 8% min. carbon 2 tenths percent maximum.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWS Section 10 & 11 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts. Scribe edges where adjoining other finish materials.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails [or finishing screws] for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to
provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets with transparent finish.
3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
4. Caulk joints between cabinets and walls with sealant specified in Division 7 Section.
5. Provide filler at tops & bottoms of corner upper cabinets.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface. Install countertops to minimize the number of joints possible.
2. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
3. Secure backsplashes [to tops with concealed metal brackets at 16 inches o.c.] and to walls with adhesive.
4. Caulk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."
5. Install flush paneling with no more than 1/16" in 96" vertical cup or bow and 1/8" in 96" horizontal variation from a true plane.

G. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06402
DIVISION 7 - THERMAL & MOISTURE PROTECTION
07180  Water Repellants
07210  Building Insulation
07415  Exterior Metal Composite Soffit System
07540  Flexible Sheet Membrane Roofing
07620  Sheet Metal Flashing and Trim
07625  Tubular Daylighting Device
07720  Roof Accessories
07841  Through-Penetration Firestop System
07920  Joint Sealants
SECTION 07180 - WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes clear water-repellent coatings required at vertical surfaces:

1. Exterior CMU (unpainted)

1.3 PERFORMANCE REQUIREMENTS

A. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.

B. Absorption: Minimum 90 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens.

C. Hardened Concrete: ASTM C 642.

D. Water-Vapor Transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E 96.

E. Water Penetration and Leakage through Masonry: Maximum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, per ASTM E 514.

F. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per ASTM G 53.

G. Permeability: Minimum 80 percent breathable in comparison of treated and untreated specimens, per ASTM D 1653.

H. Chloride-Ion Intrusion in Concrete: Transportation Research Board, National Research Council's NCHRP Report 244, Series II tests.

1. Reduction of Water Absorption: 80 percent.
2. Reduction in Chloride Content: 80 percent.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's specifications, surface preparation and application instructions, recommendations for water repellents for each surface to be treated, and protection and cleaning instructions. Include data substantiating that materials are recommended by manufacturer for applications indicated and comply with requirements.

1.5 QUALITY ASSURANCE
A. Applicator Qualifications: Engage an experienced applicator who employs only persons trained and approved by water repellent manufacturer for application of manufacturer's products.

B. Testing Agency Qualifications: An independent testing agency with experience and capability to conduct testing indicated in "Performance Requirements" Article without delaying the Work, per ASTM E 548.

C. Regulatory Requirements: Comply with applicable rules of pollution-control regulatory agency having jurisdiction in Project locale regarding VOCs and use of hydrocarbon solvents.

D. Field Samples: Architect will select one representative surface for each substrate to receive water repellents. Apply water repellent to each substrate, with either partial or full coverage as directed. Comply with application requirements of this Section.

E. Obtain Architect's approval of field samples before applying water repellents.

F. Maintain field samples during construction in an undisturbed condition as a standard for judging the completed Work.

G. Exterior Concrete Retaining Walls shall be sealed prior to building occupancy as required to provide waterproof construction. All exterior Cultured Stone Veneer walls shall be sealed again at the (2) two year building occupancy anniversary date as required to maintain waterproof construction.

1.6 PROJECT CONDITIONS

A. Weather and Substrate Conditions: Do not proceed with application of water repellent under any of the following conditions, except with written instruction of manufacturer:

B. If masonry cleaning is not acceptable to installer. Obtain approval from Owner prior to any application.

C. Ambient temperature is less than 40 deg F (4.4 deg C).

D. Concrete surfaces and mortar have cured for less than 28 days.

E. Rain or temperatures below 40 deg F (4.4 deg C) are predicted within 24 hours.

F. Application is earlier than 24 hours after surfaces have been wet.

G. Substrate is frozen or surface temperature is less than 40 deg F (4.4 deg C).

H. Windy condition exists that may cause water repellent to be blown onto vegetation or surfaces not intended to be coated.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty, executed by the applicator and water repellent manufacturer, covering materials and labor, agreeing to repair or replace materials that fail to provide water repellency within the specified warranty period.
Warranty does not include deterioration or failure of coating due to extreme weather phenomena, failure of prepared and treated substrate, formation of new joints and cracks in excess of 1/16 inch (1.5 mm) wide, fire, vandalism, or abuse by maintenance equipment.

C. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: The specified products that may be incorporated into the Work include, as follows:

1. Prosoco – Sure-Klean Weather Seal Blok-Guard and Graffiti control.
2. Subject to compliance with specifications other manufacturers may offer an alternate bid for consideration by the Owner to be in the best interest of the Owner.

2.2 WATER REPELLENTS

A. Solvent based silicone elastomer formulated to weatherproof CMU types indicated and protect treated surfaces from repeated graffiti attacks without altering the natural appearance.

B. Provide (1) gal. recommended graffiti remover to Owner.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to repellent manufacturer’s written instructions, to ensure surface is sufficiently dry.

B. Formed Concrete: Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of water repellents.

C. Test for pH level, according to water repellent manufacturer’s written instructions, to ensure chemical bond to silicate minerals.

D. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.

E. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

F. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.
G. Test Application: Before performing water-repellent work, including bulk purchase and delivery of products, prepare a 4’ x 4’ area on each type masonry application in an unobtrusive location and in a manner approved by Architect to demonstrate the final effect (visual, physical, and chemical) of planned application. Perform Rilem Tube tests in the presence of architect and owner and provide additional coatings if required to meet minimum requirements per manufacturer recommendations. Proceed with work only after Architect reviews test application or as otherwise directed.

H. Revisions of planned application, if any, as requested by Architect, will be by Change Order if they constitute a departure from requirements of Contract Documents at the time of contracting.

3.2 APPLICATION

A. Apply a heavy-saturation spray coating of water repellent on surfaces indicated for treatment using low-pressure spray equipment. Comply with manufacturer’s written instructions for using airless spraying procedure, unless otherwise indicated.

B. Apply a second saturation spray coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer’s technical representative if written instructions are not applicable to Project conditions.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Provide services of a factory-authorized technical service representative to inspect and approve the substrate before application and to instruct the applicator on the product and application method to be used.

B. Perform Rilem Tube tests as directed by architect/owner. Re-coat areas as required to meet manufacturer recommendations and to the satisfaction of the owner at no additional cost to owner or architect.

3.4 CLEANING

A. Protective Coverings: Remove protective coverings from adjacent surfaces and other protected areas.

B. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

END OF SECTION 07180
SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes the following:
      1. Foundation wall insulation.
      3. Foamed in place masonry wall insulation.
   B. Related Sections include the following:
      1. Division 3 Section "Cast-in-Place Concrete."
      2. Division 5 Section for Acoustic Deck Insulation.
      3. Division 7 Section "Flexible Sheet Membrane Roofing" for roof insulation.
      4. Division 7 Section "Elastomeric Sheet Waterproofing, Thermoplastic Sheet Waterproofing" for insulation installed with waterproofing.
      5. Division 7 Section "Exterior Insulation and Finish Systems--Class PB" for insulation specified as part of these systems.
      6. Division 9 Section[s] "Gypsum Board Assemblies" for installation in metal-framed assemblies of insulation specified by reference to this Section.
      7. Division 9 Section “Gypsum Board Assemblies for coordination of putty packs in sound walls and exterior framed walls.
      8. Division 9 "Gypsum Board Assemblies” section for sound attenuation batt insulation.
      9. Division 15 Section[s] "Duct Insulation", and "Pipe Insulation."
      10. Division 5 Section for Acoustic Deck Insulation.

1.3 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.
   C. Research/Evaluation Reports: For foam-plastic insulation.

1.5 QUALITY ASSURANCE
   A. Source Limitations: Obtain each type of building insulation through one source.
   B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products.
per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.


1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Extruded-Polystyrene Board Insulation:
   a. DiversiFoam Products.
   b. Dow Chemical Company.
   c. Owens Corning.
   d. Tenneco Building Products.

2. Glass Fiber Insulation:
   a. CertainTeed Corporation.
   c. Owens Corning.

B. Related sections include:

1. Sound attenuation blankets specified Division 9 Section.
2. Roof insulation specified Division 7 Section.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

B. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:

1. Type IV, R value = 5/inch minimum foundation walls: 3" thick R-15 min.

1. Air Permeance (for ¼ inch of material): ASTM E 2178: <0.00151 L/s.m.² @ 75 Pa.
2. Water Vapor transmission (for 1.5 inches of material): ASTM E 96; 0.97 perm.
4. Flame Spread and Smoke Developed Rating: ASTM E 84
   a. Flame Spread: Less than 25
   b. Smoke Development: Less than 300.

Provide fire rated coating where required by code.

D. Foamed-in-place masonry wall insulation equivalent to Cor-Fill 500 as manufactured by Tailored Chemical Products Thermal value R=4.91 per inch. Class A, Flame spread, smoke developed, and fuel contribution of 0, 5, and 0 respectively. Install per manufacturers recommendations to fill all voids. Control application to prevent bleed through to exposed to view faces of concrete masonry block. Repair any bleed through by stain to match CMU color & sheen or otherwise by method acceptable to Owner/Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulations, including removing projections capable of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF PERIMETER INSULATION
A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line. Install top of footing where indicated.

B. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to insulation manufacturer's written instructions.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer’s written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements: In exterior stud wall locations.

1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

4. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

5. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

6. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION 07210
SECTION 07415 - METAL COMPOSITE PANEL SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. All engineering, manufacturing and installation of the items listed below are to be supplied by a single manufacturer.

1. Aluminum face and liner, composite factory formed soffit and fascia panel units with trim and joinery.
2. Extruded aluminum trim related to its intersection with adjacent materials.
3. Sealants and gaskets between panels, windows and their intersections.

B. Related Sections

1. Secondary support system for the soffit system.
2. Sheet metal flashings & trims.

1.2 QUALITY ASSURANCE

A. Manufacturer and wall systems contractor shall demonstrate a minimum of five years experience in the successful completion of projects utilizing similar systems, applications and performance requirements.

1.3 PERFORMANCE REQUIREMENTS

A. Panels, and secondary support systems shall be designed for component and cladding wind loads determined in accordance with the more stringent of either the local building code or ASCE 7-98, or IBC 2012 for the parameters specified.

1. Importance Factor: 1.25, Building Category III.
2. Seismic Design Category “D” Site Class “D”.
3. Basic Wind Speed: 3 second gust: 120 mph wind exposure “C”.

B. Supports for the soffit system shall be designed in accordance with manufacturer's recommendations for substrates indicated.

C. The soffit and fascia system or secondary supports shall be designed to allow differential movement of the buildings roof and wall structures.

D. Design soffit & fascia system to withstand a positive and negative wind load pressure.

E. Panel Tolerances thickness + 1/32”, length & width 0-1/8” squareness 1/64” per lineal ft. (non accumulating).

F. Bond Strength shall be a minimum 450 psi as tested in accordance with ASTM-C-297.

G. Fire Performance Characteristics –

1. Finish panel system shall demonstrate compliance with the following criteria for surface burning characteristics per ASTM E-84: Class A
   Flame spread – 25 or less
   Smoke Developed – 450 or less.
H. Design system to be sealed at all joints, intersections and cutouts to prevent moisture intrusion of any type.

I. Attachment system two piece extruded aluminum moldings system.

1.4 WARRANTY

A. The manufacturer shall warrant for a period of one year from the date of Substantial Completion that the wall and window system materials will be free from defects. The soffit systems contractor shall warrant for a period of one (1) year that the installation workmanship will be free from defects.

B. Finish warranties shall be the paint manufacturer’s standard for wall panels and finished extrusions. For three (3) coat Kynar 500 the warranty period is twenty (20) years against chalk, fade and delamination.

C. Paint finish warranties shall be the paint manufacturers standard for wall panels and trim.

PART 2 - PRODUCTS

2.1 PRODUCT

A. The specified product is: Laminators Inc, Omegalite – Pre-finished, products and services shall establish the minimum level of quality, performance, dimension and appearance required. Root and return wet seal system.

1. Subject to compliance with specifications manufacturers offering products may include:

2.2 BASIS OF DESIGN

A. Composite Material:

1. Face skin 0.024 primed smooth aluminum with 7 mm high density polypropylene core. Back skin 0.010 primed smooth aluminum, 5/16” min. panel thickness.

2.3 TRIM

A. The manufacturer shall furnish extruded trim. Installation shall be by the certified wall systems contractor except for those that require completion of work by other trades such as gravel stops.

B. Corners field routed and bent.

C. Two piece reveal joints. Horizontal and vertical.

D. Dissimilar material reveal joints.

E. Parapet with aluminum cap flashing.

2.4 FINISHES – AAMA 2605 Kynar 500 custom color as selected by Architect.

2.5 SUBSTITUTIONS

A. Materials, accessories and testing specified shall establish the minimum level of quality, performance, dimension and appearance required of any substitution.
B. The manufacturer or wall systems contractor proposing the substitute shall pay the costs of any other subcontractor work affected by the proposed substitute.

PART 3 - EXECUTION

3.1 SUBMITTALS

A. Submit test reports and certifications to demonstrate compliance with performance requirements and building code acceptance specified.
   1. Shop and erection drawings shall clearly illustrate the details required to comply with the performance requirements specified including interface of the panels with adjoining construction.

B. Materials and finish for each component shall be defined.

C. Erection details will be included where required to clearly explain proper installation of fasteners, trim, gaskets and sealants.

D. Samples shall be submitted to illustrate the panel design, texture, color and other features specified.

3.2 INSPECTION

A. If the wall system contractor is not supplying the secondary wall support framing, the final alignment of the secondary steel supports for the wall and the window system shall be checked by the wall systems contractor.

B. All materials shall be inspected for damage and conformance to the specifications and shop drawings prior to installation.

3.3 FABRICATION

A. The soffit & fascia components shall be prefabricated for field assembly in accordance with the procedures and details shown on the shop drawings.

3.4 INSTALLATION

A. Install the panels, fasteners, trim and related items in accordance with dimensions and procedures shown on the approved shop and erection drawings.

B. Sealants and gaskets shall be installed where shown and in accordance with the approved shop and erection drawings to assure air and water infiltration performance specified.

C. Paint, bituminous coating, or sealant as recommended by the manufacturer shall separate dissimilar metals.

D. Work shall be coordinated with other trades as required to insure proper flashing and seals to intersecting construction.

3.5 DAMAGED MATERIAL

A. Damage caused by the manufacturer or wall systems contractor shall be replaced or repaired to as new condition.
B. The construction manager for the project shall inspect with the panel installer and approve each completed wall and window area and be responsible for protection of completed work from damage by other trades.

3.6 CLEANING

A. The wall systems contractor shall remove all protective materials and labels from the wall and window system as the system is erected.

B. The construction manager shall be responsible for final cleaning of the wall system due to conditions that occur after wall systems contractor has completed an area. Cleaning is to be done in accordance with the manufacturers instructions.

C. Repair or replace damaged installed work to the satisfaction of the Owner.

END OF SECTION
SECTION 07540 - FLEXIBLE SHEET MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Mechanically fastened membrane roofing system.
   2. Roof insulation.
   3. Tapered roof insulation at crickets.
   4. Acoustic deck insulation supplied by Division 5 Section 05310 & installed by this Section.

B. This Section includes the installation of acoustical roof deck rib insulation strips furnished under Division 5 Section "Steel Deck."

C. Related Sections include the following:
   1. Division 5 Section for Acoustic Deck Insulation.
   2. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
   3. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter-flashings.
   4. Division 7 Section "Joint Sealants."
   5. Division 15 Section "Plumbing Specialties" for roof drains.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
   1. Fire/Windstorm Classification: Class 1A-90.
   2. Hail Resistance: SH.
D. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist the factored design uplift pressures calculated according to SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems."

1.4 SUBMITTALS

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

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Insulation fastening patterns.

C. Samples for Verification: For the following products:
   1. 12-by-12-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.
   2. 12-by-12-inch square of roof insulation.
   3. 12-by-12-inch (300-by-300-mm) square of walkway pads or rolls.
   4. 12-inch (300-mm) length of metal termination bars.
   5. Six insulation fasteners of each type, length, and finish.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of meeting performance requirements.

F. Qualification Data: For Installer and manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

H. Maintenance Data: For roofing system to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Manufacturer Qualifications: A qualified manufacturer with 20 Years' experience manufacturing the same membrane without formulation changes. The roofing membrane formulation and system shall be identical to that used for this Project, per applicable change, by law. The membrane and accessories must be produced by the warranted manufacturer. No Private Label Products will be accepted.
C. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.

D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

E. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions. Note: Contractor shall have written manufacturer specifications, roof drawings, roof drawing notes and scope of work on site during the construction period.
3. Review and finalize a construction schedule and verification of material availability.
4. Review structural loading limitations, prior to loading.
5. Review all details, including base flashings, special details, roof drainage, roof penetration schedule, equipment curb and any conditions that will affect the roofs construction or integrity.
6. Review Contractors Risk Management Plan and OSHA approved Safety Program
7. Review roof observation and repair procedures during and after roof installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, walkway products and other components of membrane roofing system.

2. Warranty Period: [20] Year NDL, Non-Prorated, from date of Substantial Completion.

3. Warranty shall include a 1” Hail Warranty and shall have no exclusions for ponding conditions.

B. Special Project Warranty: Submit roofing Installer’s warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers and Products
“Basis of Design”


2. Approved Equal: Submitting manufacturers will be subject to compliance with stated requirements. Substitution request must be submitted 10 days prior to bid date. Provide products, by the manufacturer, that meet or exceed the stated manufacturers qualifications, performance requirements, fire test requirements, physical properties and warranty requirements.

   a. Thickness: 45 mils (1.14 mm), nominal.
   c. Inter-ply Reinforcement to be 18 x 19 / 840 X 1,000 denier with reinforced polyester knit fabric that includes an adhesive coating that promotes a molecular bond between the base fabric and the top and bottom membrane facer films.
   d. Maximum sheet width 6 feet (or up to 74 inches).
B. Substitution request must comply with the following minimum physical properties. Substitutes will only be considered if properties are provided in the same format, as below, for comparison purposes.

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thicknes (nominal)</td>
<td>ASTM D-751</td>
<td>0.045 (1.14mm)</td>
</tr>
<tr>
<td>Breaking Strength</td>
<td>ASTM D-751 Grab</td>
<td>375 x 350 lbs (1.7 x 1.6 kN)</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D-882</td>
<td>8500 psi (598 kgf/cm²)</td>
</tr>
<tr>
<td>Tear Strength</td>
<td>ASTM D-751</td>
<td>100 lbs (445 N)</td>
</tr>
<tr>
<td>Dynamic Puncture</td>
<td>ASTM D-5635</td>
<td>25 joules</td>
</tr>
<tr>
<td>Low Temperature Flex</td>
<td>ASTM D-2136</td>
<td>-40 degrees F</td>
</tr>
<tr>
<td>Dimensional Stability</td>
<td>ASTM D-1204</td>
<td>&lt;1.0%</td>
</tr>
<tr>
<td>Seam Strength</td>
<td>ASTM D-751</td>
<td>100% of fabric strength</td>
</tr>
<tr>
<td>Coating Adhesion</td>
<td>ASTM D-751</td>
<td>Cannot initiate coating peel</td>
</tr>
<tr>
<td>Hydrostatic Resistance</td>
<td>ASTM D-751</td>
<td>750 psi</td>
</tr>
<tr>
<td>Oil Resistance</td>
<td>MIL-C-20696C</td>
<td>No swelling, cracking, leaking</td>
</tr>
<tr>
<td>Ozone Resistance</td>
<td>ASTM D-1149</td>
<td>No effect</td>
</tr>
<tr>
<td>SRI</td>
<td>ASTM E-1980</td>
<td>98.54</td>
</tr>
</tbody>
</table>

C. All manufacturers submitting for an approved substitution must produce a Membrane which contains the solid state polymer “KEE” or Elvaloy component.

2.2 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as KEE sheet membrane.

C. Bonding Adhesive: Manufacturers standard solvent based bonding adhesive, for membrane and for base flashing applications

D. Insulation Adhesive: Manufacturers approved low rise or Two-Part Polyurethane Insulation Adhesive.

E. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

F. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories, as required and approved by the manufacturer.

H. Fiber Clad coated, heat weldable sheet metal capable of being formed into a variety of shapes and profiles. 24 gauge. G90 galvanized metal sheet with a 20 mil coating. 4 ft. x 8 ft. or 4’ x 10’.
2.3 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer’s standard sizes and of thicknesses indicated.

B. Polysocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. R-Value = R-54 minimum.

1. Available Manufacturers, or as approved by the Membrane Manufacturer:
   a. Atlas Roofing Corp.
   b. Hunter Panels.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated utilizing Polysocyanurate Insulation.

D. It is acceptable to provide EPS cricketing insulation above required specified polyiso insulation sandwiched below a top layer of polyiso if approved by manufacturer as being compatible with specified membrane roofing.

2.4 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.5 WALKWAYS

A. Flexible Walkways: Install contrasting color flexible walkways, fully adhered and acceptable to the membrane roofing system manufacturer, warranted for the duration-equal to the specified system warranty.

B. Sump Pans: Install a prefabricated insulation sumped drain, 36” x 36” at each roof drain. Reinforce, per manufacturers approved detail requirement.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck comply with requirements in Division 5 Section “Steel Deck.”

3.2 PREPARATION
A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing. It is acceptable to provide EPS insulation above required specified polyiso sandwiched below top layer of polyiso insulation if approved by manufacturer as being compatible with insulation and membrane roofing provided.

3.3 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required R-48 value, (aged value),. Install (2) layers of insulation, with joints of each succeeding layer staggered from joints of previous layer, half lapped in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

H. Multi-Purpose Area: Gym

1. Install first layer of insulation 4’ X 8’ mechanically attached to the metal decking with appropriate size fasteners, thru the weight bearing surface of the decking. Note: screws may extend a maximum of 1” through the top flute of the metal deck only. No penetrations through the bottom flutes of the deck are allowed.

2. Install acoustic deck sound insulation furnished by Division 5 Section.
3. Install second layer of insulation and any required tapered saddles or crickets in an application of an approved insulation adhesive, bonded to the previous layer with a maximum board size of 4’ X 4’.

4. Membrane Insulation shall be set into a continuous ½” bead of adhesive at a rate of (1) linear foot of adhesive for every (1) square foot of insulation board.

5. Adhesives rates are to be increased in roof perimeters and corners zones according to specific project / manufacturer requirements.

I. Supply insulation and accessories for attachment to Section 07413 Metal Roof Panels. Coordinate with Section 07413 for delivery.

3.4 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to roofing system manufacturer’s written instructions. Unroll roofing membrane and allow relaxing before installing.

B. Start installation of roofing membrane in presence of roofing system manufacturer’s technical personnel.

C. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer’s written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.

2. Verify field strength of seams a minimum of twice daily, repair seam sample areas, label with date / location and retain for manufacturers technical manager's review.

3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.

I. Through-Membrane Attachment: Secure roofing membrane using fastening plates or metal battens and mechanically fasten roofing membrane to roof deck. Cover battens and fasteners with a continuous cover strip.

J. Install roofing membrane and auxiliary materials to tie in to existing roofing.

K. Note 3.3.H for Multipurpose (Gym) room area.
3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer’s written instructions.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer’s technical personnel to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 72 hours in advance of date and time of inspection.

B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.9 ROOFING INSTALLER’S WARRANTY
A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner.>
2. Address: <Insert address.>
3. Building Name/Type: <Insert information.>
5. Acceptance Date: <Insert date.>
7. Expiration Date: <Insert date.>

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
   a. lightning;
   b. peak gust wind speed exceeding 70 mph (m/sec);
   c. fire;
   d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. vapor condensation on bottom of roofing; and
   g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally
specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner’s General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature.>
2. Name: <Insert name.>
3. Title: <Insert title.>

END OF SECTION 07540
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following sheet metal flashing and trim:

1. Manufactured through-wall flashing.
2. Manufactured reglets.
3. Formed wall flashing and trim.
4. Formed equipment support flashing.
5. Gutters and down spouts as indicated on drawing installed per SMACNA details.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for installing reglets.
2. Division 4 Section "Unit Masonry Assemblies" for installing through-wall flashing, reglets, and other sheet metal flashing and trim.
3. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
4. Division 7 Section "Flexible Roof Membrane" for installing sheet metal flashing and trim integral with roofing membrane.
5. Division 7 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
6. Division 7 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.
7. Division 7 Section 07413 Metal Roof Panels for installing metal flashings integral with metal roof panels.
8. Division 7 Section 07421 – Formed metal wall panels for installing flashings integral with metal wall panels.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:

1. Identify material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
4. Details of expansion-joint covers, including showing direction of expansion and contraction.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, [cleats,] [clips,] closures, and other attachments.
2. Trim: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

1.4 QUALITY ASSURANCE


1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.6 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Exposed to view flashings & trim.

1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate
conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Fluoropolymer 2-coat system: Manufacturer’s standard 2-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a minimum total dry film thickness of 1.5 mil (0.038 mm); complying with AAMA 2605:

a. Color: Standard colors, match Section 07421 Formed Metal Wall Panels.

2.2 UNDERLAYMENT MATERIALS

A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
4. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

C. Solder: ASTM B 32, Grade Sn50, use with rosin flux.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond. Manufacture through-wall flashing with snaplock receiver on exterior face to receive counterflashing.

B. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory- mitered and -welded corners and junctions.

1. Material: Galvanized steel, 0.0217 inch thick.
2. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
3. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflushing or where Drawings show reglet without metal counterflushing.
4. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

   1. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

   1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

H. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.

   1. Joint Style: 1” vertical standing interlocking seam.

   2. Fabricate copings from the following material:

      a. Non-Viewable Galvanized Steel: 0.032 inch thick.
      b. Prepainted, Metallic-Coated Steel: 0.032 inch thick.

I. Roof to Wall Transition and Roof to Sheet Metal Roof Edging Transition Expansion-Joint Cover: Fabricate from the following material:

   1. Galvanized Steel: [0.0336 inch (0.85 mm)] thick.

J. Base Flashing: Fabricate from the following material:
1. Aluminum: 0.032 thick.

K. Counterflashing: Fabricate from the following material:
   1. Galvanized Steel: [0.0217 inch (0.55 mm)] thick.

L. Flashing Receivers: Fabricate from the following material:
   1. Galvanized Steel: [0.0217 inch (0.55 mm)] thick.

M. Roof-Penetration Flashing: Fabricate from the following material:
   1. Galvanized Steel: [0.0276 inch (0.7 mm)] thick.

N. Gutters & Downspouts
   1. Gutters 0.040 aluminum factory finish
   2. Downspouts SMACNA style figure H square hanger design H. 0.025 aluminum factory paint finish.

2.6 FINISHES

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
   1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

   1. Underlayment: Where installing metal flashing directly on cemenitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

   1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.

G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

   1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.

H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pretinned surface would show in finished Work.

   1. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer’s written installation instructions, and SMACNA’s “Architectural Sheet Metal Manual.” Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch (400-mm) centers.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.

1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch centers.
2. Anchor interior leg of coping with screw fasteners and washers at 16-inch centers.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Reglets: Installation of reglets is specified in 4 Section "Unit Masonry Assemblies."

C. Openings Flashing in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
SECTION 07625 - TUBULAR DAYLIGHTING DEVICE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.

B. Accessories.

1.2 RELATED SECTIONS

A. Section 06105 – Miscellaneous Carpentry: skylight curbs.

B. Section 07540 – Flexible Sheet Membrane roofing: Flashing of skylight base.

C. Section 07620 – Sheet Metal Flashing and Trim: Metal Flashings.

D. Section 16140 – Wiring Devices: Electrical connections.

1.3 REFERENCES


E. ASTM A792/A 792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process


J. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
1.4 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
   1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
   2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
   3. Uniform Load Test:
      a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
      b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
   4. Fire Testing:
      a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
      b. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
      c. Smoke Density - Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
      d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
      e. Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

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. Installation methods.

C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.

D. Verification Samples: As requested by Architect.

E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.
1.6 QUALITY ASSURANCE
A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 15 years.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer’s unopened packaging until ready for installation.
B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 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.

1.9 WARRANTY
A. Daylighting Device: Manufacturer’s standard warranty for 10 years.
B. Electrical Parts: Manufacturer’s standard warranty for 5 years, unless otherwise indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS
B. Substitutions: Not permitted unless pre-approved 10 days prior to bidding.
C. Requests for substitutions will be considered in accordance with provisions of Section 01600.
D. General Contractor will bear responsibility for costs associated with substitution review.
E. Requests for substitutions will be considered provided a lighting layout with photometric data is supplied to demonstrate light levels will meet original design intent.

2.2 TUBULAR DAYLIGHTING DEVICES
A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
B. SolaMaster Series: Solatube Model 750 DS-C Penetrating Ceiling, 21 inch (530 mm) Daylighting System:
   1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
      a. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
      b. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
c. **Inner Dome Glazing: Type DAI**, 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.

2. **Roof Flashing Base:**
   a. **One Piece:** One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or AST A792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.15 mm) thick.
      1) **Base Style:** Type FC, Curb cap, with inside dimensions of 27 inches by 27 inches (685 mm x 685 mm) to cover curb as specified in Section 06105 Miscellaneous Carpentry.
   
3. **Tube Ring:** Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.

4. **Dome Seal:** Adhesive backed weatherstrip 0.63 inch (16 mm) tall by 0.28 inch (7 mm).

5. **Reflective Tubes:** Aluminum sheet, thickness 0.018 inch (0.5 mm).
   a. **General:**
      1) **Interior Finish:** Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 80.2 percent.
      2) **Color:** a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
   
6. **Diffuser Assemblies for Tubes Penetrating Ceilings:** Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
   a. **Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch (2.8 mm) thick.**
   b. **Lens:** Type L1 OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame and EPDM foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.

7. **Accessories:**
   a. **Wire Suspension Kit:** Type E, Use the wire suspension kit when additional bracing to the structure is required.
b. Local Dimmer Control utilizing a butterfly baffle design of Spectralight Infinity reflective material to minimize shadowing when in use: Provided with dimmer switch and cable.

1) Daylight Dimmer: Type D Electro-mechanically actuated daylight valve; for universal input voltages ranging between 90 and 277 V at 50 or 60 Hz; maximum current draw of 50 ma per unit; controlled by low voltage, series Type T02: circuited, 4 conductor, size 22 cable; providing daylight output between 2 and 100 percent. Provided with dimmer switch and cable.

2) Switch: Type SW, Manufacturer-specific low voltage DC DP/DT switch (white) required to operate Daylight Dimmer. Note: only one switch is required per set of synchronously controlled dimmers.

3) Cable: Type CA, Two conductor low voltage cable (500 foot) for multiple unit DC connection.** NOTE TO SPECIFIER ** The following accessory is only available when an Inner Dome option is selected (Type DAI or Type DPI).

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.

C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

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

END OF SECTION
SECTION 07720 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Roof hatch with ladder up post.

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for ladders and miscellaneous metal framing and supports.
   2. Division 6 Section "Miscellaneous Carpentry" for roof sheathing, wood cants, and wood nailers.
   3. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, fasciae, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
   4. Division 7 Section "Tubular Daylighting Device"
   5. Division 9 Section "Painting" for shop primers and field painting.
   6. Division 15 Section "Power Ventilators" for power roof-mounted ventilators.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.

1.4 QUALITY ASSURANCE

A. Standards: Comply with the following:
   1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
   2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Roof Hatches:
   a. Babcock-Davis Hatchways, Inc.
   b. Bilco Company.
   c. Dur-Red Products, Inc.
   d. J. L. Industries, Inc.
   e. Milcor, Inc.
   f. O’Keeffe’s Inc.

2.2 MATERIALS, GENERAL

A. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 (Z275) coating designation; commercial quality, unless otherwise indicated.

1. Structural Quality: Grade 40 (Grade 275), where indicated or as required for strength.

B. Insulation: Manufacturer’s standard rigid or semirigid glass-fiber board of thickness indicated.

C. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

1. Where removing exterior exposed fasteners affords access to building, provide nonremovable fastener heads.

D. Gaskets: Manufacturer’s standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

E. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, A, and, as applicable to joint substrates indicated, O.

2.3 ROOF HATCHES

A. General: Fabricate units to withstand 40-lbf/sq. ft. (1.9- kPa) external and 20-lbf/sq. ft. (0.95-kPa) internal loading pressure. Frame with minimum 18-inch- (225-mm-) high, integral-curb, double-wall construction with 1-1/2-inch (38- mm) insulation, formed cants and cap flashing (roofing counterflashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1-inch- (25-mm-) thick insulation core. Provide gasketing and equip with corrosion-resistant or hot-dip galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.

B. Type: Single-leaf personnel access.

1. For Ladder Access: 30 by 36 inches (750 by 900 mm).
2. Ladder up safety post equivalent to Bilco LU-1.

C. Material: Galvanized steel sheets.

D. Sloping Roofs: Where slope or roof deck exceeds 1/4 inch per foot (1:48), fabricate hatch curbs with height tapered to match slope to level tops of units.
2.4 FINISHES, GENERAL

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: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 GALVANIZED STEEL SHEET FINISHES

A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.


B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply the air-dried primer specified below immediately after cleaning and pretreating.

1. Shop Primer: Exterior galvanized metal primer per Division 9 Section "Painting."

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.

B. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,

3.2 CLEANING AND PROTECTION

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 07720
SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1. Floors.
2. Roofs.
3. Walls and partitions.
4. Smoke barriers and fire partitions.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for construction of openings in concrete slabs.
2. Division 9 for Putty Pack @ Sound Walls.
3. Division 15 Sections specifying duct and piping penetrations.
4. Division 16 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
3. Fire-resistance-rated floor assemblies.

B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
1. Penetrations located outside wall cavities.
2. Penetrations located outside fire-resistive shaft enclosures.
3. Penetrations located in construction containing fire-protection-rated openings.
4. Penetrating items larger than 4-inch- (100-mm-) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.

D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

A. CM is to coordinate with all trades and provide a schedule of Fire Stop Systems to be used at typical penetrations. Schedule to include UL number for each type of penetration and material to be used. Provide all material from a single manufacturer to the largest extent possible for review by Architect and approval by local jurisdiction.

B. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
   a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
   b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

      1) UL in "Fire Resistance Directory."
C. For those firestop applications that exist for which no tested and listed system is available through a manufacturer, an engineering judgment derived from similar tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents shall follow requirements set forth by the International Firestop Council.

1.7 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. The work is to be installed by a contractor with at least one of the following qualifications:
   1. FM 4991 approved Contractor
   2. UL Approved Contractor

C. Installer shall have not less than 3 years experience with fire stop installation.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS –

2.1 Subject to compliance with specifications manufacturers offering products that may be incorporated into the work include but limited to:

A. Hilti, Inc.
B. 3M
C. Nelson
D. Specified Technology

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION
A. General: Install through-penetration firestop systems to comply with “Performance Requirements” Article and firestop system manufacturer’s written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
   1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:
   1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
   1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.

B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.

C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
   2. Contractor’s name, address, and phone number.
   3. Through-penetration firestop system designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Through-penetration firestop system manufacturer’s name.
   6. Installer's name.

3.6 CLEANING AND PROTECTION
A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07841
JOINT SEALANTS

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
   b. Joints between plant pre-cast architectural concrete units.
   c. Control and expansion joints in unit masonry (or CMU color transitions).
   d. Joints in exterior metal panel systems.
   e. Joints between different materials listed above.
   f. Perimeter joints between materials listed above and frames of doors windows and louvers.
   g. Other joints as indicated.

2. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Tile control and expansion joints.
   d. Vertical joints on exposed surfaces of interior CMU walls and partitions.
   e. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   g. Other joints as indicated.

3. Interior joints in the following horizontal traffic surfaces:
   b. Other joints as indicated.

B. Related Sections include the following:

1. Division 2 Section "Pavement Joint Sealants" for sealing joints in pavements, walkways, and curbing.
2. Division 4 Section "Unit Masonry Assemblies" for masonry control and expansion joint fillers and gaskets.
3. Division 7 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
4. Division 8 Section "Glazing" for glazing sealants.
5. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
6. Division 9 Section for putty pack sound insulation.
1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

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

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Qualification Data: For Installer and testing agency.

E. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
1.7 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two (2) years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Manufacturers standard years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

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

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

D. Multicomponent Nonsag Polysulfide Sealant:

1. Type and Grade: M (multicomponent) and NS (nonsag).
2. Class: 25.
3. Use[s] Related to Exposure: T (traffic) and NT (nontraffic).
4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
   a. Use O Joint Substrates: Stainless Steel and ceramic tile.

E. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:
   1. Type and Grade: S (single component) and NS (nonsag).
   2. Class: 25.
   3. Use Related to Exposure: NT (nontraffic).
   4. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated,
      a. Use O Joint Substrates: ceramic tile.

F. Single-Component Nonsag Urethane Sealant:
   1. Type and Grade: S (single component) and NS (nonsag).
   2. Class: 50.
   3. Uses Related to Exposure: T (traffic) and NT (nontraffic)
   4. Uses Related to Joint Substrates: M, [G, ]A, and, as applicable to joint substrates indicated, O.

2.4 LATEX JOINT SEALANTS
A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.

2.5 ACOUSTICAL JOINT SEALANTS
A. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

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

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) O (open-cell material) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials
or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Concrete.
   b. Masonry.
   c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.
c. Glazed surfaces of ceramic tile.

B. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
   a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

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

3.5 PROTECTION

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

3.6 JOINT-SEALANT SCHEDULE

   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

B. Joint-Sealant Application JS-: Exterior horizontal traffic isolation and contraction joints in cast-in-place concrete slabs.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

C. Joint-Sealant Application JS-: Exterior vertical control and expansion joints in unit masonry.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

D. Joint-Sealant Application JS-: Exterior vertical joints between different materials listed above.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

E. Joint-Sealant Application JS-: Exterior perimeter joints between CMU and frames of doors windows and louvers.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

F. Joint-Sealant Application JS-: Exterior control and expansion joints in ceilings and other overhead surfaces.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

G. Joint-Sealant Application JS-: Interior perimeter joints of exterior openings.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
H. Joint-Sealant Application JS-: Interior ceramic tile expansion, control, contraction, and isolation joints in horizontal traffic surfaces.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

I. Joint-Sealant Application JS-: Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

J. Joint-Sealant Application JS-: Vertical joints on exposed surfaces of interior unit masonry

K. Joint-Sealant Application JS-: Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 07920
DIVISION 8 - DOORS & WINDOWS
08111 Standard Steel Doors and Frames
08211 Flush Wood Doors
08311 Access Doors and Frames
08331 Overhead Coiling Doors
08361 Sectional Overhead Doors
08625 Tubular Daylighting Device
08710 Door Hardware
08800 Glass and Glazing
08920 Glazed Aluminum Wall Systems
SECTION 08111 - STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Heavy-duty hollow-metal steel doors.
2. Heavy-duty hollow-metal steel frames.
3. Custom hollow metal frame to accommodate continuous window blinds.

B. Related Sections include the following:

1. Division 4 Section "Unit Masonry Assemblies" for building anchors into and grouting standard steel frames in masonry construction.
2. Division 8 Section "Glazing" for glazed lites in standard steel doors and frames.
3. Division 8 Sections for door hardware for standard steel doors.
4. Division 9 painting Sections for field painting steel doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, and finishes for each type of steel door and frame specified.

B. Shop Drawings: In addition to requirements below, provide a schedule of standard steel doors and frames using same reference numbers for details and openings as those on Drawings:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details.
3. Frame details for each frame type, including dimensioned profiles.
4. Details and locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, accessories, joints, and connections.
7. Details of glazing frames and stops showing glazing.
8. Details of conduit and preparations for electrified door hardware and controls.
C. Coordination Drawings: Drawings of each opening, including door and frame, drawn to scale and coordinating door hardware. Show elevations of each door design type, showing dimensions, locations of door hardware, and preparations for power, signal, and electrified control systems.

D. Qualification Data: For Installer.

E. Product Test Reports: Based on evaluation of comprehensive fire tests performed by a qualified testing agency, for each type of standard steel door and frame.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.

B. Fire-Rated Door Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.

1. Test Pressure: Test at atmospheric (neutral) pressure according to NFPA 252 or UL 10B.
2. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.
3. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber.

1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.7 COORDINATION

A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amweld Building Products, LLC.
2. Ceco Door Products; an ASSA ABLOY Group Company.
3. Curries Company; an ASSA ABLOY Group Company.
5. Kewanee Corporation (The).
7. Republic Hollow Metal Doors.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 (ZF180) zinc-iron-alloy (galvannealed) coating designation.

C. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

D. Glazing: Comply with requirements in Division 8 Section “Glazing.”

2.3 STEEL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.

1. Design: Flush panel.

2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.
   a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

3. Vertical Edges for Single-Acting Doors: Beveled edge, Square edge, Beveled edge unless square edge is indicated, Square edge unless beveled edge is indicated.
   a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).

4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick end closures or channels of same material as face sheets.

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
2. Provide flush top caps.

C. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:

1. Hinges: Minimum 0.123 inch (3.0 mm) thick by 1-1/2 inches (38 mm) wide by 6 inches (152 mm) longer than hinge, secured by not less than 6 spot welds.
2. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch (1.7 mm) thick.
3. All Other Surface-Mounted Hardware: Minimum 0.067 inch (1.7 mm) thick.

D. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STEEL FRAMES

A. General: Comply with ANSI A250.8 and with details indicated for type and profile. Welded type frames only.


1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
2. Frames for Level 3 Steel Doors: 16 gauge steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.

1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
2. Frames for Level 2 Steel Doors: 0.053-inch-16 gauge thick steel sheet, unless otherwise indicated.
3. Frames for Wood Doors: 0.053-inch-16 gauge thick steel.
4. Frames for Borrowed Lights: 0.053-inch-16 gauge thick steel.

D. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames to comply with the following minimum sizes:

1. Hinges: Minimum 0.123 inch (3.0 mm) thick by 1-1/2 inches (38 mm) wide by 6 inches (152 mm) longer than hinge, secured by not less than 6 spot welds.
2. Pivots: Minimum 0.167 inch (4.2 mm) thick by 1-1/2 inches (38 mm) wide by 6 inches (152 mm) longer than hinge, secured by not less than 6 spot welds.
3. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch (1.7 mm) thick.
4. All Other Surface-Mounted Hardware: Minimum 0.067 inch (1.7 mm) thick.

E. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
F. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.

2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.

G. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

H. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

I. Plaster Guards: Formed from same material as frames, not less than 0.016-inch (0.4-mm) thick.

J. Fabricate custom steel frames to accommodate continuous blinds operation within the width of the frames and located as indicated on drawings.

2.5 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

2.6 FABRICATION

A. General: Fabricate standard steel doors and frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer’s plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Standard Steel Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

C. Standard Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

3. Plaster Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete or masonry.

4. Where installed in masonry, leave vertical mullions in frames open at top for grouting.
5. **Floor Anchors**: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

6. **Jamb Anchors**: Provide number and spacing of anchors as follows:
   a. **Masonry Type**: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      1) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) in height.
   b. **Stud-Wall Type**: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      1) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) in height.

7. **Door Silencers**: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
   a. **Single-Door Frames**: Drill stop in strike jamb to receive three door silencers.
   b. **Double-Door Frames**: Drill stop in head jamb to receive two door silencers.

D. **Hardware Preparation**: Factory prepare standard steel doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."

1. Reinforce doors and frames to receive nontemplated mortised and surface-mounted door hardware.
2. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

E. **Stops and Moldings**: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. **Single Glazed Lites**: Provide fixed stops and moldings welded on secure side of door or frame.
2. **Multiple Glazed Lites**: Provide fixed and removable stops and moldings such that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of doors and frames.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.7 **STEEL FINISHES**

A. **General**: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish standard steel door and frames after assembly.

B. **Metallic-Coated Steel Surface Preparation**: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

C. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils (0.018 mm).

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

2. Frames to be finish painted prior to installation of glazing and stops (no exposed to view primer surfaces).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of standard steel doors and frames.

1. Examine roughing-in for embedded and built-in anchors to verify actual locations of standard steel frame connections before frame installation.
2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory.

B. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated mortised and surface-mounted door hardware.
3.3 INSTALLATION

A. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install standard steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Standard Steel Frames: Install standard steel frames for doors, sidelights, transoms, borrowed lights and other openings, of size and profile indicated. Comply with SDI 105.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
   a. At fire-protection-rated openings, install frames according to NFPA 80. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   b. Install frames with removable glazing stops located on secure side of opening.
   c. Install door silencers in frames before grouting.
   d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   e. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   f. Apply bituminous coating to backs of frames that are filled with mortar, grout, and plaster containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with postinstalled expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.


4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."

5. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

6. Installation Tolerances: Adjust standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Standard Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:
   a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c., and not more than 2 inches (50 mm) o.c. from each corner.
2. Glaze hollow metal frames only after frames have been finish painted (no exposed to view primer finished surfaces).

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors or frames that are warped, bowed, or otherwise unacceptable.

B. Clean grout and other bonding material off standard steel doors and frames immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

D. Galvannealed Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08111
SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Solid-core doors with wood-veneer, faces.
   2. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Sections include the following:
   1. Division 8 Section "Glazing" for glass view panels in flush wood doors.

1.3 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, and trim for openings.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
   1. Indicate dimensions and locations of mortises and holes for hardware.
   2. Indicate dimensions and locations of cutouts.
   3. Indicate fire ratings for fire doors.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.
B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. Special Warranty: Manufacturer’s standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm) in a 75-mm) span.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

2. Warranty shall be in effect during the following period of time from date of Substantial Completion:

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Wood Doors:
   a. Algoma Hardwoods Inc.
   b. Eggers Industries; Architectural Door Division.
   c. Graham Manufacturing Corp.
   d. VT Industries Inc.
   e. Weyerhaeuser Company.
   f. Oshkosh

2.2 DOOR CONSTRUCTION, GENERAL

A. Doors for Transparent Finish:

1. Grade: Premium with Grade “A” faces.
2. Performance Grade: Extra Heavyduty.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
B. Glass Light Panel: Stops are to be of wood in lieu of metal at all non-rated doors (wood stops species and finish shall match doors).

2.3 SOLID-CORE DOORS
A. Particleboard Cores: Comply with the following requirements:
   2. Blocking: Provide wood blocking in particleboard-core doors [as needed to eliminate through-bolting hardware.
   3. Provide doors with glued-block, structural composite lumber, either glued-block or structural composite lumber cores instead of particleboard cores at locations where exit devices are indicated.
B. Interior Veneer-Faced Doors:
   1. Core: Particleboard
   2. Construction: Five or seven plies, either bonded or nonbonded construction.
C. Fire-Rated Doors:
   1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
   2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as needed to eliminate through-bolting hardware.
   3. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.
   4. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

2.4 LIGHT FRAMES
A. Wood Beads for Light Openings in Wood Doors:
   1. Wood Species: Same species as door faces.
   2. Profile: Manufacturer's standard shape.
B. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of 0.0478-inch- (1.2-mm-) thick, cold-rolled steel sheet; factory primed and approved for use in doors of fire rating indicated.

2.5 FABRICATION
A. Fabricate doors in sizes indicated for Project-site fitting.
B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

A. Genera: Comply with referenced quality standard, AWS “Architectural Woodwork Quality Standards Illustrated factory finishing.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium
2. Finish: AWS System #11 catalyzed polyurethane.
3. Effect: Open-grain.

D. Plastic Laminate Finish

1. Grade premium.

2.7 SHOP PRIMING

A. Doors for Transparent Finish: Shop seal faces and edge of doors, including cutouts, other required pretreatments, and first coat of finish as specified in Division 9 Section “Painting.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Manufacturer’s Written Instructions: Install doors to comply with manufacturer’s written instructions, referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
   1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold.
      a. Comply with NFPA 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
   3. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Re-hang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08211
SECTION 08311 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Ceiling and wall access doors and frames.

1.3 SUBMITTALS
   A. Product Data: For each type of door and frame indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.

1.4 QUALITY ASSURANCE
   A. Source Limitations: Obtain doors and frames through one source from a single manufacturer.
   B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are labeled and listed by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction:
      1. NFPA 252 for vertical access doors.
   C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION
   A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Access Doors:
   a. J. L. Industries, Inc.
   c. Larsen's Manufacturing Company.
   d. Milcor Limited Partnership.

2.2 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified nominal thickness according to ASTM A 568/A 568M. Electrolytic zinc-coated steel sheet, complying with ASTM A 591/A 591M, Class C coating, may be substituted at fabricator's option.

C. Drywall Beads: Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board, gypsum base for veneer plaster, gypsum board and gypsum base for veneer plaster.

2.3 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

2.4 ACCESS DOORS AND FRAMES


   1. Locations: Ceiling assemblies.
   2. Door: Minimum 0.060-inch- (1.5-mm-) thick sheet metal, flush construction.
   3. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-1/4-inch- (32-mm-) wide, surface-mounted trim.
   5. Automatic Closer: Spring type.

2.5 FABRICATION

A. General: Provide access door assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Steel Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
1. Exposed Flanges: Nominal 1 to 1-1/2 inches (25 to 38 mm) wide around perimeter of frame.
2. Provide mounting holes in frames to attach frames to metal or wood framing in plaster and drywall construction and to attach masonry anchors in masonry construction. Furnish adjustable metal masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
   1. For doors with latches released by and locks operated by mortise cylinders, prepare access doors for cylinders specified in Division 8 Section "Door Hardware."

2.7 FINISHES, GENERAL
A. Comply with NAAMM’s "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Finish metal fabrications after assembly.

2.8 STEEL FINISHES
A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
   1. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
B. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 PREPARATION
A. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.2 INSTALLATION
B. Comply with manufacturer's written instructions for installing floor doors and frames.
B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
C. Install floor doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING AND CLEANING
A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08311
SECTION 08331 - OVERHEAD COILING DOORS

PART 1 - GENERAL

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

1.2 SUMMARY
A. This Section includes the following types of manually operated overhead coiling doors:
   1. Counter doors, stainless steel.
   2. Stainless steel apron at sill & skirt over CMU.
B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for miscellaneous steel supports.
   2. Division 8 Section "Door Hardware" for lock cylinders and keying.
   3. Division 8 Section “Sectional Overhead Doors”.

1.3 PERFORMANCE REQUIREMENTS
A. Operation-Cycle Requirements: Provide overhead coiling door components and operators capable of operating for not less than 20,000 cycles.

1.4 SUBMITTALS
A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:
   1. Summary of forces and loads on walls and jambs.

1.5 QUALITY ASSURANCE
A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

2. Cookson Company.
3. Cornell Iron Works Inc.
4. Raynor.
5. Wayne-Dalton Corp.
6. Windsor Door, a MAGNATRAX Corporation.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling door curtain of interlocking slats, unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated:

1. Stainless-Steel Door Curtain Slats: ASTM A 666, Type 304 (multi-purpose room).
   a. Minimum Specified Thickness: Not less than 0.025 inch (0.65 mm).

B. Endlocks for Counter Doors: Manufacturer’s standard locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Counter Doors: Manufacturer’s standard continuous channel or tubular shape, either stainless-steel or aluminum extrusions to suit type of curtain slats.

1. Astragal: Provide a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene; for placement between angles or fitted to shape, as a cushion bumper for interior door.

D. Curtain Jamb Guides for Counter Doors: Fabricate curtain jamb guides of extruded aluminum, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise; with removable stops on guides to prevent overtravel of curtain.

2.3 HOODS AND ACCESSORIES

A. Hood: Form to act as weatherseal and entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and provide fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sagging.

1. Fabricate hoods for stainless-steel doors of minimum 0.025-inch thick stainless-steel sheet, Type 304, complying with ASTM A 666.
2. Fabricate from minimum 0.0625-inch thick stainless-steel sheet, Type 304, complying with ASTM A 240/A 240M or ASTM A 666.

B. Integral Sills: Fabricate sills as integral part of frame assembly of same sheet metal; 0.078-inch (2.0-mm) minimum thickness.

C. Push/Pull Handles: For push-up-operated or emergency-operated doors, provide stainless steel lifting handles on each side of door.
D. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.

1. Locking Bars: Single-jamb side operable from inside only.
2. Lock cylinder is specified in Division 8 Section "Door Hardware."

2.4 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to door curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate.

2.5 MANUAL DOOR OPERATORS

A. Push-up Operation: Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf (111 N).

2.6 FINISHES, GENERAL

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 STAINLESS STEEL FINISHES

A. General: Remove or blend stretch lines and tool and die marks into finish.

1. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

B. Bright, Cold-Rolled, Unpolished Finish: No. 2B finish.
C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install coiling doors and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports.

3.2 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and with weathertight fit around entire perimeter.

END OF SECTION 08331
1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes the following types of sectional overhead doors:
   1. Doors with aluminum-framed aluminum panels.

B. Related Sections include the following:
   1. Division 8 Section "Door Hardware" for lock cylinders and keying.

1.3 PERFORMANCE REQUIREMENTS
A. Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
   1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward.

B. Operation-Cycle Requirements: Design sectional overhead door components and operator to operate for not less than 10,000 cycles.

1.4 SUBMITTALS
A. Product Data: For each type and size of sectional overhead door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
   1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
   2. Summary of forces and loads on walls and jambs.
   3. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied finishes.

C. Samples for Verification: Of each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for Work. Where
finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1. Frame: 6-inch (150-mm) length.
2. Panel: 6 inches (150 mm) square.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the sectional overhead door manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing sectional overhead doors similar to those indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain sectional overhead doors through one source from a single manufacturer.

1. Obtain operators and controls from the sectional overhead door manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of sectional overhead doors and accessories and are based on the specific system indicated. Other manufacturers’ systems with equal performance and dimensional characteristics may be considered. Refer to Division 1 Section "Substitutions."

E. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Overhead Door Corporation.
2. Raynor Garage Doors.
3. Wayne-Dalton Corp.
4. Windsor Door; A United Dominion Company.
5. Cookson
6. DDM
7. CHI

2.2 ALUMINUM SECTIONS

A. Construct door sections with extruded-aluminum shapes, complying with ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, with wall thickness not less than 0.065 inch (1.6 mm) for door section 1-3/4 inches (44 mm) deep. Fabricate sections with stile and rail dimensions and profiles shown. Join stiles and rails by welding or with concealed, 1/4-
inch- (6-mm-) minimum-diameter, aluminum or nonmagnetic stainless-steel through bolts, full height of door section. Form meeting rails to provide a weathertight-seal joint. Provide reinforcement for hardware attachment.

B. Fabricate panels of aluminum sheet, complying with ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, not less than 0.040 inch (1.0 mm) thick, set in continuous vinyl channel retained with rigid, snap-in, extruded-vinyl moldings or with rubber or neoprene glazing gasket with aluminum stop.

C. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
2. Finish doors with manufacturer's standard high-performance organic coating finish, AA-C12C42R1x, complying with AAMA 605.2. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
3. Provide custom color as selected by architect.

2.3 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Provide manufacturer's standard, galvanized steel track system, sized for door size and weight, designed for lift type indicated and clearances shown, and complying with ASTM A 653 (ASTM A 653M), for minimum G60 (Z180) zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slot vertical sections of track at 2 inches (50 mm) o.c. for door-drop safety device. Slope tracks at proper angle from vertical or otherwise design to ensure tight closure at jambs when door unit is closed. Weld or bolt to track supports.

B. Track Reinforcement and Supports: Provide galvanized steel track reinforcement and support members, complying with ASTM A 36 (ASTM A 36M) and ASTM A 123. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.

C. Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall.

D. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and at top of door.

1. In addition, provide continuous flexible seals at door jambs for a weathertight installation.

2.4 HARDWARE

A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

B. Hinges: Provide heavy-duty galvanized steel hinges, of not less than 0.0747-inch- (1.9-mm-) thick uncoated steel, at each end stile and at each intermediate stile, per manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges,
where required, for doors exceeding 16 feet (4.87 m) in width, unless otherwise recommended by door manufacturer.

C. Rollers: Provide heavy-duty rollers, with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch- (75-mm-) diameter roller tires for 3-inch (75-mm) track, 2-inch- (50-mm-) diameter roller tires for 2-inch (50-mm) track, and as follows:

1. Case-hardened steel tires.
2. Neoprene or bronze tires.

D. Push/Pull Handles: For push-up-operated provide galvanized steel lifting handles on each side of door.

E. Slide Bolt: Fabricate with side locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.

F. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.

1. Locking Bars: Single-jamb side, operable from inside only.
2. Lock cylinder is specified in another Division 8 Section.

2.5 COUNTERBALANCING MECHANISM

A. Extension Spring: Operation by extension-spring counterbalance mechanism with aircraft-type steel cable over ball-bearing sheaves. Provide oil-tempered wired springs with internal safety rods. Combine operation with a spring bumper in each horizontal track to cushion door at end of opening operation.

B. Torsion Spring: Operation by torsion-spring counterbalance mechanism consisting of adjustable-tension torsion springs, fabricated from oil-tempered-steel wire complying with ASTM A 229 (ASTM A 229M), Class II, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least 5 to 1. Provide springs calibrated for 10,000 cycles minimum.

C. Cable Drums: Provide cast-aluminum or gray-iron casting cable drums grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide 1 additional midpoint bracket for shafts up to 16 feet (4.87 m) long and 2 additional brackets at one-third points to support shafts more than 16 feet (4.87 m) long, unless closer spacing is recommended by door manufacturer.

D. Cable Safety Device: Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side, designed to automatically stop door if either cable breaks.

E. Bracket: Provide anchor support bracket, as required to connect stationary end of spring to the wall, to level shaft and prevent sag.

F. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.6 MANUAL DOOR OPERATORS
A. Push-up Operation: Provide lift handles and pull rope for raising and lowering doors, operating with not more than 25-lbf (111-N) lift or pull.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work of this Section.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer’s written instructions, and as specified.

B. Fasten vertical track assembly to framing at not less than 24 inches (600 mm) o.c. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

3.3 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weather tight for entire perimeter.

END OF SECTION 08361
SECTION 08625 - TUBULAR DAYLIGHTING DEVICE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.

B. Accessories.

1.2 RELATED SECTIONS

A. Section 06105 – Miscellaneous Carpentry: skylight curbs.

B. Section 07540 – Flexible Sheet Membrane roofing: Flashing of skylight base.

C. Section 07620 – Sheet Metal Flashing and Trim: Metal Flashings.

D. Section 16140 – Wiring Devices: Electrical connections.

1.3 REFERENCES


E. ASTM A792/A 792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process


J. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.


N. UL 181 - Factory Made Air Ducts and Air Connectors


1.4 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
   1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
   2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
   3. Uniform Load Test:
      a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
      b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
   4. Fire Testing:
      a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
      b. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
      c. Smoke Density - Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
      d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
      e. Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

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. Installation methods.

C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.
D. Verification Samples: As requested by Architect.
E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

1.6 QUALITY ASSURANCE
A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 15 years.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer’s unopened packaging until ready for installation.
B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 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.

1.9 WARRANTY
A. Daylighting Device: Manufacturer’s standard warranty for 10 years.
B. Electrical Parts: Manufacturer’s standard warranty for 5 years, unless otherwise indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS
B. Substitutions: Not permitted unless pre-approved 10 days prior to bidding.
C. Requests for substitutions will be considered in accordance with provisions of Section 01600.
D. General Contractor will bear responsibility for costs associated with substitution review.
E. Requests for substitutions will be considered provided a lighting layout with photometric data is supplied to demonstrate light levels will meet original design intent.

2.2 TUBULAR DAYLIGHTING DEVICES
A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
B. SolaMaster Series: Solatube Model 750 DS-C Penetrating Ceiling, 21 inch (530 mm) Daylighting System:
   1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
a. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
b. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
c. Inner Dome Glazing: Type DAI, 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.

2. Roof Flashing Base:
   a. One Piece: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A 792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.15 mm) thick.
      1) Base Style: Type FC, Curb cap, with inside dimensions of 27 inches by 27 inches (685 mm x 685 mm) to cover curb as specified in Section 06105 Miscellaneous Carpentry.

3. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.

4. Dome Seal: Adhesive backed weatherstrip 0.63 inch (16 mm) tall by 0.28 inch (7 mm).

5. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).
   a. General:
      1) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 80.2 percent.
      2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
   b. Top Tube Angle Adapter, Type TA:
      1) Reflective 45 degree adjustable Top Tube Angle Adapter, 16 inches (406 mm) long.
   c. Bottom Tube Angle Adapter, Type BA:
      1) Reflective 45 degree adjustable Bottom Tube Angle Adapter, 16 inches (406 mm) long, required for transition box.
   d. Top Tube Angle Adapter and Bottom Tube Angle Adapter Kit, Type AK:
      1) Reflective 45 degree adjustable top and bottom angle adapters (one each), 16 inches (406 mm) long
   e. Extension Tube:
      1) Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) or 48 inches (1220 mm) long.
   f. Reflective 90 degree Adjustable tube:
      1) Extension Tube Angle Adapter: Provide manufacturer's standard adapters for applications requiring:
         (a) Type A1 one 0 to 90 degree extension tube angle adapter.
         (b) Type A2 two 0 to 90 degree extension tube angle adapters.

6. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
   a. Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch (2.8 mm) thick.
   b. Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame and EPDM foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283. Visible Light.
Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.

7. Accessories:
   a. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
   b. Local Dimmer Control utilizing a butterfly baffle design of Spectralight Infinity reflective material to minimize shadowing when in use: Provided with dimmer switch and cable.
      1) Daylight Dimmer: Type D Electro-mechanically actuated daylight valve; for universal input voltages ranging between 90 and 277 V at 50 or 60 Hz; maximum current draw of 50 ma per unit; controlled by low voltage, series Type T02: circuited, 4 conductor, size 22 cable; providing daylight output between 2 and 100 percent. Provided with dimmer switch and cable.
      2) Switch: Type SW, Manufacturer-specific low voltage DC DP/DT switch (white) required to operate Daylight Dimmer. Note: only one switch is required per set of synchronously controlled dimmers.
      3) Cable: Type CA, Two conductor low voltage cable (500 foot) for multiple unit DC connection.** NOTE TO SPECIFIER ** The following accessory is only available when an Inner Dome option is selected (Type DAI or Type DPI).

2.3 ACCESSORIES
   A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
   B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
   C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION
   A. Do not begin installation until substrates have been properly prepared.
   B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
   A. Clean surfaces thoroughly prior to installation.
   B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION
   A. Install in accordance with manufacturer's printed instructions.
B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1 related documents

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

1.2 SUMMARY

A. This Section includes the following:
   1. Commercial door hardware for the following:
      a. Swinging doors.
      b. Fire-rated swinging doors.
   2. Cylinders for doors specified in other Sections.
   3. Electrified door hardware.

B. Related Sections include the following:
   1. Division 08 Section "Hollow Metal Doors and Frames"
   2. Division 08 Section "Aluminum-Framed Entrances and Storefronts"
   3. Division 08 Section "Flush Wood Doors"
   4. Division 16 Sections for connections to electrical power system and for low-voltage wiring
      work.
   5. Division 16 Section "Fire Detection and Alarm" for connections to building fire alarm
      system.

C. Products furnished, but not installed, under this Section include the following. Coordinating,
   purchasing, delivering, and scheduling remain requirements of this Section.
   1. Thresholds, weather stripping, and cylinders for locks specified in other Sections.

1.3 PRICING AND PAYMENT PROCEDURES

A. Alternates
   1. General: Provide pricing complying with Division 01 Section “Alternates”.
   2. Provide base bid hardware as scheduled. Provide alternate pricing to convert scheduled
      base bid products to the alternate products approved in this section.

1.4 REFERENCED STANDARDS

A. Provide hardware in accordance with the following standards in addition to those specified in
   Division 01 Section “References”.
      and Facilities, edition as adopted by local Authority Having Jurisdiction (AHJ).
2. Builders Hardware Manufacturer’s Association (BHMA)
   b. ANSI/BHMA A156.3: Exit Devices, 2008 edition
   c. ANSI/BHMA A156.4: Door Controls - Closers, 2008 edition
   e. ANSI/BHMA A156.18: Materials and Finishes, 2006 edition

3. Door and Hardware Institute (DHI)
   e. Sequence and Format for the Hardware Schedule, 2001 edition

4. National Fire Protection Association (NFPA)
   a. NFPA 70: National Electrical Code, edition as adopted by local AHJ.
   b. NFPA 80: Standard for Fire Doors and Other Opening Protectives, edition as adopted by local AHJ.
   c. NFPA 252: Standard Methods of Fire Tests of Door Assemblies, edition as adopted by local AHJ.

1.5 SUBMITTALS

A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:
   1. Wiring Diagrams: Power, signal, and control wiring. Include the following:
      a. System schematic.
      b. Point-to-point wiring diagram.
      c. Riser diagram.
      d. Elevation of each door.
   2. Detail interface between electrified door hardware and fire alarm, access control, security, building control system.
   3. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Samples for Verification: For exposed door hardware of each type, in specified finish, full size. Tag with full description for coordination with the door hardware sets. Submit Samples before, or concurrent with, submission of the final door hardware sets, if requested.
   1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Qualification Data: For Installer

E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for locks, latches, and closers as requested.
F. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

G. Warranty: Special warranty specified in this Section.

H. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
2. Content: Include the following information:
   a. Identification number, location, hand, fire rating, and material of each door and frame.
   b. Type, style, function, size, quantity, and finish of each door hardware item.
   c. Complete designations of every item required for each door or opening including name and manufacturer.
   d. Fastenings and other pertinent information.
   e. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   f. Explanation of abbreviations, symbols, and codes contained in schedule.
   g. Mounting locations for door hardware.
   h. Door and frame sizes and materials.
   i. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
      1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
   j. List of related door devices specified in other Sections for each door and frame.

3. Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.

I. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
2. Installer shall have warehousing facilities in Project's vicinity.
4. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for
door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 and UBC Standard 7-2.

1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1016 mm) or less above the sill.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination.” In addition to Owner, Construction Manager, Contractor, and Architect, conference participants shall also include Installer’s Architectural Hardware Consultant and Owner’s Security Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

G. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination.”

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to Owner’s Representative by registered mail or overnight package service.

1.8 Coordination

A. Coordinate layout and installation of recessed hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Coordinate with aluminum entrance door supplier for door hardware installation.
D. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system.

1.9 Warranty

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection, cracking, or breakage.
   b. Faulty operation of operators and door hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three (3) years from date of Substantial Completion, except as follows:
   a. Continuous Hinges: Lifetime of Building
   b. Grade 1 Cylindrical Locks: Ten (10) years from date of Substantial Completion.
   c. Exit Devices: Three (3) years from date of Substantial Completion.
   d. Manual Closers: Thirty (30) years from date of Substantial Completion.
   e. Electrified Hardware Items: One (1) year from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

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

B. Maintenance Service: Beginning at Substantial Completion, provide six (6) months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

1.11 EXTRA MATERIALS

A. Furnish full-size units of door hardware described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Door Hardware:
   1. each Von Duprin 98-L x 626 Exit Device
   2. each Schlage ND75PD x 626 Lockset
   3. each LCN 4040XP HEDA x 689 Closer

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. **Hinges:** Ives, Hager, Stanley, McKinney, Bommer
2. **Continuous Hinges:** Ives, Stanley, Hager, Select, McKinney, Pemko
3. **Operating Door Trim:** Ives, Rockwood, Hager, Trimco
4. **Locks and Latches:** Schlage ND, Sargent 10
5. **Cylinders and Cores:** Schlage Primus Exterior, Classic E Interior, Owner's Standard
6. **Exit Devices:** Von Duprin, Owner's Standard
7. **Mechanical Door Closers:** LCN 4040XP, Sargent 281 P10
8. **Closer Release Devices:** ABH, LCN
9. **Auto Operators:** LCN, GyroTech
10. **Accessories and Trim:** Ives, Rockwood, Hager, Trimco
11. **Overhead Stops and Holders:** Glynn Johnson, Rixson, ABH, Sargent
12. **Saddle and Panic Thresholds:** Zero, National Guard, Pemko
13. **Weather Strip and Gasket:** Zero, National Guard, Pemko
14. **Miscellaneous Hardware:** Ives, Rockwood, Hager, Trimco
15. **Electronic Accessories** Schlage Electronics / Von Duprin,
16. **Emergency Access Key Box:** Knox, Inc

B. Substitutions submitted in compliance with Division 01 Section “Substitutions” requirements will be reviewed for conformance to basis of design.

### 2.2 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the “Hardware Schedule” at the end of this Section. Products are identified by using hardware designation numbers of the following:

1. **Manufacturer's Product Designations:** The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.

### 2.3 MATERIALS and fabrication

A. **General**

1. **Manufacturer's Name Plate:** Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.

   a. Manufacturer's identification will be permitted on rim of lock cylinders only.

2. **Base Metals:** Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.

3. **Provide hardware manufactured to conform to published templates generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

B. **Fasteners**

1. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Furnish stainless steel (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish
of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

2. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Use through bolts only as indicated in this section unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.4 Hinges

A. Acceptable Products:

1. Ives: 5BB1 5BB1HW
2. Hager: BB1279 BB1168
3. Stanley: FBB179 FBB168
4. McKinney: TB2714 T4B3386
5. Bommer: BB5000 BB5004

B. Requirements:

1. Quantity: Provide the following, unless otherwise indicated:
   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.

2. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

3. Hinge Weight: As indicated in hardware sets.

4. Hinge Base Metal: Unless otherwise indicated, provide the following:
   b. Interior Hinges: Steel with steel pin.
   c. Hinges for Fire-Rated Assemblies: Steel with steel pin.

5. Hinge Options: Where indicated in door hardware sets or on Drawings:
   a. Safety Stud: Designed for stud in one leaf to engage hole in opposing leaf.
   b. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for out-swinging doors.
   c. Corners: Square.

6. Fasteners: Comply with the following:
   b. Wood Screws: For wood doors and frames.
   c. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.

2.5 Continuous Hinges

A. Acceptable Products:

1. Ives: 112HD 224HD
2. Stanley: 661HD 662HD
3. Hager: 780-112HD 780-224HD
4. Select: SL11HD SL24HD
5.  McKinney:  MCK-12HD  MCK-25HD
6.  Pemko:  FMSLFHD  FMHD

B.  Requirements:

1.  Geared Continuous Hinges: Shall utilize a single gear section for the door leaf and a separate gear section for the frame side of the door. Provide full mortise or surface applied hinge as scheduled in each set. Geared hinges are to be UL 10C tested and approved for 90 minutes.
2.  To be used on pairs of doors, no exception.

2.6  Operating Door Trim

A.  Door Bolts

1.  Acceptable Products:
   a.  Ives:  FB458  DP1/DP2
   b.  Rockwood:  557/555  570
   c.  Hager:  282D  280X
   d.  Trimco:  3915/3917  3910/3911

2.  Requirements:
   a.  Provide bolt model recommended by manufacturer for door material type.
   b.  Provide 1 inch throw stainless steel bolt with 12 inch length unless otherwise scheduled in the sets.
   c.  Provide a dust proof strike for bottom bolt at all locations where there is not a threshold.

B.  Push Plates, Pull Plates, and Pulls

1.  Acceptable Products:
   a.  Ives:  8200  8305
   b.  Rockwood:  70C  111x70C
   c.  Hager:  30S  31J
   d.  Trimco:  1001  1018

2.  Requirements:
   b.  Pull Plate: Provide 4 inch by 16 inch by .050 inch push plate constructed of stainless steel, bevel all four edges. Provide 10 inch center to center (CTC) pull constructed of stainless steel with a diameter of 1 inch.
   c.  Offset Pull: Provide 10 inch center to center (CTC) pull with a 4 inch offset constructed of stainless steel with a diameter of 1 inch.
   d.  Push bar: Push bar shall be constructed of stainless steel with a diameter of 1 inch.
   e.  Push/Pull Bar: Provide 10 inch center to center (CTC) pull with a 4 inch offset and door pull equal to door width less 3 inches. Push/pull bar shall be constructed of stainless steel with a diameter of 1 inch.

2.7  Electric Strikes

A.  Acceptable Products:

1.  Von Duprin:  6300 Series  5000 Series
2. HES: 9000 Series --

B. Requirements:

1. Provide electric strikes that are continuous duty rated without the use of external rectifiers.
2. Provide electric strikes with function (fail safe, fail secure) and power requirements as scheduled.
3. Where scheduled, provide electric strikes with monitor switches.

2.8 Locks And Latches

A. General:

1. Lock Chassis: Shall be made from steel, with locking spindles of stainless steel.
2. Latch Bolt: Shall be constructed of stainless steel with 3/4 inch throw on mortise locks and 1/2 inch throw otherwise. Latch to be deadlocking on keyed functions.
3. Lever Trim: Shall be pressure cast brass, bronze, zinc, or steel with wrought rose design. Levers are to be solid with no voids or plastic inserts.
4. Fire Rating: Lock shall be listed for up to 3 hours.
5. Strike Plates: Provide ANSI 4-7/8 inch strike plates. At pairs of doors, provide strike with 7/8 inch flat lip. At single doors, provide round-lipped strike with lip length as required to minimally clear jamb and trim. Provide dust box at each strike location.

B. Grade 1 Bored Locks

1. Acceptable Products:
   a. Base Bid:
      1) Schlage: ND Series, Rhodes Lever
   b. Alternate Bid:
      1) Sargent: 10 Line, LL Lever

2. Requirements:
   a. ANSI Grade: BHMA/ANSI A156.2, Series 4000, Grade 1.
   c. Anti-Rotation Plate: Provide lockset with a mechanically interlocked anti-rotation plate. Anti-Rotation teeth or “bite tabs” are not acceptable. Locks without any rotation prevention devices are not acceptable.
   d. Lever Return Springs: Provide each lever with two compression type return springs that are easily accessible without dismantling the lock chassis. Locks utilizing tension or torsion lever return springs are unacceptable. Locks with internal springs that require dismantling the lock chassis are unacceptable.
   e. Lever Spindles: Provide lock with either milled or 1-piece deep drawn spindles. 2-piece interlocking stamped spindles are not acceptable.
   f. Multi-Functionality: Provide modular lockset with capability to convert to a new lock function by changing key cams.
   g. Vandal Resistant Lever: Where scheduled, provide lockset with lever that freely rotates even when locked to resist vandalism and abuse.

C. Deadbolts

1. Requirements:
   a. Provide deadbolts by same manufacturer as the provided locksets.
   b. Provide chassis type, function, and grade as scheduled.
2.9 Cylinders And Cores

A. Acceptable Products:

1. Schlage: Primus, exterior Classic E, interior
2. No Substitution, Match existing facility standard

B. Requirements:

1. Exterior: Primus Full Size Interchangeable Cylinders: Provide cylinders of quantity and type and with the appropriate cam/tailpiece to be compatible with the locking hardware provided. Provide cylinder housings ready to accept 6-pin, Full-Size Interchangeable Cores (FSIC).
   a. Temporary Construction Keying: Provide each cylinder housing and/or lock lever with keyed construction core during the construction period. Cores will remain property of the contractor and will be returned upon installation of owner’s permanent key system.
   b. Permanent Cores: Provide cores with a geographically exclusive factory-restricted keyway. Ship cores directly to owner’s representative. At substantial completion, accompany the owner’s representative while replacing temporary construction cores with the owner’s permanent key system.

2. Interior: Conventional Cylinders: Provide Classic E cylinders of quantity and type and with the appropriate cam/tailpiece to be compatible with the locking hardware provided. Provide factory keyed 6-Pin conventional cylinders
   a. Temporary Construction Keying: Provide each cylinder with “Split Key” type temporary keying during the construction period. At substantial completion, accompany the owner’s representative while voiding construction keying.

3. Keys: Provide cylinder manufacturer’s standard keys. Keys shall be shipped separate from cores directly to owner’s representative. For estimating purposes, provide keys in the following quantities:
   a. Construction Control Keys: 2 each
   b. Construction Change Keys: 15 each
   c. Permanent Control Keys: 2 each
   d. Split Key Voiding Keys: 2 each
   e. Permanent Master Keys: 5 each
   f. Permanent Grand Master Keys: 5 each
   g. Permanent Change Keys: 2 per core
   h. Primus key blanks: 100 each

2.10 Exit Devices

A. Acceptable Products:

1. Base Bid:
   a. Von Duprin: 98Series
   b. No Substitution, Owner’s Standard

B. Requirements:

1. ANSI Grade: BHMA/ANSI A156.3, Grade 1.
2. Device Construction:
   a. Exit device(s) shall have a mechanism case constructed of extruded aluminum or wrought stainless steel, base plates constructed of cold rolled or cast steel, push
pad of extruded aluminum with stainless steel covering or wrought stainless steel, and end caps with flush mounted, sloped design. At full-glass doors, provide exit devices with no exposed fasteners or rivets visible through glass. Where required by stile width, provide narrow-stile type device.

b. Latchbolt: Provide Pullman-type deadlocking latch bolts constructed of stainless steel. Where specified provide high security Pullman-type latchbolt that collapses to be square faced under high pull forces. Latch return springs shall be compression type. Tension and Torsion latch return springs are not acceptable.

c. Dogging Mechanism: where dogging or latch-retraction options are not specifically scheduled for non-fire rated doors, provide device with a hex-key activated hook-type dogging mechanism constructed of steel.

d. Plastic or nylon used for the push pad, or parts in the dogging mechanism or latchbolt mechanism are unacceptable.

e. Sound Dampening: Device shall be provided with factory-installed sound dampening materials.

f. Provide device type, function, and trim style as indicated in hardware schedules.

g. Concealed vertical exit devices shall be a cable-actuated concealed vertical latch system available in two-point and less bottom latch (LBL) configurations. Vertical rods are not acceptable.

1) Cable shall include color-coded stainless steel with polytetrafluoroethylene (Teflon®) liner and stainless steel core wire. Latches and center slides are color coded to aid in installation. Conduit and core wire ends snap into latch and center slides without the use of tools. Latchbolts and blocking cams shall be manufactured from sintered metal low carbon copper- infiltrated steel, with a molybdenum disulfide coating for low friction and consistent performance.

2) Top latchbolt shall have a minimum 0.382 inch and greater than 90 degree engagement with strike to prevent door and frame separation under high static load. Bottom latchbolt, when used, shall have a minimum of 0.44 inch engagement with strike.

3) Product cycle life shall exceed 1,000,000 cycles.

4) Latch release does not require separate trigger mechanism.

5) Top and bottom latch must operate independently of each other. Top latch will fully engage top strike even when bottom latch is compromised.

6) Cable and latching system shall have the ability to:

a) Be assembled as a complete assembly and function prior to being installed in the door.

b) Install into the door as a one-piece single assembly

c) Be installed independently of device installation and function on door even prior to device and trim installation.

d) Connect to the exit device at a single attachment point.

e) Adjust bottom latch height from a single point, after the system is installed and connected to exit device, while the door is hanging

f) Alter latch position up and down within two-inches without additional adjustment.

g) Ability to remove the system while door is hanging.

h) Configure latchbolt mounting: double or single tab mount for steel doors, and wood doors, face mount for aluminum doors, eliminating requirement of tabs.

i) Provide adjustable exit device to latch center line adjustment. Ensures double tab mounting option for top latch, regardless of exit device centerline.

3. Where exit device(s) are provided for fire rated door, provide with fire listing and label indicating “Fire Exit Hardware”. If device is mounted on wood doors, provide sex nuts and bolts.

4. Provide shim kits, filler plates, and other accessories as required for each opening.

5. Unless otherwise indicated in the sets, provide device with roller-type strike.
6. Where scheduled, provide removable mullions by same manufacturer as provided exit devices. Provide mullion stabilizers, key removable option, strike preps, and fire rating as indicated in sets.

2.11 Mechanical Door Closers

A. General:

1. Valves: Closers shall have separate valves for latch speed, main speed, and back check. Valves shall be staked to prevent accidental removal.
2. Provide the appropriate closer body, handing, and brackets to mount closer inside the building on the least-public side of the door.
   a. Where closers are to be mounted parallel arm, provide with heavy duty, fully forged arms.
   b. Where closers are to be mounted regular arm and the opening can otherwise be opened to 180 degrees, provide closer with the appropriate special templating to allow 180 degree door swing. Where a special template is not available for 180 degree swing, provide closer arm with integrated stop.
3. Integrated Stop Closer Arms: Where a closer with integrated stop is required, provide the appropriate closer and arm as follows:
   a. Parallel arm with spring-cushioned stop arm: Provide where door is otherwise able to open to 95 degrees and requires a parallel arm mount closer.
   b. Parallel arm with dead stop arm: Provide where door is obstructed from opening to 95 degrees and requires a parallel arm mount closer.
   c. Regular arm with push side surface-mounted overhead stop: Provide where door closer should mount on pull side of door.
4. Hold Open Arms: Provide closer arms with mechanical hold-opens as scheduled.
5. Provide closers with any special templates, brackets, plates, or other accessories required for interface with header, door, wall, and other hardware. Provide closers with screw packs containing thru-bolts, machine screws, and wood screws.
6. Closers shall be provided with all-weather fluid and shall not require readjustment from 120 degrees F to -30 degrees F. Fluid shall be non-flaming and shall not fuel door or floor covering fires. Upon request, provide data indicating thermal properties of fluid.
7. Closers shall close and latch door when adjusted to meet accessibility requirements for door opening force: 8.5 lbs at exterior doors, 5 lbs at interior doors, and 15 lbs at labeled fire doors.

B. Heavy Duty Door Closers:

1. Acceptable Products:
   a. Base Bid:
      1) LCN: 4040XP
   b. Alternate Bid:
      1) Sargent: 281 P10
2. Requirements:
   a. ANSI Grade: BHMA/ANSI A156.4, Grade 1.
   b. Closer Construction: Closer shall have cast iron or aluminum alloy body with 1-1/2 inch steel piston, double heat treated pinion, 5/8 inch bearing journals, and full complement needle or caged ball bearings. Closer shall be adjustable from sizes 1 through 6.
   c. Provide closers with spring size adjustment dial for ease of adjusting.
C. Closer Release Devices

1. Acceptable Products:
   1) LCN SEM7850
   2) ABH 2510

D. Requirements:

1. Provide 35 and 400 pound electro-magnetic hold open device as noted in hardware sets, constructed of die cast metal. Electromagnet shall accept 120VAC, 24VDC, and/or 12VDC power from fire alarm. Provide mounting style as scheduled.

2.12 Automatic Operators

A. Acceptable Products:

1. LCN: 4600 Series
2. GyroTech: 710

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI A156.19.
2. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door.
   a. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
4. Provide drop plates, brackets, or adapters for arms as required for details.
5. Provide actuator switches for operation as specified. Provide weather-resistant actuators at exterior applications.
6. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf.
7. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.13 Architectural Door Trim

A. Protection Plates and Edge Guards

1. Acceptable Products:
   a. Ives: 8400 Series
   b. Rockwood: K1050
   c. Hager: 194S
   d. Trimco: K Series

2. Requirements:
   a. Provide .050 inch thick stainless steel protection plates with height as scheduled. Plate shall have four beveled edges and countersunk screws. Provide plate with width as follows:
1) Pairs of Doors: Provide plate to be 1 inch less door width.
2) Single Doors: Provide plate to be 2 inches less door width on push side, pull side mounted plates to be 1 inch less door width.

b. Where plate exceeding 16 inches in height is scheduled on fire rated door, provide visual UL marking on plate and fasten using adhesive rather than screws.

B. Door Stops and Holders

1. Acceptable Products:
   a. Ives: WS407
   b. Rockwood: 405/406
   c. Hager: 236W
   d. Trimco: 1270

2. Requirements:
   a. Provide stops and holders as indicated in the HW sets.
   b. Where wall bumpers are scheduled, provide concave rubber bumper where the adjacent lever trim incorporates a push-button. Otherwise, provide convex rubber bumpers.

2.14 Overhead Stops And Holders

A. Acceptable Products:
   1. Glynn Johnson: 100 Series
   2. Rixson-Firemark: 6 Series
   3. ABH: 1000 Series
   4. Sargent: 100 Series

B. Requirements:
   1. Provide overhead stops and holders as scheduled, sized per manufacturer’s recommendations based on door width.
   2. Provide concealed overhead stops with adjustable jamb bracket.
   3. Where possible without conflicting with other hardware, mount surface overhead stops on least public side of door.
   4. Provide stops with any special templates, brackets, plates, or other accessories required for interface with header, door, wall, and other hardware.

2.15 Saddle And Panic Thresholds

A. Acceptable Products:
   1. Zero International: 655A
   2. National Guard: 425HD
   3. Pemko: 1715A

B. Requirements:
   1. Saddle thresholds: Provide with length equal to the width of the opening.
   2. Panic thresholds: Provide with length equal to the overall frame width. Provide with mitered and welded ends.
   3. Where floor closers are scheduled with thresholds, provide threshold with factory cut outs to be compatible with the provided floor closer.
4. Provide stainless steel machine screws and lead anchors for each threshold.

2.16 Weatherstrip And Gasket

A. General:
   1. Provide weather strip and gasketing as scheduled.
   2. Size weather strip and gasket to provide a continuous seal around opening and at meeting stiles.

B. Perimeter Seals
   1. Acceptable Products:
      a. Zero: 429A 8303AA 188S-BK
      b. National Guard: 700SA 160S 5050B
      c. Pemko: 2891AS 303AS S88D

C. Astragals, Meeting Stiles, and Mullion Seals
   1. Acceptable Products:
      a. Zero: 8193AA 43SP 8780N
      b. National Guard: 9605A 139A 5100
      c. Pemko: 18041CNB 357C 5100SB
   2. Requirements
      a. Where overlapping astragals are scheduled on exterior doors, provide with thru-bolts.
      b. Where overlapping astragals are scheduled on out-swinging doors, provide for mounting on the pull-side of the active leaf. Otherwise, provide for mounting on the push-side of the inactive leaf.

D. Door Bottoms
   1. Acceptable Products:
      a. Zero: 8198AA
      b. National Guard: C627A
      c. Pemko: 3452CNB

2.17 Miscellaneous Hardware

A. Silencers
   1. Acceptable Products:
      a. Ives: SR64
      b. Rockwood: 608
      c. Hager: 307D
      d. Trimco: 1229A
   2. Requirements:
      a. Where indicated on single openings, provide 3 each rubber silencers on lock jamb.
      b. Where indicated on paired openings, provide 2 each rubber silencers on header.
2.18 Electronic Accessories

A. Keyswitches and Push Buttons

1. Acceptable Products:
   a. Schlage Electronics: 653 Series
   b. Securitron: MK Series

2. Requirements:
   a. Keyswitches: Provide single gang keyswitch with momentary/maintained switches as indicated in the sets. Provide with LED indicator lights as scheduled.

2.19 High Security Emergency Key Box

A. Acceptable Products:

1. Knox, Inc. 3200 Series x RMK

B. Requirements:

1. Provide recess-mounted emergency key box as approved by the local fire jurisdiction. Key box to be master-keyed as dictated by local fire jurisdiction.

2.20 FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and locksets (or push-pull units if no latch or locksets).

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

D. The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.

1. Brushed Chrome and/or Stainless Steel Appearance
   e. Weatherstrip and Gasket: Clear Anodized Aluminum finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 Series.
   1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

B. Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

A. Pre-installation conference shall be conducted prior to installation of hardware at Project site. Meet with the, Owner, Contractor, installer, and manufacturer’s representatives. A separate pre-installation conference shall be conducted prior to the installation of electronic security hardware with the electrical contractor Review catalogs, brochures, templates, installation instructions, and the approved hardware schedule. Survey installation procedures and workmanship, with special emphasis on unusual conditions, as to ensure correct technique of installation, and coordination with other work. Notify participants at least ten, 10 working days before conference.

B. Hardware Installers must have a minimum of five (5) years’ experience in installation of hardware. Provide verification of installer’s qualification to Consultant for approval. All installers to attend review meetings with the hardware distributor.

C. Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturer's published installation instructions.

D. Install head seal prior to installation of “PA”-parallel arm mounted door closers and push side mounted door stops/holders. Trim, cut and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Install thresholds and saddles in a bed of caulking completely sealing the underside from water and air penetration.

E. Counter sink through bolt of door pull under push plate during installation.

F. Mounting Heights: Mount door hardware units at heights indicated, as follows, unless otherwise indicated or required to comply with governing regulations.
   2. Custom Steel Doors and Frames: DHI's “Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames.”

G. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
   1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
   2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
H. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

A. Architectural Hardware Consultant: Architect shall engage a qualified Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

B. Architectural Hardware Consultant shall inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer’s Architectural Hardware Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section “Demonstration and Training.”

3.8 DOOR HARDWARE SETS

A. The following schedule of hardware sets shall be considered a guide and the supplier is cautioned to refer to general conditions, special conditions, and the full requirements of this section. It shall be the hardware supplier’s responsibility to furnish all required hardware.

B. Where items of hardware are not definitely or correctly specified and are required for completion of the Work, a written statement of such omission, error, conflict, or other discrepancy shall be sent to the Architect, prior to date specified for receipt of bids, for clarification by addendum.
C. Adjustments to the Contract Sum will not be allowed for omissions or items of hardware not clarified prior to bid opening.

**HARDWARE SCHEDULE**

**HW SET NO: 01**  
DOOR NUMBER: (Includes but is not limited to the following doors)  
145A

| 1 EA | CYLINDER | CLASSIC E AS REQ’D BY DR MFG 626 SCH | REMAINING BY DOOR MFG B/O HARDWARE |

**HW SET NO: 02**  
DOOR NUMBER: (Includes but is not limited to the following doors)  
175A  175B  175C  175D  190  190A

| 1 EA | FSIC CYLINDER | PRIMUS AS REQ’D BY DR MFG 626 SCH | 626 SCH |
| 1 EA | PERMANENT PRIMUS CORE | 20-740 | 626 SCH |
| REMAINING | BY DOOR MFG | B/O HARDWARE |

**HW SET NO: 03**  
DOOR NUMBER: (Includes but is not limited to the following doors)  
146

| 3 EA | HW HINGE | 5BB1HW 4.5 X 4.5 NRP 630 IVE | 626 VON |
| 1 EA | PANIC HARDWARE | LD-98-NL | |
| 1 EA | PRIMUS RIM CYLINDER | 20-757 | 626 SCH |
| 1 EA | FSIC CONST. CORE | 23-030-ICX | SCH |
| 1 EA | PERMANENT PRIMUS CORE | 20-740 | 626 SCH |
| 1 EA | SURFACE CLOSER | 4040XP SHCUSH MC | 689 LCN |
| 1 EA | CUSH SHOE SUPPORT | 4040-30 | 689 LCN |
| 1 EA | KICK PLATE | 8400 10" X 2" LDW | 630 IVE |
| 1 EA | SEAL SET | 429A | A ZER |
| 1 EA | DOOR SWEEP | 8198AA | AL ZER |
| 1 EA | THRESHOLD | 655A MSLA-10 | AL ZER |
| 1 EA | RAIN DRIP | 142A | A ZER |
| 1 EA | DOOR CONTACT | 679-05 | WHT SCE |
### HW SET NO: 04
DOOR NUMBER: (Includes but is not limited to the following doors)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Part Number</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5 NRP</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>VANDL STOREROOM LOCK</td>
<td>ND96JD RHO</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>FSIC CONST. CORE</td>
<td>23-030-ICX</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>PERMANENT PRIMUS CORE</td>
<td>20-740</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER SUPPORT</td>
<td>4040XP SHCUSH MC</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>CUSH SHOE</td>
<td>4040-30</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>SEAL SET</td>
<td>429A</td>
<td>A ZER</td>
</tr>
<tr>
<td>1 EA</td>
<td>DOOR SWEEP</td>
<td>8198AA</td>
<td>AL ZER</td>
</tr>
<tr>
<td>1 EA</td>
<td>THRESHOLD</td>
<td>655A MSLA-10</td>
<td>AL ZER</td>
</tr>
<tr>
<td>1 EA</td>
<td>RAIN DRIP</td>
<td>142A</td>
<td>A ZER</td>
</tr>
</tbody>
</table>

INSTALL WEATHERSTRIP BEFORE CLOSER. DO NOT NOTCH WEATHERSTRIP AROUND CLOSER BRACKET.

### HW SET NO: 05
DOOR NUMBER: (Includes but is not limited to the following doors)

<table>
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<th>Quantity</th>
<th>Description</th>
<th>Part Number</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5 NRP</td>
<td>652 IVE</td>
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<tr>
<td>1 EA</td>
<td>PASSAGE SET</td>
<td>ND10S RHO</td>
<td>626 SCH</td>
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<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDA MC TBWMS</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 SET</td>
<td>SEAL</td>
<td>8303AA</td>
<td>AL ZER</td>
</tr>
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</table>

### HW SET NO: 06
DOOR NUMBER: (Includes but is not limited to the following doors)

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<th>Location</th>
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</thead>
<tbody>
<tr>
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<td>HINGE</td>
<td>5BB1 4.5 X 4.5 NRP</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>KEYED PRIVACY WITH INDICATOR (CLASSIC E KEYWAY)</td>
<td>L9056P 06B L583-363 L283-722</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDA MC TBWMS</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>GASKETING</td>
<td>188S-BK (1 HEADER, 2 JAMB)</td>
<td>S-Bk ZER</td>
</tr>
</tbody>
</table>

### HW SET NO: 07
DOOR NUMBER: (Includes but is not limited to the following doors)

<table>
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<th>Part Number</th>
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<td>5BB1 4.5 X 4.5 NRP</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>VANDL CLASSROOM LOCK</td>
<td>ND94PD RHO CLASSIC E</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDA MC TBWMS</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 SET</td>
<td>SEAL</td>
<td>8303AA</td>
<td>AL ZER</td>
</tr>
</tbody>
</table>

HARDWARE
CACHE HIGH SCHOOL
HW SET NO: 08
DOOR NUMBER: (Includes but is not limited to the following doors)
112 113 114 116 118 120
121 122A 125 129 131 133
135
3 EA HINGE 5BB1 4.5 X 4.5 NRP 652 IVE
1 EA VANDL CLASSROOM LOCK ND95PD RHO CLASSIC E 626 SCH
1 EA SURFACE CLOSER 4040XP HEDA MC TBWMS 689 LCN
1 EA KICK PLATE 8400 10" X 2" LDW 630 IVE
1 EA WALL STOP WS406/407CCV 630 IVE
1 SET SEAL 8303AA AL ZER

HW SET NO: 09
DOOR NUMBER: (Includes but is not limited to the following doors)
111 123
3 EA HINGE 5BB1 4.5 X 4.5 NRP 652 IVE
1 EA VANDL STOREROOM LOCK ND96PD RHO CLASSIC E 626 SCH
1 EA SURFACE CLOSER 4040XP SCUSH MC 689 LCN
1 EA CUSH SHOE 4040-30 689 LCN
1 EA WALL STOP WS406/407CCV 630 IVE
1 EA GASKETING 188S-BK (1 HEADER, 2 JAMB) S-Bk ZER

HW SET NO: 10
DOOR NUMBER: (Includes but is not limited to the following doors)
103
3 EA HINGE 5BB1 4.5 X 4.5 NRP 652 IVE
1 EA VANDL CLASSROOM LOCK ND94PD RHO CLASSIC E 626 SCH
1 EA ELECTRIC STRIKE 5100-3FP FSE 689 VON
1 EA SURFACE CLOSER 4040XP ED A MC TBWMS 689 LCN
1 EA AUTO OPERATOR 710 689 GYR
2 EA ACTUATOR, WALL MOUNT 8310-853 630 LCN
1 EA KICK PLATE 8400 10" X 2" LDW 630 IVE
1 EA WALL STOP WS406/407CCV 630 IVE
1 SET SEAL 8303AA AL ZER
1 EA REMOTE SWITCH BY DIV 28 B/O

EXTERIOR ACTUATOR AND ELECTRIC STRIKE IS REMOTELY RELEASED FROM RECEPTION.
USER EITHER OPENS DOOR TO ENTER OR PUSHES ACTUATOR TO ENGAGE AUTO OPERATOR.
HW SET NO: 11
DOOR NUMBER: (Includes but is not limited to the following doors)
115 119 130 134

6 EA HW HINGE 5BB1HW 4.5 X 4.5 NRP 652 IVE
1 SET AUTO FLUSH BOLT FB42 630 IVE
1 EA VANDL STOREROOM LOCK
1 EA COORDINATOR COR X FL 628 IVE
2 EA MOUNTING BRACKET MB 689 IVE
2 EA SURFACE CLOSER 4040XP EDA MC TBWMS 689 LCN
2 EA WALL STOP WS406/407CCV 630 IVE
1 EA GASKETING 188S-BK (1 HEADER, 2 JAMB) S-Bk ZER
1 EA SECURITY ASTRAGAL 43SP ZER

HW SET NO: 12
DOOR NUMBER: (Includes but is not limited to the following doors)
136

2 EA SC CONT. HINGE 711 630 IVE
2 EA FIRE EXIT HARDWARE 9849-L-F-06-LBL 626 VON
1 EA MORTISE CYLINDER 20-001 CLASSIC E (KEYSWITCH) 626 SCH
2 EA RIM CYLINDER 20-057 CLASSIC E 626 SCH
2 EA SURFACE CLOSER 4004T MC TBWMS 689 LCN
2 EA KICK PLATE 8400 10" X 2" LDW 630 IVE
2 EA MAG HOLDER 2510 LPB 626 ABH
1 SET SEAL 8303AA AL ZER
1 EA MULLION SEAL 8780N N ZER
1 EA KEYSWITCH 653-04 630 SCE

INTERFACE REQUIRED WITH FIRE LIFE SAFETY SYSTEM FOR IMMEDIATE RELEASE OF MAG
HOLDERS IN THE EVENT OF A FIRE. KEYSWITCH TO CONTROL MAGNETS FOR MAINTENANCE
PURPOSES.

HW SET NO: 13
DOOR NUMBER: (Includes but is not limited to the following doors)
137

6 EA HW HINGE 5BB1HW 4.5 X 4.5 NRP 652 IVE
1 EA FIRE RATED 9954 689 VON
REMOVABLE MULLION
2 EA FIRE EXIT HARDWARE 98-L-F-06 626 VON
2 EA RIM CYLINDER 20-057 CLASSIC E 626 SCH
2 EA SURFACE CLOSER 4040XP EDA MC TBWMS 689 LCN
2 EA KICK PLATE 8400 10" X 2" LDW 630 IVE
2 EA FIRE/LIFE WALL MAG SEM7850 689 LCN
1 SET SEAL 8303AA AL ZER
1 EA MULLION SEAL 8780N N ZER

INTERFACE REQUIRED WITH FIRE LIFE SAFETY SYSTEM FOR IMMEDIATE RELEASE OF MAG
HOLDERS IN THE EVENT OF A FIRE.
### HW SET NO: 14
**DOOR NUMBER:** (Includes but is not limited to the following doors)

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<th>Brand</th>
<th>Notes</th>
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<td>5BB1HW 4.5 X 4.5 NRP</td>
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<td>KEYED FIRE RATED HINGE REMOVABLE MULLION</td>
<td>KR9954</td>
<td>VON</td>
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<tr>
<td>2</td>
<td>FIRE EXIT HARDWARE</td>
<td>98-L-F-06</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MORTISE CYLINDER</td>
<td>20-001 (MULLION)</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>RIM CYLINDER</td>
<td>20-057 CLASSIC E</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDA MC TBWMS</td>
<td>LCN</td>
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<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FIRE/LIFE WALL MAG</td>
<td>SEM7850</td>
<td>LCN</td>
<td></td>
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<tr>
<td>1</td>
<td>SEAL</td>
<td>8303AA</td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>MULLION SEAL</td>
<td>8780N</td>
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**INTERFACE REQUIRED WITH FIRE LIFE SAFETY SYSTEM FOR IMMEDIATE RELEASE OF MAG HOLDERS IN THE EVENT OF A FIRE.**

### HW SET NO: 15
**DOOR NUMBER:** (Includes but is not limited to the following doors)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Part Number</th>
<th>Brand</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5 NRP</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PUSH PLATE</td>
<td>8200 4&quot; X 16&quot;</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDA MC TBWMS</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SILENCER</td>
<td>SR64</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
<td>IVE</td>
<td></td>
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<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
<td>IVE</td>
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</tr>
<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
<td>IVE</td>
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</tr>
<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PULL PLATE</td>
<td>8305 10&quot; 4&quot; X 16&quot;</td>
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### HW SET NO: 16
**DOOR NUMBER:** (Includes but is not limited to the following doors)

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<th>Part Number</th>
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<th>Notes</th>
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<td>HINGE</td>
<td>5BB1 4.5 X 4.5 NRP</td>
<td>IVE</td>
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<tr>
<td>1</td>
<td>KEYED PRIVACY WITH INDICATOR</td>
<td>L9056P 06B L583-363 L283-722</td>
<td>SCH</td>
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<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK (1 HEADER, 2 JAMB)</td>
<td>ZER</td>
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### HW SET NO: 17
**DOOR NUMBER:** (Includes but is not limited to the following doors)

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<th>Item Description</th>
<th>Part Number</th>
<th>Brand</th>
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<td>5BB1 4.5 X 4.5 NRP</td>
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<td>VANDL ENTRANCE LOCK</td>
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<td>8400 10&quot; X 2&quot; LDW</td>
<td>IVE</td>
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<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>IVE</td>
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<tr>
<td>3</td>
<td>SILENCER</td>
<td>SR64</td>
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**HARDWARE**  
**CACHE HIGH SCHOOL**
HW SET NO: 18
DOOR NUMBER: (Includes but is not limited to the following doors)
140

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<tr>
<th>Quantity</th>
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<td>5BB1 4.5 X 4.5</td>
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<td>IVE</td>
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<td>1</td>
<td>VANDL STOREROOM LOCK</td>
<td>ND96PD RHO CLASSIC E</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td>630</td>
<td>IVE</td>
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<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
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<tr>
<td>3</td>
<td>SILENCER</td>
<td>SR64</td>
<td>GY</td>
<td>IVE</td>
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HW SET NO: 19
DOOR NUMBER: (Includes but is not limited to the following doors)
141 142 144

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<tr>
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<th>Part Number</th>
<th>Supplier</th>
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<tr>
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<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
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<tr>
<td>1</td>
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<td>ND96PD RHO CLASSIC E</td>
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<tr>
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<td>WS406/407CCV</td>
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HW SET NO: 20
DOOR NUMBER: (Includes but is not limited to the following doors)
143

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<td>WALL STOP</td>
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<tr>
<td>3</td>
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HW SET NO: 21
DOOR NUMBER: (Includes but is not limited to the following doors)
124

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<td>2510 LPB</td>
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<td>ABH</td>
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<td>GY</td>
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<td>KEYSWITCH</td>
<td>653-04</td>
<td>630</td>
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KEYSWITCH TO CONTROL MAGNETS FOR MAINTENANCE PURPOSES.
### HW SET NO: A
DOOR NUMBER: (Includes but is not limited to the following doors)

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<td>628</td>
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<tr>
<td>Keyed Removable Mullion</td>
<td>KR4954-STAB</td>
<td>1</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>Panic Hardware</td>
<td>CD-98-DT</td>
<td>1</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>Panic Hardware</td>
<td>CD-98-NL</td>
<td>1</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>Mortise Cylinder (Mullion)</td>
<td>20-001</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>Mortise Cylinder (Classic E)</td>
<td>20-001</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>Mortise Cylinder (Keyswitch)</td>
<td>20-001</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>Primus Rim</td>
<td>20-757</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>FSIC Const. Core</td>
<td>23-030-ICX</td>
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<td>Permanent Primus Core</td>
<td>20-740</td>
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<td>OH Stop</td>
<td>100S ADJ</td>
<td>2</td>
<td>630</td>
<td>GLY</td>
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<tr>
<td>Surface Closer</td>
<td>4040XP EDAW/62G MC</td>
<td>1</td>
<td>689</td>
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<tr>
<td>Auto Operator</td>
<td>710</td>
<td>1</td>
<td>689</td>
<td>GYR</td>
</tr>
<tr>
<td>PA Mounting Plate</td>
<td>4040-18PA</td>
<td>2</td>
<td>689</td>
<td>LCN</td>
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<tr>
<td>Actuator, Wall Mount</td>
<td>8310-853</td>
<td>2</td>
<td>630</td>
<td>LCN</td>
</tr>
<tr>
<td>Perimeter Seals</td>
<td>Door MFG Std</td>
<td>1</td>
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<tr>
<td>Door Sweep</td>
<td>Door MFG Std</td>
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<td>Rain Drip</td>
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<td>A</td>
<td>ZER</td>
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<td>Keyswitch</td>
<td>653-04</td>
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<td>Exit Devices</td>
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**EXIT DEVICES MUST BE MECHANICALLY DOGGED BY CYLINDERS FOR ADA OPERATOR TO FUNCTION AND FOR PUSH/PULL FUNCTION. KEYSWITCH TO TURN OFF/ON EXTERIOR ACTUATOR. OPERATOR FUNCTIONS INDEPENDENT OF INTERIOR OPERATOR.**

### HW SET NO: A1
DOOR NUMBER: (Includes but is not limited to the following doors)

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<th>Supplier</th>
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<td>628</td>
<td>IVE</td>
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<tr>
<td>Keyed Removable Mullion</td>
<td>KR4954-STAB</td>
<td>1</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>Panic Hardware</td>
<td>CD-98-DT</td>
<td>1</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>Panic Hardware</td>
<td>CD-98-NL</td>
<td>1</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>Mortise Cylinder (Mullion)</td>
<td>20-001</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>Mortise Cylinder (Classic E)</td>
<td>20-001</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>Mortise Cylinder (Keyswitch)</td>
<td>20-001</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>Primus Rim</td>
<td>20-757</td>
<td>1</td>
<td>626</td>
<td>SCH</td>
</tr>
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<td>FSIC Const. Core</td>
<td>23-030-ICX</td>
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<td>Permanent Primus Core</td>
<td>20-740</td>
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<tr>
<td>OH Stop</td>
<td>100S ADJ</td>
<td>2</td>
<td>630</td>
<td>GLY</td>
</tr>
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<td>Surface Closer</td>
<td>4040XP EDAW/62G MC</td>
<td>1</td>
<td>689</td>
<td>LCN</td>
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<td>Auto Operator</td>
<td>710</td>
<td>1</td>
<td>689</td>
<td>GYR</td>
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<td>PA Mounting Plate</td>
<td>4040-18PA</td>
<td>2</td>
<td>689</td>
<td>LCN</td>
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<td>Actuator, Wall Mount</td>
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<td>630</td>
<td>LCN</td>
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<tr>
<td>Perimeter Seals</td>
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<td>B/O</td>
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<tr>
<td>Door Sweep</td>
<td>Door MFG Std</td>
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<td>AL</td>
<td>B/O</td>
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<tr>
<td>Rain Drip</td>
<td>142A</td>
<td>1</td>
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**HARDWARE**

CACHE HIGH SCHOOL 08710 - 25
EXIT DEVICES MUST BE MECHANICALLY DOGGED BY CYLINDERS FOR ADA OPERATOR TO FUNCTION AND FOR PUSH/PULL FUNCTION. OPERATOR FUNCTIONS INDEPENDENT OF EXTERIOR OPERATOR.

HW SET NO: A2
DOOR NUMBER: (Includes but is not limited to the following doors)
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<td>VON</td>
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<td>CYLINDER</td>
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<td>1</td>
<td>PERMANENT PRIMUS CORE</td>
<td>20-740</td>
<td>SCH</td>
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<td>2</td>
<td>OH STOP</td>
<td>100S ADJ</td>
<td>GLY</td>
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EXIT DEVICES MAY BE MECHANICALLY DOGGED BY CYLINDERS FOR PUSH/PULL OPERATION.

HW SET NO: A3
DOOR NUMBER: (Includes but is not limited to the following doors)
105 122 138

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<td>MORTISE CYLINDER</td>
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<td>SCH</td>
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<td>1</td>
<td>PERMANENT PRIMUS CORE</td>
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<td>SCH</td>
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<td>OH STOP</td>
<td>100S ADJ</td>
<td>GLY</td>
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<td>SURFACE CLOSER</td>
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EXIT DEVICES MAY BE MECHANICALLY DOGGED BY CYLINDERS FOR PUSH/PULL OPERATION.
### HW SET NO: A4

**DOOR NUMBER:** (Includes but is not limited to the following doors)

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<td>CD-98-NL</td>
<td>626 VON</td>
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<td>1 EA MORTISE CYLINDER</td>
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<td>20-001 CLASSIC E (KEYSWITCH)</td>
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<td>1 EA PRIMUS RIM</td>
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<td>1 EA FSIC CONST. CORE</td>
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<td>SCH</td>
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<td>1 EA PERMANENT PRIMUS CORE</td>
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<td>6300 FSE</td>
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<td>2 EA OH STOP</td>
<td>100S ADJ</td>
<td>630 GLY</td>
</tr>
<tr>
<td>1 EA SURFACE CLOSER</td>
<td>4040XP EDAW/62G MC</td>
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<td>1 EA AUTO OPERATOR</td>
<td>710</td>
<td>689 GYR</td>
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<tr>
<td>2 EA PA MOUNTING PLATE</td>
<td>4040-18PA</td>
<td>689 LCN</td>
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<tr>
<td>2 EA ACTUATOR, WALL MOUNT</td>
<td>8310-853</td>
<td>630 LCN</td>
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<tr>
<td>1 EA PERIMETER SEALS</td>
<td>DOOR MFG STD</td>
<td>B/O</td>
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<tr>
<td>2 EA DOOR SWEEP</td>
<td>DOOR MFG STD</td>
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<td>1 EA THRESHOLD</td>
<td>DOOR MFG STD</td>
<td>AL B/O</td>
</tr>
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<td>1 EA RAIN DRIP</td>
<td>142A</td>
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<td>1 EA KEYSWITCH</td>
<td>653-04</td>
<td>630 SCE</td>
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**EXIT DEVICES MUST BE MECHANICALLY DOGGED BY CYLINDERS FOR ADA OPERATOR TO FUNCTION AND FOR PUSH/PULL FUNCTION. KEYSWITCH TO TURN OFF/ON EXTERIOR ACTUATOR. OPERATOR FUNCTIONS INDEPENDENT OF INTERIOR OPERATOR.**

### HW SET NO: B

**DOOR NUMBER:** (Includes but is not limited to the following doors)

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</tr>
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<td>2 EA DUMMY PUSH BAR</td>
<td>350-DT</td>
<td>626 VON</td>
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<tr>
<td>2 EA OH STOP</td>
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<td>630 GLY</td>
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<tr>
<td>2 EA SURFACE CLOSER</td>
<td>4040XP EDAW/62G MC</td>
<td>689 LCN</td>
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<td>2 EA PA MOUNTING PLATE</td>
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<td>1 EA PERIMETER SEALS</td>
<td>MFG STD</td>
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<td>2 EA DOOR SWEEP</td>
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HARDWARE
CACHE HIGH SCHOOL

08710 - 27
**HW SET NO:** B1  
**DOOR NUMBER:** (Includes but is not limited to the following doors)  
117A

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<tr>
<td>2 EA</td>
<td>DUMMY PUSH BAR</td>
<td>350-DT</td>
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<tr>
<td>2 EA</td>
<td>OH STOP</td>
<td>100S ADJ</td>
<td>630 GLY</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDAW/62G MC</td>
<td>689 LCN</td>
</tr>
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<td>PA MOUNTING PLATE</td>
<td>4040-18PA</td>
<td>689 LCN</td>
</tr>
<tr>
<td>2 EA</td>
<td>ACTUATOR, WALL</td>
<td>8310-853</td>
<td>630 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>PERIMETER SEALS</td>
<td>MFG STD</td>
<td>AL B/O</td>
</tr>
<tr>
<td>2 EA</td>
<td>DOOR SWEEP</td>
<td>DOOR MFG STD</td>
<td>AL B/O</td>
</tr>
</tbody>
</table>

**OPERATOR FUNCTIONS INDEPENDENT OF EXTERIOR OPERATOR.**

**END OF SECTION**
SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Glazed storefront systems.

1.3 DEFINITIONS

A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

C. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer’s written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

D. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer’s written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

E. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer’s written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass
breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
   a. Specified Design Wind Loads: As indicated.
   b. Specified Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (centimeters per second) at 33 feet (10 m) above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on Drawings.
   c. Specified Design Snow Loads: As indicated, but not less than snow loads applicable to Project, required by ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 7, "Snow Loads."
   d. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
   1) Load Duration: 60 seconds or less.
   e. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.
   1) For monolithic-glass lites heat treated to resist wind loads.
   2) For insulating glass.
   3) For laminated-glass lites.
   f. Minimum Glass Thickness for Exterior Lites: Not less than ¼”.
   g. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites ¼” thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units with lites ¼” thick and a nominal 1/2-inch wide interspace.
4. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).
7. Solarban 60 Clear +clear SHGC 0.39, SC 0.45 visible light 70% winter U-Value 0.29 summer U-Value 0.27, visible light out 11%.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass and of 12-inch- (300-mm-) long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

C. Samples: Provide in the form of 12 inch square samples for glass.

D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

F. Product Test Reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products:
   1. Insulating glass.
   2. Glazing sealants.

G. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Glass: Obtain glass from one primary-glass manufacturer.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

   1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.


H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of inspecting and testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer’s Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that deteriorate as defined in “Definitions” Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 5 years from date of Substantial Completion.
D. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2: PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated in schedules at the end of Part 3.

2.2 PRIMARY FLOAT GLASS

B. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); class as indicated in schedules at the end of Part 3.

2.3 HEAT-TREATED FLOAT GLASS

A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); class, kind, and condition as indicated in schedules at the end of Part 3.

2.5 WIRED GLASS (Not Allowed)

2.6 INSULATING GLASS

A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in the Insulating-Glass Schedule at the end of Part 3.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.

B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

C. Sealing System: Dual seal, with primary and secondary sealants as follows:

1. Manufacturer's standard sealants.

D. Spacer Specifications: Manufacturer's standard spacer material and construction.
2.7 ELASTOMERIC GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers’ written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer’s full range for this characteristic.

B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant in the Glazing Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

1. Additional Movement Capability: Where additional movement capability is specified in the Glazing Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASTM C 920 for uses indicated.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. EPDM, ASTM C 864.
2. Silicone, ASTM C 1115.
3. Thermoplastic polyolefin rubber, ASTM C 1115.
4. Any material indicated above.
B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. EPDM.
2. Silicone.
3. Thermoplastic polyolefin rubber.
4. Any material indicated above.

2.10 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.11 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

PART 3- EXECUTION

3.1 PREPARATION

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

3.2 GLAZING, GENERAL
A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where the length plus width is larger than 50 inches (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.3 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.4 GASKET GLAZING (DRY)
A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 SEALANT GLAZING (WET)
A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 PROTECTION AND CLEANING
A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

3.7 MANUFACTURERS:

A. Subject to compliance with specifications Manufacturers offering products that may be incorporated include the following:

   1. Libby Owens Ford Glass Co.
   2. American Saint Gobain Corp.
   3. Capital Glass
   4. Ford
   5. Pittsburgh Plate Glass Co.

3.8 GLASS TYPES – Schedule of glass types as shown on the drawings.

A. Type SG: Safety Glass, 1/4” clear tempered glass.
B. Type SGI: Insulated Safety Glass, 1” insulated glass with ¼” clear tempered glass on the exterior and ¼” clear tempered glass on the interior with a ½” air space, and high performance “LOW E” coating.
C. Type CGI: Insulated Glass, 1” insulated glass with ¼” clear glass on the exterior and ¼” clear glass on the interior with a ½” air space, and high performance “LOW E” coating.
D. Type CW: Polished Wire Glass (NOT ALLOWED).
E. Type FRG20 – Fire Rated Glass – 20 min. clear.
F. Type FRG45 – Fire Rated Glass – 45 min. clear.
G. Type FRG90 – Fire Rated Glass – 90 min. clear.

END OF SECTION 08800
PART 1 - GENERAL

1.1 SUMMARY

A. Work required for this section includes glazed aluminum wall systems and supplementary items necessary to complete their installation including storefront, entrance framing & entrance doors.

B. Installation of cylinders supplied by Section 08711.

C. Door hardware for component doors Section 08711. Prep all doors to fit perfectly.

1.2 SYSTEM DESCRIPTION

A. Contents documents establish aesthetic criteria and performance requirements for the wall system. Requirements specified or indicated by details are intended to establish basic dimensions of module and sight lines and profiles of members. Include modifications or additions required to meet specified requirements and maintain the visual design concept.

B. Contract Documents do not necessarily indicate or describe total work required for completion of Work. Furnish and install all items required for complete installation.

C. Dimension and profile adjustments may be made in proposed design in interest of fabrication or erection methods or techniques, weatherability factor, or ability of design to satisfy aesthetic and performance requirements, provided that design intent and intent of Contract Documents are maintained.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide manufacturer's glazed aluminum wall system, adapted to application indicated, that complies with performance requirements specified as demonstrated by testing the manufacturers corresponding systems according to test methods indicated.

1. It is the intent to allow manufacturer to provide a standard system and components to the extent that such system complies with the aesthetic design and performance criteria.

B. Air and Water Infiltration: Design and install the glazed aluminum wall system for permanent resistance to air and water leakage through the system in accordance with the following:

1. Air Infiltration: Air leakage through wall system shall not exceed 0.06 cfm per sq. ft. of fixed wall area when tested in accordance with NFRC 400 at a minimum static air pressure differential of 6.24 lbf per sq. ft.

2. Water Penetration:

a. Static Air Pressure: There shall be no evidence of uncontrolled water leakage through the wall system, as defined in AAMA 501, when tested in accordance with ASTM E 331 at a minimum differential pressure of 20 percent of inward design wind load but not less than 12.0 lbf per sq. ft.
C. Structural Performance: provide glazed aluminum wall system, including anchorages, to withstand the effects of a wind load acting inward and outward, normal to the plane of the wall, when tested in accordance with ASTM E 330, with no material and deflection failures or permanent deformation of structural members exceeding 0.2 percent of the span.

1. Meet wind load requirements of applicable Local Building Codes and Design Wind Pressures 20 psf minimum.
2. Structural test pressure shall be equal to 150 percent of the positive and negative design wind pressures.
3. Wall system to accommodate movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
4. Deflections: Wall system shall be capable of withstanding building movements including wind loading and of performing within the following limitations:
   a. Deflection of framing members perpendicular to the plane of the wall shall not exceed 1/175 of its clear span or 3/4 inch, whichever is less.
   b. Deflection of members parallel to the plane of the wall, when carrying its full dead load, shall not exceed an amount that will reduce glass bite by less than 75 percent of the design dimension and shall not reduce edge clearance between itself and the panel, glass, or other fixed member to less than 1/8 inch.
   c. Deflection of framing members in a direction normal to wall plane is limited to 1/360 of clear span, 3/4 inches maximum, where gypsum board surfaces are subject to bending.
   d. Deflection of framing members overhanging an anchor point is limited to 2 times the length of the cantilevered member, divided by 175.
   e. The center deflection of the window stool trim, when subjected to a 250 pound vertical concentrated load, shall not exceed 1/8-inch.
   f. Design wall system to accommodate 3/8-inch differential vertical live load movement of the floors.

D. Seismic Loads: Provide glazed aluminum wall system, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction.

E. Thermal Movements: Provide glazed aluminum wall system, including anchorages, capable of withstanding thermal movements resulting from an ambient temperature differential of 120 degrees F, and a metal surface temperature range of 180 degrees F within the wall framing without causing buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, noise or vibration, and other detrimental effects.

F. Condensation Requirements: Provide glazed aluminum wall system with thermal-break construction that has been tested in accordance with AAMA 1503.1 and certified by the manufacturer to provide a condensation resistance factor (CRF) of not less than 55.

G. Infiltrated and Condensation Water Management: Design system to incorporate provisions for guttering and weeping infiltrated and condensate water out of system to the exterior. Coordinate with other adjacent exterior wall components.

H. Dimensional Tolerances: Provide glazed aluminum wall system, including anchorage, that accommodates dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

A. Product data: Include manufacturer’s specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
B. Shop Drawings: Prepared by or under the supervision of a qualified engineer. Show adaptation of manufacturer’s standard glazed aluminum wall system to the project; include typical unit elevations at 1/2-inch scale and details at full scale. Show dimensions, profiles of members, anchorage system, interface with building construction, and glazing.

C. Samples: Provide pairs of samples of each aluminum finish type and color on 12-inch-long sections of extrusions or formed shapes and on 6-inch-squares of aluminum sheet or plate. Include 2 or more units in each sample set showing the extreme limits of variations expected in color and texture of finish.

D. Test Reports: Provide test reports from a qualified independent testing agency evidencing compliance of the manufacturer’s glazed aluminum wall system with performance requirements indicated based on comprehensive testing of manufacturers current system.

E. Manufacturer’s Field Reports: Submit detailed report of visits made by representatives of the manufacturer to the Project as specified in “Field Quality Control” Article.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform glazed aluminum wall work who has a minimum of 5 years specialized experience in installing glazed aluminum wall systems similar to that required for this Project and who is acceptable to manufacturer of wall system.

B. Single-Source Responsibility: Provide glazed aluminum wall system for the project from one source from a single manufacturer.

C. Product Options: The drawings indicate size, profiles, and dimensional requirements of the glazed aluminum wall system and are based on the specific type and model indicated. Glazed aluminum wall systems by other manufacturers having equal performance characteristics may be considered provided deviations in dimensions and profiles are minor and do not change the intended aesthetic effects or intended performance requirements as judged by the Architect.

D. Preinstallation Conference: Before beginning wall installation, conduct a preinstallation conference at the Project site with the wall system manufacturer, installer, and other interested parties to review procedures, schedules, and coordination of the wall installation with other elements of the Work.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

A. Manufacturer’s Project Acceptance Document: Submit certification that manufacturer and installer will warrant glazed aluminum wall system for the specific site, design, details and application indicated for this Project.

1. Submit sample copy of Manufacturer's Extended Warranty 10 years.
2. Maintenance service for entrance doors. 12 months from Date of Substantial Completion.
2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. Kawneer Company/Traco
2. United States Aluminum Corp.
4. YKK AP America Inc.
5. EFCO
6. Manco Window Systems

2.2 PRODUCT STANDARD

A. The design for glazed aluminum wall system is based on the following manufacturer’s system. Subject to compliance with requirements, provide named product or a comparable product by one of the acceptable manufacturers.

1. Storefront windows – Kawneer Co. 451 T VG Center Plane with vent glass outswing casement with screen. Alternate manufacturers must provide similar VG profiles.
2. Entrance doors – Kawneer Co. 500 Widestyle with 10” bottom rail.
3. See Hardware Division Section 08710.

2.3 MATERIALS

A. Aluminum: Provide alloy, temper, and thickness recommended by the manufacturer for the type of use and finish indicated and with not less than the strength and durability properties required to fulfill performance requirements.

1. Extruded Bars, Tubes and Shapes: Comply with requirements of ASTM B 221.
2. Plate and Sheet: Comply with requirements of ASTM B 209.

B. Glass: Provide glass of types and thicknesses indicated or as required. Fabricate glass to sizes required for openings indicated with edge clearances and tolerances complying with manufacturer’s recommendations. Refer to Division 8 Section ”Glazing” for requirements.

C. Glazing Gaskets: Manufacturer’s standard sealed-corner pressure-glazing or wedge-lock dry glazing system. Refer to Division 8 Section ”Glazing” for requirements.

D. Concealed Metal Joint Sealant: Curtain wall type, nondrying, nonskinning, AAMA 809.2.

E. Exposed Sealants and joint fillers, for joints at the interface of wall construction and other work, shall comply with requirements specified in Division 7 Section ”Joint Sealers”.

F. Fasteners and Accessories: Manufacturer’s standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads.
4. Finish exposed portions to match framing system.
5. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
G. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

H. Concealed Flashing: Manufacturer’s standard corrosion-resistant, non-staining, non-bleeding flashing compatible with adjacent materials of type recommended by manufacturer.

I. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

J. Insect Screens: Aluminum, mesh full screen with standard wicket.

2.4 FABRICATION

A. General: Fabricate glazed aluminum wall system at the manufacturer’s shop to the fullest extent possible and before applying finishes. Provide concealed fasteners. Make provisions to drain to exterior face of wall, water entering at joints and condensation occurring within wall construction including secondary water. Provide horizontal members with continuous gutters to drain moisture to exterior through protected weep holes.

1. Match exposed work to produce continuity of line. Fit joints accurately and secure rigidly.
2. Seal joints and connections in exterior metal watertight with metal joint sealant.
3. Provide properly designed watertight expansion joints as required.
4. Design and anchor wall system so that it will not be distorted nor the fastenings seriously stressed from the expansion and contraction of the metal. Provide slotted holes for erection adjustment.
5. Welding shall conform to the requirements of the Standard Code for Arc and Gas Welding of the American Welding Society.
6. Welds shall be of adequate strength and durability, with jointing tight, flush, smooth and clean.
7. Weld behind finished surfaces so as to cause no distortion and/or discoloration on the finished side.
8. Remove weld splatter and welding oxides on finished surfaces.
9. Provide minimum clearances and depth of glazing packets as recommended by glass manufacturer for thickness and type of glass indicated.

2.5 FINISHES

A. General: Comply with the NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.

D. Finish: Clear Class I anodized aluminum frames.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates surfaces to receive glazed aluminum wall system and associated work and conditions under which work will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer. Starting work within a particular area will be construed as applicator's acceptance of surface conditions.

3.2 PREPARATION

A. Furnish inserts for setting in concrete formwork, and similar work required to support glazed aluminum wall system.

B. Field measure and verify governing dimensions, including floor elevations, floor-to-floor heights, minimum clearance between wall system and structural frames and other permissible dimensional tolerances in building frame.

C. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.3 INSTALLATION

A. Comply with manufacturer's instructions for installing fabricated wall components, with particular care and attention to preservation of applied finishes. Discard or remove and replace damaged members.

B. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.

C. Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

D. Do not cut, trim, weld or braze component parts during erection, in any manner which would damage finish, decrease strength or result in visual imperfection or failure in performance of construction.

E. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers.

F. Maintain minimum clearance of one inch between inside face of wall system and outside face of building structure. Allow 3/8 inch minimum for sealant between wall system and adjacent construction.

G. Anchor components securely in place. Shim and allow for movement resulting from changes in thermal conditions. Provide separators and isolators to prevent corrosion, electrolytic deterioration, and impede movement of moving joints.

H. Glazing: Install glass and glazing material in accordance with manufacturers, recommendations and as specified. Comply with requirements specified in Division 8 Section "Glazing".

I. Sealants and joint fillers: Seal perimeter of glazed aluminum wall system. Comply with requirements specified in Division 7 Section "Joint Sealants".
J. Erection Tolerances: Install components plumb, level, accurately aligned, and located in reference to column lines and floor levels. Adjust work to conform to the tolerances indicated below. Tolerances indicated below are maximum and are not cumulative.

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or greater, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane or location shown to 1/8 inch in 12 feet or 1/2 inch in any total length.
DIVISION 9 - FINISHES
09260  Gypsum Board Assemblies
09310  Ceramic Tile
09511  Acoustical Panel Ceilings
09550  Wood Gymnasium Flooring
09651  Resilient Floor Tile
09680  Carpet
09841  Tackable Panels and Acoustic Sound Panels
09911  Painting
SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Interior gypsum wallboard.
2. Tile backer board.
3. Putty packs at back box sound walls including TV back boxes.
4. Sound attenuation batt insulation.
5. Acoustical sealant.
6. Coordinate with G.C. for installation of solid blocking for accessories, hardware, visual display surfaces, cabinetry, millwork & toilet partitions, etc., as required.
7. Installation of counter support brackets furnished by Division 5 Section.

B. Related Sections include the following:

1. Division 6 Section for wood stud framing.
2. Division 9 Section "Ceramic Tile".

1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

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

B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

C. Samples: For the following products:

1. Trim Accessories: Full-size sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated
according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.


B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.

1.8 MOCK UP

A. Provide mock up where approved by Architect for approval of texture and finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Gypsum Board and Related Products:
   a. Georgia Pacific.
   b. United States Gypsum Co.
   c. National Gypsum Company

2. Tile Backer Board Products
2.2 STEEL SUSPENDED CEILING FRAMING

A. Components, General: Comply with ASTM C 754 for conditions indicated.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

C. Hangers: As follows:
   1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2-inch- (12.7-mm-) wide flange, with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized.
   1. Depth: 2-1/2 inches.

   1. Cold Rolled Channels: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange, 3/4 inch (19.1 mm) deep.
   2. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
      a. Minimum Base Metal Thickness: 0.0179 inch.

F. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard:
   1. Fire Rated Gypsum Board: ASTM C1396, Type X, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered and beveled edges.
   2. Sag-Resistant Gypsum Board: ASTM C1396, 5/8 inch thick, maximum permissible length; ends square cut, tapered and beveled edges. Install in wet ceiling areas.

2.5 TILE BACKING PANELS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
B. Tile Backer Units: ASTM C 1178.
   1. Available Products: Subject to compliance with requirements, products that may
      be incorporated into the Work include, but are not limited to, the following:
      Thickness: 5/8”. Densshield or equivalent.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Shapes:
      a. Cornerbead: Use at outside corners. 800 Series.
      b. LC-Bead: J-shaped.
      c. Reveal joints at exposed panel edges. No. 200A where indicated on
         drawings.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.
B. Joint Tape:
   1. Interior Gypsum Wallboard: Paper.
   2. Tile Backing Panels: As recommended by panel manufacturer.
C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is
   compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints and damaged surface areas, use setting-type taping
      compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints,
      fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim
         accessories.
   3. Fill Coat: For second coat, use drying-type, all-purpose compound.
   4. Finish Coat: For third coat, use setting-type, sandable topping compound.
   5. Finish coat may be omitted where not exposed to view behind Trackable Wall
      System or Acoustic Panels.
D. Joint Compound for Tile Backing Panels:
   1. As recommended by manufacturer.

2.8 ACOUSTICAL SEALANT

A. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning,
   nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior
   concealed joints to reduce airborne sound transmission.
B. Putty packs equivalent to products by 3M, Hilti, or Quiet Rock EZ installed at all sound
   wall back boxes including large screen TV back boxes sealed air tight.

2.9 AUXILIARY MATERIALS
A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
   2. Thickness: 3-1/2".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.

3.4 INSTALLING STEEL SUSPENDED CEILING FRAMING

A. Suspend ceiling hangers from building structure as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
   3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

6. Do not attach hangers to steel deck tabs.

7. Do not attach hangers to steel roof deck. Attach hangers to structural members.

8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

9. Trapeze members to not come in contact with ductwork.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.

C. Sway-brace suspended steel framing with hangers used for support.

D. For exterior soffits, install cross bracing and framing to resist wind uplift.

E. Wire-tie furring channels to supports, as required to comply with requirements for assemblies indicated.

F. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.

1. Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches.
3. Furring Channels (Furring Members): 24 inches.

G. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.6 APPLYING AND FINISHING PANELS, GENERAL

A. Install putty packs in sequence indicated on drawings.


C. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

D. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

E. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

F. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
G. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

H. Attach gypsum panels to framing provided at openings and cutouts.

I. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.

J. Form control and expansion joints with space between edges of adjoining gypsum panels.

K. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

L. Floating Construction: Where feasible, including where recommended in writing by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.

M. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

N. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
   1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

O. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.7 PANEL APPLICATION METHODS

A. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels horizontally perpendicular to framing, unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of board.
      b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

B. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
C. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

D. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

E. Tile Backing Panels:
   1. Tile Backing Units: ANSI A108.11, at locations indicated to receive tile in wet areas.
   2. Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface.
   3. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

I. Note application methods for putty packs – see drawing details.

3.8 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer’s written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect. Clean all vee’s and intersections to be clean & smooth.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
   1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
   2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

E. Tile Backer Units: Finish according to manufacturer’s written instructions.

3.10 FIELD QUALITY CONTROL
A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.

2. Level 2: In utility areas, behind cabinetry and behind tackable wall system except paint gyp board behind vertical track standards.

3. Before notifying Architect, complete the following in areas to receive gypsum board ceilings.

   a. Installation of 80 percent of lighting fixtures, powered for operation.
   b. Installation, insulation, and leak and pressure testing of water piping systems.
   c. Installation of air-duct systems.
   d. Installation of air devices.
   e. Installation of mechanical system control-air tubing.
   f. Installation of ceiling support framing.

END OF SECTION 09260
SECTION 09310 - CERAMIC TILE

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes the following: Note Drawings and Finish Schedules for Tile Selections.
      1. Floor tile.
      2. Glazed wall tile.
      3. Corridor wall tile
   B. Related Sections include the following:
      1. Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
      2. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
      3. Division 9 Section "Gypsum Board Assemblies" for tile backer units.

1.3 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Samples for Verification:
      1. Full-size units of each type and composition of tile and for each color and finish required.
      2. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches (300 mm) square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.
      3. Full-size units of each type of trim and accessory.
      4. Stone thresholds in 6-inch (150-mm) lengths.
      5. Metal edge strips in 6-inch (150-mm) lengths.
   C. Product Certificates: For each type of product, signed by product manufacturer.
   D. Qualification Data: For Installer.
   E. Material Test Reports: For each tile-setting and -grouting product that is coordinated with TCNA assemblies listed.

1.4 QUALITY ASSURANCE
A. Source Limitations for Tile: Obtain all tile from one source or producer from one tile run.
   1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
   1. Waterproofing.
   2. Joint sealants.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer’s written instructions.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
   1. Basis-of-Design Product: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 PRODUCTS, GENERAL
A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, “Specifications for Ceramic Tile,” for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.


C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. As indicated by manufacturer's designations.

D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE PRODUCTS: Indicated on Drawings and finish schedules

A. Available Manufacturers:

1. Basis-of-Design Product: Dal Tile
2. See finish schedule on drawings.

2.4 SETTING AND GROUTING MATERIALS

A. Available Manufacturers:

1. LATICRETE International Inc.
2. MAPEI Corporation.

B. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A.

1. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Prepackaged dry-mortar mix containing dry, dispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
D. Medium-Bed, Latex-Portland Cement Mortar: Provide materials composed as follows, with physical properties equaling or exceeding those required for thin-set mortars based on testing of medium-bed specimens according to ANSI A118.4:

1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.

E. Organic Adhesive: ANSI A136.1, Type I.

F. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.

2.5 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.6 MISCELLANEOUS MATERIALS

A. Aluminum edge strips equivalent to Schluter AE 100.

B. Trowelable Underlayment's and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard[ silicone] product for sealing grout joints that does not change color or appearance of grout.

2.7 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.

2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION, GENERAL
A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series “Specifications for Installation of Ceramic Tile” that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.


C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

   1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

   1. Locate joints in tile surfaces directly above joints in concrete substrates.
   2. Prepare joints and apply sealants to comply with requirements in Division 7 Section “Joint Sealants.”

H. Grout tile to comply with requirements of the following tile installation standards:

   1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

I. Tile Joint at vertical corners. Provide specified silicone sealant at vertical wall corner joints in toilet rooms.

3.4 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCNA – latest version installation methods and ANSI A108 Series of tile installation standards.

   1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage. Coordinate type with drawings.

      a. Tile floors in wet areas. F-112 w/cementitious bond coat.
      b. Tile Floors thin set areas: F-113 w/cementitious bond coat.

B. Joint Widths: Install tile on floors with the following joint widths:

   1. Ceramic Tile: 1/16 inch (1.6 mm).
C. Rubber Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

D. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.5 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile referencing TCNA installation methods and ANSI setting-bed standards.

   1. Joint Widths: Install tile on walls with the following joint widths.
      a. Glazed Wall Tile: 1/16 inch (1.6 mm).
      b. Flexible sealant at inside corners & abutments to dissimilar materials.

   1. Joint Widths: Install tile on walls with the following joint widths.
      a. Glazed Wall Tile: 1/16 inch (1.6 mm).
      b. Flexible sealant at inside corners & abutments to dissimilar materials.

D. Corridor wall tile installation. W245 without membrane at stud walls cementitious grout.
   1. 3/16” joint widths.
   2. Grout: cementitious grout.

E. Install aluminum edge strips at outside corners except in corridors where aluminum map rail is provided.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove latex-portland cement grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
   3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed or as per manufacturer recommendation.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces

END OF SECTION 09310
1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes acoustical lay in ceiling panels and exposed suspension systems.
   B. Sound panels attached directly to metal roof deck is specified 09841.

1.3 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
      1. Acoustical Panel: Set of 6-inch Samples of each type, color, pattern, and texture.
      2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch long Samples of each type, finish, and color.
   C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
   D. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor type.
   E. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE
   A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
   B. Source Limitations:
      1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
   C. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.
D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class [A] [B] [C] materials as determined by testing identical products per ASTM E 84:
   a. Smoke-Developed Index: 450 or less.

E. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:


1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.

2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.
PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL – Specified system is compression post and wire system rigid bracing as required to meet code at contractor option.

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

B. Acoustical Panel Patterns: Match appearance characteristics indicated for each product type. Colors of panels, white.

1. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
   a. Armstrong World Industries, Inc.
   b. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
   c. USG Interiors, Inc.

2. Acoustical Lay-in Panels equivalent to:
   a. 24 inch x 48 inch x 5/8 inch, Cortega 747 as mfg by Armstrong-CAC 40 min.
   b. 24 inch x 24 inch x 5/8 inch, Cortega 704 as mfg by Armstrong-CAC 33 min.

2.2 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:


   2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than [0.106-inch- (2.69-mm-)] [0.135-inch- (3.5-mm-)] diameter wire.

E. Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Angle Hangers: Angles with legs not less than 15/16 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
G. Seismic Struts: Manufacturer’s standard compression struts designed to accommodate seismic forces.

H. Seismic Clips: Manufacturer’s standard seismic clips designed and spaced to secure acoustical panels in-place.

2.3 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

A. Products:

1. 15/16” exposed heavy duty.

B. Manufacturer:

a. Specified systems: Armstrong – Seismic Rx system or equivalent products by:
   b. Chicago Metallic
   c. USG Interior
   d. Celotex
   e. Donn

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

A. General: Install acoustical panel ceilings to comply with [ASTM C 636] [UBC Standard 25-2] and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook." Note: 2” perimeter trim is not required and is not to be provided as indicated in IBC. Install per UBC 97 requirements.

Optional Installation: Provide 1” perimeter trim and the 1496 seismic perimeter clip as manufactured by Chicago Metallic Corp in compliance with IBC latest edition.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

8. Do not attach hangers to steel deck tabs.

9. Do not attach hangers to steel roof deck. Attach hangers to structural members.

10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

11. Cut excessive wire at end of wire wraps.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building’s structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.66 m). Miter corners accurately and connect securely.

3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. For square edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
4. Conceal fastener in tectum panels with sealant - color to match finish of panel.
5. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09511
SECTION 09550 - WOOD FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:
A. Extent of wood flooring is shown on drawings and in schedules, either by terms specified or by abbreviations.
B. Types of wood flooring required include the following:
   1. Wood strip gymnasium flooring including rubber base.
   2. Finishing including painting of game lines is work of this section.
   3. Install volleyball standard floor sleeves provided by Section 11490 - Athletic Equipment.

1.3 QUALITY ASSURANCE:
A. Installer: Specialized wood flooring firm with not less than 3 years successful experience in installation of types specified, and acceptable to manufacturer of wood flooring.
B. General Standard: Comply with recommendations of Maple Flooring Manufacturer’s Association (MFMA).
C. Source Quality Control: Obtain flooring of each type from single manufacturer or source, to ensure match of quality, color, pattern and texture.

1.4 SUBMITTALS:
A. Product Data: Submit manufacturer's detailed technical product data and installation instructions for each type of wood flooring, including installation, storage, and finishing recommendations.
B. Samples: Submit sets of range samples for each type of wood flooring, including finish on 75% of each sample.

1.5 DELIVERY, STORAGE, AND HANDLING:
A. Moisture Content: At time of delivery, limit average moisture content of wood flooring to 12%, with 14% max. for any piece.
B. Protect wood flooring from excessive moisture in shipment, storage, and handling. Deliver material in unopened bundles and store in a dry place, with adequate air circulation.

1.6 JOB CONDITIONS:
A. Conditioning: Do not proceed with installation of wood flooring until spaces have been enclosed and are at approximate humidity condition planned for occupancy. Condition
wood for 5 days prior to start of installation by placing in spaces to receive flooring and maintaining ambient temperature between 65°F and 70°F (18°C and 21°C) before, during, and after installation. Open packages of wood flooring which are sealed (if any) to permit natural adjustment of moisture content.

1.7 SPECIAL PROJECT WARRANTY:

A. Submit 3-year warranty signed by Manufacturer, Installer, and Contractor, agreeing to repair or replace wood flooring which shrinks, warps, cracks, or otherwise deteriorates excessively, or which breaks its anchorage or bond with substrate or otherwise fails to perform as required, due to failures of materials and/or workmanship and not due to unusual exposure to moisture or other abusive forces or elements not anticipated for application.

PART 2 - PRODUCTS

2.1 WOOD STRIP FLOORING:

A. Available Manufacturers: Specified system is Connor-AGA-Neo-Shok. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Connor-AGA-NEOSHOK
2. Robins-Bio System
3. Acerflex TP – Horner Flooring

B. Species, Grade, and Cut: Provide the following wood wherever strip type flooring is indicated:

1. Gym Floor:
   a. Species: Northern Hard Maple 25/32” x 2-1/4”
   b. Grade: Second & Better
   c. Cut: Plain Sawn.

D. Back Channeling: Provide manufacturer's standard channeling on back face of each strip.

1. Thickness: 25/32”
2. Face Width: 2-1/4”.
3. Lengths: Provide standard random length strips, complying with applicable grading rules.
4. Seasoning: Manufacture wood strip flooring from kiln-dried lumber.

2.2 ACCESSORY MATERIALS FOR WOOD FLOORING:

A. Adhesive/Mastic: Polyvinyl acetate or special mastic of type recommended by manufacturer of flooring, and complying with flammability and environmental control restrictions.

B. Resilient Pads: Two stage polyurethane durometer value 70 installed per manufacturer's instructions.

C. Plywood: 15/32” APA rated plywood sheathing exposure 1 (2) layers.
D. Fasteners: As recommended by manufacturer.
   Flooring fasteners – 2” barbed cleats or coated staples.
   Subfloor Fasteners – 1” staples or equivalent.

E. Wood Filler: Paste type wood filler, pigmented if necessary to match Architect's sample.

F. Oil modified polyurethane sealer. Bona Sport – Sportseal or equivalent.

F. Finish low VOC oil modified urethane varnish equivalent to Sikafloor WP-8.2 game line paint shall be compatible with finish.

H. Base: 3” x 4”, vented rubber cove base with outside corners.

I. Aluminum Threshold Plates: Width as required X 1/4” thick x 5” wide, fluted, slightly tapered both edges, finished clear anodized finish.

J. Vapor Barrier: 6 mil polyethylene vapor barrier. 6” minimum sealing & lapping joints with all penetrations & joints sealed.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Installer must examine substrates on which wood flooring will be installed and conditions under which work will be performed and must notify Contractor in writing of conditions detrimental to proper completion and maintenance of wood flooring. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 PREPARATION:

A. Wherever direct application of wood flooring to concrete substrate is indicated, test for dryness before proceeding with installation. Test with 3% solution of phenolphthalein in grain alcohol. Sprinkle a few drops on concrete at several locations. If drops turn red, do not proceed.

3.3 INSTALLATION:

A. General: Comply with flooring manufacturer’s instructions and recommendations, but not less than recommended by MFMA in MFMA Hard Maple Flooring, “Design and Installation Guide” and by recommendations of APA, Inc., as applicable to type of flooring required.

B. Expansion Space: Provide expansion space at walls and other obstructions and terminations of flooring, not less than ½” unless otherwise indicated on drawings. Attach base to wall rather than to flooring.

3.4 SANDING AND FINISHING:

A. Machine sand installed unfinished flooring to remove offsets and non-level conditions, ridges, cups, and sanding machine marks which would be visually noticeable after finishing. Use 3 grades of sandpaper, ending with 00 grade. Vacuum clean and immediately apply finish. Do not permit traffic on floor after sanding and until finish is completed.

B. Apply wood filler by brush, followed by wiping across grain to work into pores and cracks.
C. Apply floor sealer (2 coats) in accordance with manufacturer's instructions, including machine buffing with steel wool, in-the-wet where recommended by manufacturer.

D. Paint game lines between seal and first coat of finish. 2" wide game lines.

E. Apply urethane finish, in accordance with manufacturer's instructions. Apply (4) coats finish. Retain empty containers for confirmation of film thickness.

F. Wax and buff completed finish before permitting traffic.

3.5 PROTECTION:

A. Protect completed wood flooring during remainder of construction period or other suitable covering, so that flooring and finish will be without damage or deterioration at time of acceptance.

END OF SECTION 09550.
SECTION 09651 - RESILIENT FLOOR TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Vinyl composition tile (VCT).
   2. Resilient wall base and accessories.
   3. Color selections are shown on drawings & finish schedule.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples for Initial Selection: For each type of product indicated.
C. Samples for Verification: Full-size units of each color and pattern of resilient floor tile required.
   1. Resilient Wall Base and Accessories: Manufacturer's standard-size Samples, but not less than 12 inches long, of each resilient product color and pattern required.
D. Maintenance Data: For resilient products to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store tiles on flat surfaces.

1.6 PROJECT CONDITIONS
A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.
   2. Resilient Wall Base and Accessories: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Provide products as specified or equivalent by other manufacturers subject to compliance with requirements,

2.2 COLORS AND PATTERNS

A. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.3 VINYL COMPOSITION TILE

A. Vinyl Composition Tile (VCT): ASTM F 1066.
   1. Equivalent to Armstrong Standard Excelon Tile color as indicated on finish schedule.

B. Class: #2 through pattern.

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch.
E. Size: 12” x 12” nominal.
F. Fire-Test-Response Characteristics:

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.4 RESILIENT WALL BASE

A. Wall Base: ASTM F 1861.
   1. Flexco
   2. Burke Mercer Flooring Products;
   3. Johnsonite Inc
   4. Roppe Corporation.


C. Group (Manufacturing Method): I (solid).

D. Style: Cove (with top-set toe).

E. Minimum Thickness: 0.125 inch.

F. Height: 4 inches (102 mm).

G. Lengths: Coils in manufacturer's standard length.

H. Outside Corners: Premolded.

I. Inside Corners: Continuous.

J. Surface: Smooth.

2.5 RESILIENT MOLDING ACCESSORY

A. Description: As detailed on drawings.

2.6 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer’s written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
3. Moisture Testing:
   a. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
1. Lay tiles in pattern of colors and sizes indicated.

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 RESILIENT WALL BASE INSTALLATION

A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

D. Do not stretch wall base during installation.

E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.

F. Premolded Corners: Install premolded corners before installing straight pieces.

G. Install per manufacturers best recommendation for installation method for substrates & environmental conditions indicated.

3.5 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

   a. Do not wash surfaces until after time period recommended by manufacturer.
B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.
   a. Use commercially available product acceptable to manufacturer.
   b. Coordinate selection of floor polish with Owner’s maintenance service.

2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09651
PART 1 - GENERAL

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

1.2 SUMMARY
A. This Section includes the following:
   1. Tufted carpet with integral cushion.
   2. Carpet selections are indicated on drawings & finish schedule.
   3. Multiple dye lots per color not allowed.
   4. Carpet base with hemmed edges.
B. Related Sections include the following:
   1. Division 9 Section "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet.
   2. Division 12 “Floor mats”.

1.3 SUBMITTALS
A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate required.
B. Shop Drawings: Show the following:
   1. Carpet type, color.
   2. Seam locations,
   3. Type of installation
   4. Pattern type, repeat size, locations, direction, and starting point.
   5. Pile direction.
   6. Transition details to other flooring materials.
   7. Type of cushion.
C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   1. Carpet: 12-inch- (300-mm-) square Sample.
   2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.
D. Maintenance Data: For carpet to include in maintenance manuals specified in Division 1. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

2. Precautions for cleaning materials and methods that could be detrimental to carpet.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

C. Product Options: Products and manufacturers named in Part 2 establish requirements for product quality in terms of appearance, construction, and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered. Refer to Division 1 Section "Substitutions."

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Carpet Warranty: Written warranty, signed by carpet manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

1. Warranty Period: 25 years from date of Substantial Completion.
1.8 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

PART 2 - PRODUCTS

2.1 CARPET – SEE FINISH DRAWINGS FOR CARPET TYPES

A. Substitutes/Alternates

1. Subject to compliance with all requirements, “or equal” must match the selected colors, have similar aesthetic appearance and tuft density, factory-applied “dry” adhesive, asbestos enclosure properties and recyclability. Substitution sample and submittals must be submitted for written approval of quality and color at least ten days prior to bid to be considered. Sample of proposed substitute must be inclusive of both the face and proposed cushion (color-only sample not acceptable).

B. Carpet Base

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by the following:

1. Carpet manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and that is recommended by the following:

1. Carpet manufacturer.

C. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the following:
   a. Carpet manufacturer.

2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the following:
   1. Carpet manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 10, "Attached Cushion."

B. Comply with carpet manufacturer's written recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
   1. Level adjoining border edges.

C. Do not bridge building expansion joints with carpet.

D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
G. Cut and fit carpet to butt tightly at seams. Glue all seams continuously.

H. Carpet base with hemmed edges & securely attached to walls.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet:
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
   2. Remove yarns that protrude from carpet surface.

B. Protect installed carpet to comply with CRI 104, Section 15, "Protection of Indoor Installations."

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 09680
SECTION 09841 - TACKABLE PANELS & ACOUSTIC SOUND PANELS – WALLS & CEILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Sound panels (back mounted and fabric faced)
2. Acoustic sound panels, ceiling panels (Tectum) painted by Section 09911.
3. Tack panels (back mounted and vinyl covering faced)

B. Related Sections

1. Section 09911 for painting of Tectum acoustic sound panels.

1.3 SUBMITTALS

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

B. Shop Drawings: Show fabrication and installation details for acoustical wall panels, including plans, elevations, sections, details, and attachments to other Work.

1. Show orientation of fabric application, pattern matching, and seams.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors, textures, and patterns available for facing materials for each type of acoustical wall panel indicated. Include samples of installation devices and accessories.

D. Samples for Verification: 8-by-11-inch (200-by-280-mm) units of each type of acoustical wall panel indicated; in sets for each color, texture, and pattern specified for facing materials, showing the full range of variations expected in these characteristics. Include samples of installation devices and accessories.

E. Product Certificates: Signed by manufacturers of acoustical wall panels certifying that products furnished comply with requirements.

F. Qualification Data: For firms and persons specified in "Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

G. Product Test Reports: From a qualified testing agency indicating acoustical wall panels comply with requirements, based on comprehensive testing of current products.

H. Maintenance Data: For acoustical wall panels and facings to include in maintenance manuals specified in Division 1.
1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing acoustical wall panels similar to those indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Acoustical Wall Panels: Obtain acoustical wall panels from one source with resources to provide products of consistent quality in appearance and physical properties.

C. Fire-Test-Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical wall panels with appropriate markings of applicable testing and inspecting agency.

1. Flame Spread: 25 or less.
2. Smoke Developed: 450 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical wall panels from excessive moisture when shipping, storing, and handling. Deliver in unopened bundles and store in a dry place with adequate air circulation. Do not deliver material to building until wet-work, such as concrete and plaster, has been completed and cured to a condition of equilibrium. Protect panel edges from crushing and impact.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical wall panels until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Air-Quality Limitations: Protect acoustical wall panels from exposure to airborne odors, such as tobacco smoke, and install panels under conditions free from odor contamination of ambient air.

C. Field Measurements: Verify wall surface dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish surface dimensions and proceed with fabricating acoustical wall panels without field measurements. Coordinate wall construction to ensure that actual surface dimensions correspond to established dimensions.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, signed by manufacturer agreeing to repair or replace components of acoustical wall panel system that fail in performance, materials, or
workmanship within specified warranty period. Failure in performance includes, but is not limited to, acoustical performance. Failure in materials includes, but is not limited to, sagging or distortion of facing or warping of core.

C. Warranty Period: Two years from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Wall Panels: Full-size units equal to 2 percent of amount installed.

PART 2 - PRODUCTS

2.1 SOUND PANELS

A. Refer to interior elevation drawings finish schedule & finish plans for panel types & locations.

B. Fabric Wrapped Wall Panels

C. Acoustic Panels: 2” Acoustic Panels or approved equal Multipurpose Room.

1. Sizes as indicated on drawings.

D. 2” Acoustic Panel:

1. Acoustic panels consisting of 2-inch thick mineral wool core with fiberglass mat front and back, fabric wrapped with square edges.

2. Product cores shall have a melting point of 1850°F (ASTM E-136); a flame spread of 0 and smoke developed rating of 0, a tensile strength minimum of 2631 lbs/ft² breaking load, and a compressive resistance of 480 lbs/ft² at 10% compression, and a horizontal sag of not more than ½” in 4 ft. Panel rating will be that of the fabric wrap selected.

3. All NRC numbers must be in accordance with ASTM C423 for Type A mounting and certifiable acoustical data as obtained by an NVLAP-approved, independent testing laboratory shall be submitted to verify if the sound absorption at specified frequencies is satisfactory for this project.

4. Sound absorption coefficients for 2-inch panels shall be as follows:

   a. 125 Hz .51 1000 Hz 1.25
   b. 250 Hz 1.01 2000 Hz 1.16
   c. 500 Hz 1.24 NRC 1.15

5. Fabric and color are to be selected from manufacturer’s standard fabrics and colors. Fabrics shall be bonded to face and edges, and returned at the edges a minimum of 2” on the back of the panels. Manufacturer shall insure flat, wrinkle-free surface and tailored corners. All panels shall be pre-sized from exact field dimensions and altered in field as required for proper on location fit.

6. Manufacturer shall provide “Concealed Multiple-Perforation Fastening Devices: (EZ-Clips) as follows: 4 per 4’x4’; 6 per 4’ x 6’, 8 per 4’ x 8’, or equal.

E. Fabricate panels to sizes and configurations indicated; attach facing materials to cores to produce installed panels with visible surfaces fully covered and free from waves in fabric weave, wrinkles, sags, blisters, seams, adhesive, or other foreign matter.
1. Fabricate back-mounted panels in factory to exact sizes required to fit wall surfaces, based on field measurements of completed substrates indicated to receive acoustical wall panels.
2. Where square corners are indicated, tailor corners.
3. Where fabrics with directional or repeating patterns, or directional weave, are indicated, mark fabric top and attach fabric in same direction.

F. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch (1.6 mm) for the following:
1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.

2.2 VINYL FACED TACK PANELS

A. Refer to interior elevation drawings finish schedule & finish plans for panel types, sizes & locations
B. Vinyl Faced Tack Panels with all edges and corners wrapped.
1. Core material panels shall be fabricated from ½ inch class “a” fiberboard pressure laminated with facing material with structural laminate adhesive at 10 lbs per sq. ft. for a minimum of 12 hours. Panels shall be warranted for two (2) years against delaminating, warpage, and surface bubbles or any defect workmanship and materials.
2. Vinyl surface with all edges & corners wrapped.
   a. 100% polyester vinyl (Type II)
      1) Koroseal
      2) Product: Harbor Weave
   b. Flame spread – Class A
   c. Color: As selected by Architect from manufacturers standard colors.
   d. Adhesive: Type recommended by panel manufacturer for application. Utilize low VOC type where available.

2.3 ACOUSTIC CEILING PANELS (Multipurpose)

A. Ceilings sizes as indicated on drawings x 1-1/2” thick direct attached panel system with radiused edges as manufactured by Tectum or approved equivalent. Painted color per finish schedule by painting section.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine substrates and blocking, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting acoustical wall panel performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, and scribed to fit adjoining work accurately at borders and at penetrations. Comply with panel manufacturer's written
instructions for installation of panels using type of mounting accessories indicated or, if not indicated, as recommended by manufacturer.

1. Cut units to be at least 50 percent of unit width, with facing material extended over cut edge to match uncut edge. Scribe acoustical wall panels to fit adjacent work. Butt joints tightly.

B. Construction Tolerances: As follows:

1. Variation from Plumb and Level: Plus or minus 1/16 inch (1.6 mm).
2. Variation of Joints from Hairline: Not more than 1/16 inch (1.6 mm).

C. Attach acoustic sound panels direct to roof deck using mechanical fasteners at 1'-0" o.c. around the perimeter and 1'-6") o.c. each way in the field. Apply caulk to head of fastener to conceal fastener. Coordinate with roof membrane installer who is to cut all screw penetrations through deck to be minimum length to maintain membrane warranty.

D. 2" Acoustic Panel: Panels: Each “concealed Multiple-Perforation Fastening Device” (EZ-Clips) shall be placed on the wall with appropriate attachment screws to that it will impale the acoustical absorber approximately 6" in from each corner and approximately 6" in from each side on longer panels. Paneling adhesive is to be applied in a 3/8" bead 1-1/2" in from the edge before impaling panel on concealed Multiple-Perforation Fastening Devices” (EZ-Clips). All necessary field alterations are to be done according to manufacturer’s own specific instruction and information directives.

3.3 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels with fabric facing, on completion of installation, to remove dust and other foreign materials according to manufacturer's written instructions.

C. Remove surplus materials, rubbish, and debris resulting from acoustical wall panel installation, on completion of the Work, and leave areas of installation in a neat and clean condition.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure acoustical wall panels are without damage or deterioration at time of Substantial Completion.

B. Replace panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 09841
SECTION 09911 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

2. Roof top mechanical units to be painted.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

E. Related sections include

1. Section 07180 Exterior & Interior water repellants & sealers on concrete masonry units.

1.3 SUBMITTALS

A. Product Data: For each paint system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer’s catalog number and general classification.

2. Manufacturer’s Information: Manufacturer’s technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples: For each type of finish-coat material indicated. Colors and selections are as indicated on finish plans & schedule.

1.4 PROJECT CONDITIONS
A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

B. Manufacturers: Specified paints are products by Sherwin Williams. Subject to product & quality standards manufacturers offering equivalent products includes but is not limited to the following as pre-approved by Owner to bid.

1. Sherwin-Williams Co.
2. Benjamin Moore & Co.

2.2 PAINT MATERIALS, GENERAL

A. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

B. Provide the following paint systems (or pre approved equal) for various substrates, as indicated.

2.3 EXTERIOR PAINT SYSTEM

A. Ferrous Metal
   Powder coated by Division 5 section.

B. Zinc Coated Metal Galvanized
   First Coat: Universal Acrylic Primer Off White
   Second Coat: DTM Acrylic Semi-Gloss Extra White
   Third Coat: DTM Acrylic Semi-Gloss Extra White

2.4 INTERIOR PAINT SCHEDULE

A. Concrete/Cement
   First Coat: .09760000 - WB GLOSS N GUARD
   Second Coat: .09760000 - WB GLOSS N GUARD
   Third Coat: .09760000 - WB GLOSS N GUARD
B. Gypsum Board
First Coat: Low VOC Interior Latex Primer White
Second Coat: Low Zero VOC Interior Latex Semi-Gloss Extra White
Third Coat: Low VOC Interior Latex Semi-Gloss Extra White

C. Ferrous Metal
First Coat: Universal Acrylic Primer Off White
Second Coat: DTM Acrylic Semi-Gloss Extra White
Third Coat: DTM Acrylic Semi-Gloss Extra White

D. Zinc Coated Metal
First Coat: Universal Acrylic Primer Off White
Second Coat: DTM Acrylic Semi-Gloss Extra White
Third Coat: DTM Acrylic Semi-Gloss Extra White

E. Concrete Floor Sealer
First Coat: Rust Penetrating Epoxy Pre-Primer Transparent
Part A
First Coat: Rust Penetrating Epoxy Pre-Primer
Part B Hardener
Second Coat: Waterbased 100 Polyurethane (Part A) Extra White
Second Coat: Waterbased 100 Polyurethane (Part B) Hardener
Third Coat: Waterbased 100 Polyurethane (Part A) Extra White
Third Coat: Waterbased 100 Polyurethane (Part B) Hardener

F. Concrete Masonry Units
First Coat: 09760000 - WB GLOSS N GUARD
Second Coat: 09760000 - WB GLOSS N GUARD
Third Coat: 09760000 - WB GLOSS N GUARD
Fourth Coat: 09760000 - WB GLOSS N GUARD

G. Acoustic Sound Panels (Multi-Purpose Room)
1. Waterborne Acrylic Dryfall Sherwin Williams (B42W1)
2. Wet mils 3.5-5.0 dry mils 1.5-2.0
3. Coverage 336-450 per gallon
4. Cross spray at right angles if necessary
5. Airless spray or conventional spray per manufacturer’s recommendation
6. Indicated surface brush or roller is not allowed.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator’s acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.
3.2 PREPARATION
A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
   a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
   b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
   c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to [SSPC-SP 6/NACE No. 3] [SSPC-SP 10/NACE No. 2].
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
5. CMU Surfaces: Inspect cleaning of CMU surfaces by Division 4 Section and obtain approval of Owner prior to sealing of masonry. Any surfaces encountered which are not acceptable are to be brought to the attention of the G.C. and rectified prior to sealing.

F. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

G. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
10. Sand lightly between each succeeding enamel or varnish coat.
11. Primer paint behind tack wall system standards at where occurs. Paint exposed to view walls immediately behind tack wall track system with punched holes.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instruction, sand between applications.
2. Omit primer over metal surfaces that have been shop primed and touched up if the existing primer is in sound condition.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried according to the manufacturer’s recommendation, and/or until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer’s written instructions.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer’s recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

1. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.

F. Mechanical items to be painted include, but are not limited to, the following:

1. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.

G. Electrical items to be painted include, but are not limited to, the following:

1. Panelboards and equipment indicated as factory primed for field painting including exposed to view conduits.
2. Exposed to view conduits including at stage area.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
1. Owner may engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

C. At the completion of work of other trades, touch-up and restore all damaged or defaced painting surfaces. Scratches, scrapes and dings are to be filled, sanded and painted to match adjacent surface for color, texture and sheen so as not to be visible or distracting as determined by the Architect. Repaint wall when necessary to meet above requirements.

3.7 EXTRA STOCK

A. Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, packaged for storage and identified with appropriate labels.

1. Furnish Architect with written material list including manufacturer, catalog number/paint number and color.

2. Furnish quantity equal to 2.0% of amount installed, but in no case less than 1 gallon.

3. Provide Architect with receipt for extra stock signed by designated Owner’s Representative.

END OF SECTION 09911
DIVISION 10 - SPECIALTIES
10100  Visual Display Surfaces
10155  Toilet Compartments
10350  Flagpole
10431  Signs
10520  Fire Protection Specialties
10525  Key Keeper
10801  Toilet and Bath Accessories
SECTION 10100 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Markerboards.
2. Custom sizes where indicated on drawings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Show location of panel joints.
2. Include sections of typical trim members.
C. Samples for Initial Selection: For each type of visual display surface indicated and as follows:

1. Actual sections of porcelain-enamel face sheet tack assembly.
2. Samples of accessories involving color selection.
D. Samples for Verification: For each type of visual display surface indicated and as follows:

1. Visual Display Surface: Not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch- (152-mm-) long sections of each trim profile.
E. Maintenance Data: For visual display surfaces to include in maintenance manuals.
F. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.
B. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display surfaces and are based on the specific system indicated. Refer to Division 1 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.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display boards, including factory-applied trim, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.

B. Store visual display units vertically with packing materials between each unit.

1.6 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer’s standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Surfaces lose original writing and erasing qualities.
   b. Surfaces become slick or shiny.
   c. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

B. Specified Products are:
2. PolyVision Corporation; Markerboard

C. Subject to compliance with specifications manufacturers offering equivalent products may include the following:

1. AARCO.
2. Green Steel Inc
3. Newline Products, Inc
4. ADP Lemco

D. Note custom sizes where indicated on drawings.
2.2 MATERIALS, GENERAL

A. Porcelain-Enamel Face Sheet equivalent to Claridge LCS – III Finish: ASTM A 424, enameling-grade steel, uncoated thickness indicated; with exposed face and edges coated with primer, 1.7-to-2.5-mil- (0.043-to-0.064-mm-) thick ground coat, and color cover coat; and concealed face coated with primer and 1.7-to-2.5-mil- (0.043-to-0.064-mm-) thick ground coat.

1. Low Gloss Finish Cover Coat: Low reflective; marker wipes clean with dry cloth or marker eraser. Minimum 2.0-to-2.5-mil- (0.051-to-0.064-mm-) thick cover coat. Cover and ground coats shall be fused to steel at manufacturer's standard firing temperatures but not less than 1250 deg F (677 deg C).

B. Hardboard: AHA A135.4, tempered.

C. Particleboard: ANSI A208.1, Grade 1-M-1.

D. Fiberboard: ANSI A208.2, Grade MD.

E. Cork Sheet: MS Mil-C-15116-C, Type II.

F. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

2.3 MARKERBOARD ACCESSORIES

A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- (1.57-mm-) thick, extruded aluminum; of size and shape indicated.


B. Chalktray: Manufacturer's standard, continuous.

1. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

C. Map Rail: Provide the following accessories:

1. Display Rail: Continuous and integral with map rail; fabricated from cork.
2. End Stops: Located at each end of map rail.
3. Map Hooks: [Two] map hooks for every 48 inches (1220 mm) of map rail or fraction thereof.

D. Paper Holder: Extruded aluminum; designed to hold paper by clamping action.

E. 1" Plas-Cork Map Rails as manufactured by MyWhiteBoards or equivalent

1. Plas-cork composite tack surface.
2. Install in maximum lengths possible.
3. Color as selected by architect from manufacturers standard.
4. Endcaps where exposed to view ends.

2.4 FABRICATION
A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer’s standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards, unless otherwise indicated.

C. Modular Visual Display Boards: Fabricated with integral panel clips attached to core material.

D. Provide for reinforced core material to accommodate panel clips and as required to support Modular Display Boards.

E. Visual Display Wall Panels: Fabricate panels with 0.0209-inch-(0.55-mm-) thick, porcelain-enamel face sheets.

F. Aluminum Frames: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure.

2.5 ALUMINUM FINISHES

A. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.

B. Examine walls and partitions for proper backing for visual display surfaces.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display boards and surfaces.

3.3 INSTALLATION, GENERAL

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY UNITS
A. Visual Display Boards: Attach with concealed clips to tackable wall system modular support section 09841. Provide clips at 4’-0” o.c. top and bottom. Provide additional backing or spacers as required to provide solid, quiet contact to wall panel surface to prevent rattling or flexing marker board surface when writing on the board.

3.5 CLEANING AND PROTECTION

A. Clean visual display surfaces according to manufacturer’s written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 10100
SECTION 10155 - TOILET COMPARTMENTS

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes phenolic-core units as follows:
      1. Toilet Enclosures: Floor anchored overhead braced.
      2. Urinal Screens: Wall hung and floor/ceiling post supported. Coordinate with Division 5 Metal Fabricated for overhead support.

1.3 SUBMITTALS
   A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
      1. Show locations of cutouts for compartment-mounted toilet accessories.
      2. Show locations of reinforcements for compartment-mounted grab bars.
   C. Samples for Initial Selection: For each type of unit indicated.
   D. Samples for Verification: Of each type of color and finish required for units, prepared on 6-inch- (150-mm-) square Samples of same thickness and material indicated for Work.

1.4 QUALITY ASSURANCE

1.5 WARRANTY
   A. Provide manufacturer’s standard warranty (10) years from Date of Substantial Completion.

1.6 PROJECT CONDITIONS
   A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PHENOLIC CORE UNITS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Accurate Partitions Corporation.
2. American Sanitary Partition Corporation
4. Bradley Corporation; Mills Partitions
5. Capitol Partitions, Inc.
6. Global Steel Products Corp.
7. Metpar Corp.
8. Sanymetal; a Crane Plumbing Company.

B. Door, Panel, and Pilaster Construction: Solid phenolic-core panel material phenolic facing on both sides fused to substrate during panel manufacturer (not separately laminated), and with eased and polished edges. Provide minimum 3/4-inch- (19-mm-) thick doors and pilasters and minimum 1/2-inch- (13-mm-) thick panels.

1. Facing Sheet Color: One color in each room as selected by Architect from manufacturer’s full range of colors. Allow for two colors.
2. Core Color: Manufacturer’s standard dark color.
3. Class B fire rated per E-84.

C. Pilaster Shoes and Sleeves (Caps): Stainless steel, ASTM A 666, Type 302 or 304.

D. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer’s standard design; stainless steel.

E. Anti grip head rails. Secure ends to walls.

2.2 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.


B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION
A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

B. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be accessible to people with disabilities.

1. Hinges: Manufacturer's standard continuous self-closing. Provide ADA required hinges at ADA accessible doors to meet emergency access to stalls.
2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities. Provide door pull each side of ADA accessible doors.
6. Anti-grip head rails.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:
   a. Pilasters and Panels: 1/2 inch (13 mm).
   b. Panels and Walls: 1 inch (25 mm).

2. Stirrup Brackets: Secure panels to walls and to pilasters with continuous brackets.
   a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
   b. Align brackets at pilasters with brackets at walls.

B. Floor-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.

C. Wall-Hung and Post Supported Floor Ceiling Urinal Screens: Attach with continuous wall stirrup brackets and anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact. Coordinate with Division 5 Metal Fabrications for ceiling support system of posts.

3.2 ADJUSTING
A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer’s written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10155
SECTION 10350 - FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes ground-set flagpoles made from aluminum.

B. Related Sections include the following:

1. Division 3 Section “Cast-in-Place Concrete” for concrete footings for flagpoles.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide flagpole assemblies, including anchorages and supports, capable of withstanding the effects of wind loads, determined according to [NAAMM FP 1001, “Guide Specifications for Design of Metal Flagpoles.”] or the building code in effect for this project, whichever is more stringent.

1. Base flagpole design on polyester, nylon or cotton flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2. Basic Wind Speed: 90 mph (40 m/s); 3-second gust speed at 33 feet (10 m) aboveground.

1.4 SUBMITTALS

A. Product Data: For each type of flagpole required.

B. Shop Drawings: Include elevations and details showing general arrangement, jointing, fittings and accessories, grounding, and anchoring and supporting systems.

1. Include details of foundation system for ground-set flagpoles.

C. Structural Calculations: For flagpoles indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Finish Samples for Verification: For each finished material used for flagpoles and accessories.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain[ each] flagpole as a complete unit, including fittings, accessories, bases, and anchorage devices, from a single manufacturer.
1.6 DELIVERY, STORAGE, AND HANDLING

A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Baartol Company Inc. (The)
3. Concord Industries, Inc.
4. Eder Flag Manufacturing Company, Inc.
5. Ewing International.
6. Flagpoles Etc.
7. Lingo Inc.; Acme Flagpole Division.
8. Michigan Flagpole Inc.
10. PLP Composite Technologies, Inc.

2.2 FLAGPOLES

A. Flagpole Construction, General: Construct flagpoles in one piece.

B. Exposed Height: 40 feet.

C. Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/ (B 241M), Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm). Heat treat after fabrication to comply with ASTM B 597, Temper T6.

D. Foundation Tube: Galvanized corrugated-steel foundation tube, 0.064-inch- (1.6-mm-) minimum nominal wall thickness. Provide with 3/16-inch (4.8-mm-) steel bottom plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering wedges all welded together. Galvanize steel parts, including foundation tube, after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.

1. Provide flashing collar of same material and finish as flagpole.

2.4 FITTINGS

A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

1. 0.063-inch (1.6-mm) spun aluminum with gold anodic finish.

B. Internal Halyard: Concealed revolving truck assembly of cast metal with stainless steel ball-bearings. Halyard is a stainless steel aircraft cable. Winch inside pole at 4’-6” above ground to raise and lower flag by use of a removable hand crank. The winch contains an automatic brake system to permit locking of flag in any position.
C. Halyard Flag Snaps: Provide two chromium-plated bronze swivel snap hooks per halyard.
   1. Provide with neoprene or vinyl covers.

D. Retain ring with beaded balls.

E. Counter weight with neoprene coating to match pole.

2.5 MISCELLANEOUS MATERIALS

A. Concrete: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa, unless otherwise indicated.)


C. Sand: ASTM C 33, fine aggregate.

D. Elastomeric Joint Sealant: Comply with requirements in Division 7 Section "Joint Sealants".

2.5 FINISHES

A. Metal Finishes, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Aluminum: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Fiberglass: Hard, high-gloss gel coat or high-gloss, high-build polyurethane or polyester coating.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms and foundation tube, sleeve, or anchor bolts in position, to prevent displacement during concreting.

D. Place concrete immediately after mixing. Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.
E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.

B. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 10350
PART 1 - GENERAL

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

1.2 SUMMARY
A. This Section includes the following:
   1. Panel signs.

1.3 SUBMITTALS
A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.

B. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
   1. Provide message list for each sign, including large-scale details of wording, lettering, [artwork, ]and braille layout.

C. Samples for Initial Selection: For each type of sign material indicated that involves color selection.

1.4 QUALITY ASSURANCE
A. Installer Qualifications: An employer of workers trained and approved by signage manufacturer.

1.5 PROJECT CONDITIONS
A. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION
A. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.
1. For signs supported by or anchored to permanent construction, furnish templates for installation of anchorage devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 PANEL SIGNS

A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

1. Produce smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally.

B. Manufacturers:

1. Allenite Signs; Allen Marking Products, Inc.
2. Andco Industries Corp.
3. APCO Graphics, Inc.
4. ASI Sign Systems, Inc.
5. Best Manufacturing Co.
6. Innerface Sign Systems, Inc.
8. Vomar Products
9. Scott Sign Systems

C. Cast-Acrylic Sheet: Manufacturer's standard and as follows:

1. Color: As selected by Architect from manufacturer's full range.

D. Unframed Panel Signs: Fabricate ¼” thick photo polymer type signs with edges mechanically and smoothly finished to comply with the following requirements:

1. Edge Condition: Square cut.
2. Corner Condition: Rounded to radius indicated 3/4” R.

E. Graphic Content and Style: Provide sign copy that complies with requirements indicated in the Sign Schedule for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

F. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.

1. Raised-Copy Thickness: Not less than 1/32 inch. All letters to be upper case.
G. **Subsurface Copy:** Apply minimum 4-mil- (0.10-mm-) thick vinyl copy to back face of clear acrylic sheet forming panel face to produce precisely formed opaque image. Image shall be free from rough edges.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

#### 3.2 INSTALLATION

A. **General:** Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
2. **Interior Wall Signs:** Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.

B. **Wall-Mounted Panel Signs:** Attach panel signs to wall surfaces using methods indicated below:

1. **Silicone-Adhesive Mounting:** Use liquid-silicone adhesive recommended in writing by sign manufacturer to attach signs to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended in writing by sign manufacturer to hold sign in place until adhesive has fully cured.

#### 3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.
### 3.1 SIGN SCHEDULE - See drawing A-101

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>G</td>
<td>Room #___ (room #'s to be supplied by Owner)</td>
</tr>
<tr>
<td>G2</td>
<td>F</td>
<td>PRINCIPAL</td>
</tr>
<tr>
<td>G3</td>
<td>H</td>
<td>WORK ROOM</td>
</tr>
<tr>
<td>G4</td>
<td>J1</td>
<td>WOMEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exterior Signage at Handicapped Parking Stalls (Refer to Site Drawings for locations)</td>
</tr>
<tr>
<td>G5</td>
<td>J2</td>
<td>MEN</td>
</tr>
<tr>
<td>G6</td>
<td>J3</td>
<td>RESTROOM</td>
</tr>
<tr>
<td>G7</td>
<td>H</td>
<td>KITCHEN</td>
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<tr>
<td>G8</td>
<td>H</td>
<td>ELECTRICAL</td>
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<tr>
<td>G9</td>
<td>H</td>
<td>MECHANICAL</td>
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<tr>
<td>G10</td>
<td>H</td>
<td>CUSTODIAL</td>
</tr>
<tr>
<td>G11</td>
<td>H</td>
<td>MULTIPURPOSE</td>
</tr>
<tr>
<td>G12</td>
<td>H</td>
<td>ADMINISTRATION</td>
</tr>
<tr>
<td>G13</td>
<td>F</td>
<td>COUNSELOR</td>
</tr>
<tr>
<td>G14</td>
<td>F</td>
<td>SECRETARY</td>
</tr>
<tr>
<td>G15</td>
<td>H</td>
<td>ADULT EDUCATION</td>
</tr>
<tr>
<td>G16</td>
<td>L</td>
<td>CONSTRUCTION SIGN</td>
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<tr>
<td>G17</td>
<td>H</td>
<td>TESTING</td>
</tr>
<tr>
<td>G18</td>
<td>K</td>
<td>See Spec – Confirm text with Owner</td>
</tr>
<tr>
<td>G19</td>
<td>H</td>
<td>LIBRARY</td>
</tr>
<tr>
<td>G20</td>
<td>F</td>
<td>OFFICE</td>
</tr>
<tr>
<td>G21</td>
<td>E</td>
<td>CACHE HIGH SCHOOL Verify final name with School District and Architect</td>
</tr>
<tr>
<td>G22</td>
<td>E</td>
<td>Building Address Numbers. Verify final address with School District and Architect</td>
</tr>
<tr>
<td>G23</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>G24</td>
<td>H</td>
<td>MAIL / COPY</td>
</tr>
<tr>
<td>G25</td>
<td>H</td>
<td>THE NUMBER OF PEOPLE PERMITTED IN THIS AREA SHALL NOT EXCEED 246 BY ORDER OF THE FIRE MARSHAL</td>
</tr>
<tr>
<td>G26</td>
<td>D</td>
<td>Building Plaque</td>
</tr>
<tr>
<td>G27</td>
<td>H</td>
<td>FIRE RISER</td>
</tr>
<tr>
<td>G28</td>
<td>A</td>
<td>Sign Type A.5</td>
</tr>
</tbody>
</table>

END OF SECTION 10431
A. NOT USED

2" CALV PIPE

5'-0" (TOP)

3'-0"

12"

6"

B. ALUMINUM

ASSISTIVE
LISTENING
SYSTEM

C. NOT USED
D:
STAINLESS STEEL ETCHED PLAQUE,
TEXT TO BE PREPARED BY
ARCHITECT

E:
CAST ALUMINUM
CUSTOM COLOR

F:
NAME
SLOT

G:
NUMBER
SLOT
SLOT

H:
MESSAGE

CLEAR ACRYLIC FACE

CLEAR ACRYLIC FACE

1'-3"
1'-11"
2"
6"
DOOR MOUNTED SIGNAGE (TYP.)

PROVIDE APPROPRIATE J AND J-? @ EACH TOILET ROOM LOCATION
WALL MOUNT J-? ON WALL AS DIRECTED BY ARCH

WALL MOUNTED LOCATION TO BE LOCATED ON LATCH SIDE OF DOOR-SWING.
MOUNT AT 60" TO CENTERLINE OF SIGN FROM FLOOR.

HEIGHT OF LETTERING 5/8" TO 2" MAX.

LETTERING RAISED 1/32"

UPPERCASE CHARACTERS

CORRESPONDING GRADE II BRAILE

1" HIGH VINYL LETTERS ALL CAPS APPLIED TO INTERIOR FACE OF GLASS
(CONFIRM ACTUAL TEXT WITH OWNER)

COPY: ALL VISITORS ARE REQUIRED TO CHECK IN AT THE MAIN ENTRANCE OFFICE
ARCHITECT: LOGAN, UT

CONSTRUCTION MANAGER: LOGAN, UT

CIVIL ENGINEER: CACHE LANDMARK LOGAN, UT

STRUCTURAL ENGINEER: STRUCTURAL SOLUTIONS PROVIDENCE, UT

MECHANICAL ENGINEER: NIELSON ENGINEERING POCKETEL, ID

ELECTRICAL ENGINEER: BEAZER ENGINEERING MILLVILLE, UT

CACHE HIGH

4 X 4 POST - BOTTOM OF POST TO BE 24" MIN. BELOW GRADE

FINISH GRADE
SECTION 10520 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes the following:
      1. Portable fire extinguishers.
      2. Fire-protection cabinets for the following:
         a. Portable fire extinguishers.
      3. Wall mounted fire extinguisher bucket.

1.3 SUBMITTALS
   A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.
      1. Fire Extinguishers: Include rating and classification.
      2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

1.4 QUALITY ASSURANCE
   A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
   B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
   C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
      1. Provide fire extinguishers approved, listed, and labeled by FMG.

1.5 COORDINATION
   A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick

2.3 PORTABLE FIRE EXTINGUISHERS

A. Available Manufacturers:

1. Ansul Incorporated.
2. JL Industries, Inc.
4. Potter Roemer; Div. of Smith Industries, Inc.
5. Buckeye.

B. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Valves: Manufacturer's standard.
3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

C. 2A: WC-GL 1.8 gal required at kitchen.

2.4 FIRE-PROTECTION CABINET

A. Available Manufacturers: Provide equivalent to Larsen 2409-R7

1. JL Industries, Inc.
2. Larsen's Manufacturing Company.
3. Potter Roemer; Div. of Smith Industries, Inc.

B. Cabinet Type: Suitable for fire extinguisher.

C. Cabinet Construction: Nonrated.

D. Cabinet Material: Enameled-steel sheet.

1. Shelf: Same metal and finish as cabinet.

E. Semirecessed Cabinet: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Rolled-Edge Trim: 1-1/2-inch backbend depth.

F. Cabinet Trim Material: Same material and finish as door.
G. Door Material: Steel sheet.

H. Door Style: Solid door with pull handle & type “A” black decal.

I. Door Glazing: None.

J. Door Hardware: Manufacturer’s standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide manufacturer’s standard.
   2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

K. Accessories:
   1. Mounting Bracket: Manufacturer’s standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
   2. Lettered Door Handle: One-piece, cast-iron door handle with the word “FIRE” embossed into face.
   3. Door Lock: Cylinder lock, keyed alike to other cabinets – battery operated tamper alarm.
   4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
      a. Identify fire extinguisher in fire-protection cabinet with the words “FIRE EXTINGUISHER.”
         1) Location: Applied to cabinet door.
         2) Application Process: Decals.
         3) Lettering Color: Red.
         4) Orientation: Vertical.

L. Wall mounted fire extinguisher bracket manufacturer standard.

M. Finishes:
   5. Manufacturer’s standard baked-enamel paint for the following:
      a. Exterior of cabinet door, and trim (white).
      b. Interior of cabinet and door.
      a. Color and Texture: As selected by Architect from manufacturer’s full range.
   7. Provide sealant at perimeter of wall joint to cabinet.

2.5 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer’s standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
   1. Weld joints and grind smooth.
   2. Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- (1.1-mm-) thick, cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick, fire-barrier material.
      a. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer’s standards, from materials indicated and coordinated with cabinet types and trim styles selected.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.6 FINISHES, GENERAL

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.

2.7 STEEL FINISHES

A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.

Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for hose [valves] [racks] and cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where [recessed] [semirecessed] [recessed and semirecessed] cabinets will be installed.

C. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged units.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection specialties in locations and at mounting heights indicated or, acceptable to authorities having jurisdiction.

B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.
1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer’s written installation instructions.
B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet manufacturer.
E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10520
SECTION 10525 - FIRE DEPARTMENT KEY KEEPER (KNOX BOX)

PART 1 - GENERAL

1.1 SUMMARY
A. Work required for this section includes fire department key keeper and supplementary items necessary for their proper installation.

1.2 QUALITY ASSURANCE
A. Local Authority Approval: Obtain approval of local fire department for keyway access and exact location of key keeper box prior to product data submittal.
B. Key keeper will be required at entrances to the following:
   1. Building entrance designated by the fire department.

1.3 SUBMITTALS
A. Product Data: Manufacturer’s product data, marked specifically to indicate compliance with these specifications.
B. Samples: 3 inch square sample of exposed metal to indicate compliance with finish specified.

PART 2 - PRODUCTS

2.1 KEY KEEPER
A. Product Standard: Knox Co. “Knox Box” 3200 Series. Provide with sub key and marked by Fire Marshal.
B. Size: As follows:
   1. Recessed: 7 inches wide, 7 inches high, 3-1/4 inches deep.
C. Finish: Manufacturer’s standard weather resistant polyester powder coat.
   1. Color: As selected from manufacturer’s standard colors.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Install in accordance with manufacturer’s latest published requirements and where directed by Fire Marshal.

END OF SECTION
SECTION 10801 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Toilet accessories.
   2. Electric Handryers

B. Related Sections include the following:
   1. Division 10 Section “Toilet Compartments” for compartments and screens.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

B. Samples: For each accessory item to verify design, operation, and finish requirements.

C. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.

D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.

E. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.4 QUALITY ASSURANCE

A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.

1.6 COORDINATION
A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer’s Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:

B. Toilet and Bath Accessories

1. Bobrick Washroom Equipment, Inc.
2. Bradley Corporation
3. McKinley/Parker Washroom Accessories Corp.
4. Columbia Accessories
5. Dyson

C. Manufacturers: Subject to compliance with requirements, provide accessories by one of the following:

D. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

E. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Toilet and Bath Accessory Schedule as indicated on drawings.

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.

C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.

F. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.


H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.4 FABRICATION

A. General: One, maximum 1-1/2-inch- (38-mm-) diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of accessories. On interior surface not exposed to view or back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

C. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

D. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.

E. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.

1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

F. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:

1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
G. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

C. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET AND BATH ACCESSORY SCHEDULE


B. Toilet Tissue Dispenser B: Owner furnished contractor installed (OFCI).

C. Grab Bar C: Where this designation is indicated, provide stainless-steel grab bar complying with the following:

1. Products: Provide one of the following
2. Stainless-Steel Nominal Thickness: Minimum 0.05 inch.
3. Mounting: Concealed with manufacturer's standard flanges and anchors.
5. Outside Diameter: 1-1/2 inches for heavy-duty applications.

D. Feminine Napkin Disposal (OFCI)

E. Robe Hook E: Where this designation is indicated, provide robe hook complying with the following:

1. Double-Prong Unit: Stainless-steel, double-prong robe hook with rectangular wall bracket and back plate for concealed mounting.

F. Mirror Unit F: Where this designation is indicated, provide mirror unit complying with the following:
1. Stainless-Steel, Channel-Framed Mirror: Fabricate frame from stainless-steel channels in manufacturer’s standard satin or bright finish with square corners mitered to hairline joints and mechanically interlocked.

G. Soap Dispenser G: Owner furnished contractor installed (OFCI).

H. Mop and Broom Holder H: Where this designation is indicated, provide mop and broom holder complying with the following:

1. Products: Available products include the following:
2. Mop and Broom Holder: 36-inch- (914-mm-) long unit fabricated of minimum nominal 0.0375-inch- (0.95-mm-) thick, stainless-steel hat channel with four spring-loaded, rubber, cam-type, mop/broom holders.

END OF SECTION 10801
DIVISION 11 - EQUIPMENT
11132  Projection Screens
11490  Gymnasium Equipment
SECTION 11132 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Multi-purpose Room - 141" x 188".
2. Coordinate with electrical for power requirements.

B. Related Sections include the following:

1. Division 16 Sections for electrical service and connections including metal device boxes for switches and conduit, where required, for low-voltage control wiring.

1.3 DEFINITIONS

A. Gain of Front-Projection Screens: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

B. Half-Gain Angle: The angle, measured from the axis of the screen surface, to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.4 SUBMITTALS

A. Product Data: For each type of screen indicated.

B. Shop Drawings: Show layouts and types of projection screens. Include the following:

1. Location of screen centerline relative to ends of screen case.
2. Location of wiring connections.
3. Location of seams in viewing surfaces.
4. Drop length.
5. Connections to supporting structure for pendant- and recess-mounted screens.
6. Anchorage details.
7. Details of juncture of exposed surfaces with adjacent finishes.
8. Frame details.
10. Wiring Diagrams: For electrically operated units.

C. Samples for Initial Selection: For finishes of surface-mounted screen cases.
D. Maintenance Data: For projection screens to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of projection screen through one source from a single manufacturer. Obtain each screen as a complete unit, including necessary mounting hardware and accessories.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver projection screens until building is enclosed and other construction within spaces where screens will be installed is substantially complete and ready for screen installation.

1.7 COORDINATION

A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling framing, light fixtures, HVAC equipment, [fire-suppression system,] and partitions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

   a. Da-Lite Large Advantage Electrol (at multipurpose room)

2.2 FRONT-PROJECTION SCREENS

A. Electrically Operated Screens, General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

   1. Line Voltage Control: Remote, key-operated, Hubbell or Bryant 3-position control switch installed in recessed metal device box with flush cover plate matching other electrical device cover plates in room where switch is installed.

   2. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
3. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch- (9.5-mm-) diameter metal rod with ends of rod protected by plastic caps.
   
   a. Roller for motor in roller supported by vibration- and noise-absorbing supports.

B. Mounted to structure, Electrically Operated Screens without Ceiling Closure: Motor in roller or end-mounted motor units with bottom of case entirely or partially open under screen compartment.

   1. Provide metal or metal-lined motor enclosure on units with end-mounted motor.
   2. Screen Case: Made from metal.
   3. Provide screen case with trim flange to receive ceiling finish.
   4. Prime paint surfaces of screen case that will be exposed to view in the finished work.
   5. 120v motor.

C. Screen Material and Viewing Surface:

   1. Viewing Surface:
      a. Location: Multi-purpose
      b. Products or equivalent by other manufacturers:
         1) Da-Lite Screen Co., Inc.; Matte white.

   3. Mildew Resistance: Rating of 0 or 1 when tested according to ASTM G 21.


   5. Seams: Where length of screen indicated exceeds maximum length produced without seams in material specified, provide screen with horizontal seam placed as follows:

      a. At top of screen at juncture between extra drop length and viewing surface.
      b. In location indicated.


   7. Edge Treatment: With black masking borders.

   8. Provide extra drop length of dimension as recommended. Comply with the following requirements for fabric color and location of drop length:

      a. Color: Black
      b. Location: At top of screen for complete viewing surface at bottom of ceiling.

PART 3: EXECUTION
3.1 INSTALLATION

A. General: Install projection screens at locations indicated to comply with screen manufacturer’s written instructions.

B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
1. Install low-voltage controls according to NFPA 70 and manufacturer's written instructions.
   a. Wiring Method: Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.
2. Test electrically operated units to verify that screen controls, limit switches, closure, and other operating components are in optimum functioning condition.

3.2 PROTECTING AND CLEANING

A. After installation, protect projection screens from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

1. Provide temporary covering of rear-projection screens until time of Substantial Completion. Use type of covering approved by screen manufacturer that will effectively protect screen from abrasion, breakage, or other damage.

END OF SECTION 11132
SECTION 11490 - GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following gymnasium equipment:

1. Basketball equipment - Gymnasium.
2. Volleyball equipment.
3. Wall-mounted safety pads.

B. Related Sections include the following:

1. Division 5 Section "Structural Steel" for structural supports not provided by gymnasium equipment manufacturer for supporting gymnasium equipment to building structure.

C. Products furnished, but not installed under this Section, include floor insert sleeves for inserts to be cast in concrete subfloors and footings.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Provide basketball backstops capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads," whichever is more stringent.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, features, and finishes. Include details of anchors, hardware, and fastenings. If applicable, include assembly, disassembly, and storage instructions.

2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.

B. Shop Drawings: Show location and extent of fully assembled gymnasium equipment. Show location and extent of disassembled equipment and components and transport and storage accessories. Include elevations, sections, and details not shown in Product Data. Show method of field assembly, connections, installation details, mountings, floor inserts, attachments to other Work, operational clearances, and relationship to adjoining work.
1. Blocking and Reinforcement: Show locations of blocking and reinforcement required for support of gymnasium equipment.

2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for supporting gymnasium equipment and for seismic restraint. Verify capacity of members and connections to support loads and verify loads, point reactions, and locations for attachment of gymnasium equipment to structure with those indicated on Drawings.


C. Samples for Initial Selection: For each type of gymnasium equipment indicated.

D. Product Certificates: For each type of gymnasium equipment, signed by product manufacturer.

E. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements. Include evidence of manufacturing experience.

F. Qualification Data: For installer professional engineer.

G. Maintenance Data: For gymnasium equipment to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of gymnasium equipment through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install gymnasium equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify position and elevation of floor inserts and layout for gymnasium equipment. Verify dimensions by field measurements.

1.7 COORDINATION

A. Coordinate layout and installation of overhead-supported gymnasium equipment and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Gymnasium Equipment:
   a. AALCO.
   b. AL, Inc.; ADP Lemco, Inc.
c. Basketball Products International; American Athletic, Inc.
d. Bison Inc.
e. Institutional Products, Inc.
f. Jaypro Sports, Inc.
g. Performance Sports Systems, Inc.
h. Porter Athletic Equipment Co.
i. AAI
j. Draper

2. Wall-Mounted Safety Pads:
   a. Jaypro Sports, Inc.
   b. Porter Athletic Equipment Co.
   c. ADP Lemco

2.2 MATERIALS, GENERAL

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; mill finish or decorative, baked-enamel, powder-coat finish.

B. Steel: Comply with the following:
   3. Cold-Formed Steel Tubing: ASTM A 500, Grade A, unless another grade is required by structural loads.
   4. Steel Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513 or steel tubing fabricated from steel complying with ASTM A 569/A 569M and complying with the dimensional tolerances in ASTM A 500.
   6. Support Cable: 1/4-inch- (6-mm-) diameter, 7x19 galvanized steel aircraft cable with a breaking strength of 7000 lb (3175 kg). Provide fittings complying with cable manufacturer's written recommendations for size, number, and method of installation.
   7. Support Chain: Proof coil chain, complying with ASTM A 413/A 413M, Grade 30, size and diameter as required by structural loads; plated or painted. Provide fittings complying with chain manufacturer's written recommendations for size, number, and method of installation.

C. Equipment Mounting Pads: Wood, transparent finish, size, and quantity as required to mount gymnasium equipment according to manufacturer's written recommendations.

D. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed tamperproof, vandal and theft resistant. Provide as required for gymnasium equipment assembly, mounting, and secure attachment.

2.3 BASKETBALL EQUIPMENT

A. General: Provide equipment complying with requirements in "NFHS Basketball Rule Book." Protruding fasteners or exposed bolt heads on front face of backboards are not permitted.
B. Wall-Mounted Backstops: Complete assembly extending from wall, including 2 x 8 solid red oak support wall pad framing to building structure, bracing, cables, chains, pulleys, fittings, hardware, pipe anchors, equipment pads, and fasteners.

1. Center strut wall mounted with 3 point framing & horizontal wood wall pads.
2. Framing: Steel pipe, tubing, and shapes. Design framing to minimize vibration during play.
   a. Finish: Manufacturer's standard factory-applied, baked powder-coating finish complying with finish manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness; black
3. Stationary Type: Provide manufacturer's standard assembly for stationary backstop.
4. Extension: as indicated on Drawings.
5. Goal Height Adjuster: Adjustable from 8 to 10 feet (2.4 to 3 m) with crank mechanism, locking in any position within adjustment range, with visible height scale and finish matching framing.

C. Basketball Backboard: Provide predrilled holes or preset inserts for mounting goals.

1. Description: Rectangular, 72 by 48 inches (1800 by 1200 mm) fabricated from the following:
   a. Glass: Not less than 1/2-inch- (12-mm-) thick, transparent tempered glass. Provide glass with impact-absorbing, resilient rubber, PVC or vinyl gasket around perimeter in a fully welded painted steel frame, with steel subframe, reinforcement, and bracing, including center-strut frame reinforcement, and with mounting slots for mounting backboard frame to backstop support framing.
      1) Direct Mount: Designed for mounting backboard frame to center mast of backstop framing to maximize relief of stresses on backboard frame and glass.
2. Target Area and Border Markings: Permanently etched in white color, marked in manufacturer's standard pattern and stripe width.
3. Finish: Manufacturer's standard factory-applied, white background.
4. Rim-Restraining Device: Complying with NCAA and NFHS rules and designed to ensure that basket remains attached if glass backboard breaks.

D. Goal Mounting Assembly: Compatible with goal, backboard, and support framing, with manufacturer's standard.

1. Direct Mount: Designed for mounting goal directly and independently to center mast of backstop support framing so no force, transmitted by ring, is directly applied to backboard and rigidity and stability of goal are maximized.

E. Basketball Goals: Complete with flanges, braces, attachment plate, and evenly spaced loops welded around underside of ring.

1. Single-Rim Basket Ring Competition Goal: Materials, dimensions, and fabrication per manufacturer's standard design.
2. Type: Movable, breakaway design with manufacturer's standard breakaway mechanism and rebound characteristics identical to those of fixed, nonmovable ring.
5. Finish: Manufacturer's standard factory-applied, baked powder-coating finish complying with finish manufacturer's written instructions for surface
preparation including pretreatment, application, baking, and minimum dry film thickness; orange.

F. Basketball Nets: 12-loop-mesh net, between 15 and 18 inches (400 to 450 mm) long, sized to fit rim diameter, and as follows:

1. Cord: Made from white nylon.

G. Safety Pads: Provide safety pads,, designed for backboard thickness indicated and extending continuously along bottom and up sides of backboard and over goal mounting and backboard supports as per manufacturer's standard design.

1. Safety Pad Attachment: Manufacturer's standard.
2. Color: As selected by Architect from manufacturer's full range.

H. Wall Safety Pads: Padded wall wainscot panels designed to be attached in a continuous row; each panel section consisting of 1-1/2” urethane filler laminated to 7/16” backer board with visible surfaces fully covered by seamless vinyl cover, free from sag and wrinkles and firmly attached to back of backer board. Provide for concealed aluminum Z clip attachment for ease of removal. 14 oz. polyester flame retardant.

1. 14 oz polyester. Flame retardant.
2. Cover Color: As selected by Architect from manufacturer's full range for one color.

2.4 VOLLEYBALL EQUIPMENT

A. Equivalent to Jaypro PVB-1350 multipurpose aluminum net system 4” OD uprights height adjustment. Floor sleeves. Winch drive competition high school net.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for play court layout, alignment of mounting substrates, installation tolerances, operational clearances, and other conditions affecting performance.

1. Verify critical dimensions.
2. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements have been clearly marked for installers. Locate reinforcements and mark locations if not already done.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written installation instructions. Complete equipment field assembly, where required.

B. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, have been completed.

C. Permanently Placed Gymnasium Equipment and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and
elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.

D. Wall Safety Pads: Mount with bottom edge at 4 inches above finished floor.

E. Anchoring to In-Place Construction: Use anchors and fasteners where necessary for securing built-in and permanently placed gymnasium equipment to structural support and for properly transferring load to in-place construction.

3.3 ADJUSTING

A. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.4 CLEANING AND PROTECTION

A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.

B. Provide final protection and maintain conditions acceptable to manufacturer and Installer that ensure gymnasium equipment is without damage or deterioration at time of Substantial Completion.

C. Replace gymnasium equipment and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 11490
DIVISION 12 - FURNISHINGS
12484  Floor Mats
12491  Horizontal Louver Blinds
12494  Roller Shades
SECTION 12484 - FLOOR MATS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Entry mat

1.3 SUBMITTALS

A. Product Data: Include manufacturer’s specifications and installation instructions, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of floor mat and frame specified.

B. Shop Drawings: For floor mats and frames. Show assembly, joint locations, installation details, layout, plans, elevations, sections, details of patterns or designs, accessories, anchors, and attachments to other Work.

1. Coordinate Shop Drawings showing oversized recess for deferred installation of frames with concrete work.

C. Samples for Initial Selection: For each type of floor mat and frame indicated.

D. Maintenance Data: For cleaning and maintaining floor mats to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain floor mats and frames through one source from a single manufacturer.

B. Accessibility Requirements: In addition to requirements of authorities having jurisdiction, provide installed floor mats that comply with Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

C. Warranty: See Division 01700 Section.

1.5 COORDINATION

A. Coordinate size and location of oversized recesses in concrete work to receive floor mats and frames. Defer frame installations until building enclosure is completed and related interior finish work is in progress. Concrete, reinforcement, and formwork requirements are specified in Division 3.
B. Coordinate integral installation of recessed frames and anchors with placing of concrete slab so frames are positioned accurately.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equivalent by other manufacturers:

1. Mats:
   a. Interface Deco Tuft Collection – See Finish Schedule
   b. Lee’s Carpet First Step Sheet product.

2.2 CONCRETE FILL AND GROUT MATERIALS

A. Provide concrete materials complying with Division 3 for grout and fill around and under recessed mats and frames that produce concrete equivalent in strength to cast-in-place concrete slabs. For concrete fill, adjust aggregate size to not exceed one-third fill thickness.

2.3 FLOOR MATS

A. General: Provide colors, patterns, and profiles of materials, including metals and metal finishes indicated or specified. If not indicated, provide colors, patterns, and profiles selected by Architect from manufacturer's standards.

B. Mats: Laminated and chenille-buffed.

   1. Construction Nedlefelt
   2. Surface Texture Multilevel
   3. Pile Content 100% Polypropylene
   4. Pile Weight 34 oz
   5. Total Thickness .124 in., 3.1 mm
   6. Dye Method Solution dyed
   7. Tile Size 19.69" x 19.69"
   8. Backing Graphlar
   9. 20 Tiles per Box 5.98 sq. yds.

2.4 FINISHES, GENERAL - As selected by Architect from manufacturers standard.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install surface-type mats to comply with manufacturer's written instructions at locations indicated; coordinate with entrance locations and traffic patterns.

3.2 PROTECTION

A. Defer installation of floor mats until Project is near Substantial Completion.

END OF SECTION 12484
SECTION 12491 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

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

1.2 SUMMARY
A. This Section includes the following types of venetian blinds and accessories:
   1. Miniblinds with aluminum louver slats.
   2. Section 12494 for motorized roller shades.

1.3 DEFINITIONS
A. Miniblind: Venetian blind with nominal 1-inch- (25-mm-) wide louver slat.

1.4 SUBMITTALS
A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
B. Samples for Initial Selection: For each colored component of each type of horizontal louver blind indicated.
   1. Include similar Samples of accessories involving color selection.

1.5 QUALITY ASSURANCE
A. Source Limitations: Obtain horizontal louver blinds through one source from a single manufacturer.
B. Fire-Test-Response Characteristics: Provide horizontal louver blinds with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
C. Corded Window Covering Product Standard: Provide horizontal louver blinds complying with WCMA A 100.1.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Deliver blinds in factory packages, marked with manufacturer and product name, fire-test-
response characteristics, and location of installation using same room designations
indicated on Drawings and in a window treatment schedule.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and
wet and dirty finish work in spaces, including painting, is complete and ambient
temperature and humidity conditions are maintained at the levels indicated for Project
when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other
construction, verify dimensions of other construction by field measurements before
fabrication and indicate measurements on Shop Drawings. Allow clearances for operable
glazed units' operation hardware throughout the entire operating range. Notify Architect
of discrepancies. Coordinate fabrication schedule with construction progress to avoid
delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the
following:

1. Horizontal Louver Blinds, Aluminum Louver Slats:
   b. Levolor Contract; a Newell Company; Levolor.

2.3 HORIZONTAL LOUVER BLINDS, ALUMINUM LOUVER SLATS

A. Products: Subject to compliance with requirements, provide one of the following:

1. Hunter Douglas - Light Lines
   a. Color: Manufacturer full range of solid color selected by Architect.

B. Louver Slats: Aluminum, alloy and temper recommended by producer for type of use and
finish indicated; with crowned profile and radiused corners.

1. Nominal Slat Width: 1 inch (25 mm) for miniblinds.
   a. Slat Spacing: Every 18 mm for 16.7 slats or more per foot (18 mm).

2. Nominal Slat Thickness: Manufacturer standard for commercial use.

3. Slat Finish: Three colors as selected by architect from manufacturer's full range.

C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled; fully
enclosing operating mechanisms on three sides and ends; capacity for two blind[s] per
headrail.

D. Headrail/Valance: Decorative, integrated headrail/valance not requiring a separate
valance or end brackets for finished appearance; formed steel or extruded aluminum;
long edges returned or rolled; fully enclosing operating mechanisms on three sides and
ends; capacity for two blind[s] per headrail.

1. Finish Color Characteristics: Match color, texture, pattern, and gloss of louver
slats.
E. Bottom Rail: Formed-steel or extruded-aluminum tube, sealed with plastic or metal capped ends top contoured to match crowned shape of louver slat; with enclosed and protected ladders and tapes to prevent their contact with sill.

F. Tilt Control: Consisting of enclosed worm gear mechanism, slip clutch or detachable wand preventing overrotation, and linkage rod, for the following operation:

2. Length of Tilt Control: Length required to make operation convenient from floor level.
3. Tilt: Full.

G. Lift Operation: Manual, cord lock; locks pull cord to stop blind at any position in ascending or descending travel.

H. Tilt-Control and Cord-Lock Position: Center blind and left side of headrail, respectively and Center blind and right side of headrail, respectively, unless otherwise indicated.

I. Ladders: Evenly spaced to prevent long-term louver sag.

1. For Blinds with Nominal Slat Width 1 Inch (25 mm) or Less: Braided string.

J. Valance: Manufacturer's standard.

1. Finish Color Characteristics: Match color, texture, pattern, and gloss of louver slats.

K. Mounting: Mounting permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated.

1. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind.

L. Colors, Textures, Patterns, and Gloss: As selected by Architect from manufacturer's full range.

2.8 HORIZONTAL LOUVER BLINDS FABRICATION

A. Product Standard and Description: Comply with AWCMA Document 1029, unless otherwise indicated, for each horizontal louver blind designed to be self-leveling and consisting of louver slats, rails, ladders, tapes, lifting and tilting mechanisms, cord, cord lock, tilt control, and installation hardware.

B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lifting and Tilting Mechanisms: With permanently lubricated moving parts.

C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Blind Units Installed Outside Jambs inside window opening: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
D. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail, valance, and operating hardware, and for hardware position and blind mounting method indicated.

E. Installation Fasteners: Not fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:
   1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

G. Component Color: Provide rails, cords, ladders, and exposed-to-view metal and plastic matching or coordinating with slat color, unless otherwise indicated.

PART 3- EXECUTION

3.1 HORIZONTAL LOUVER BLIND INSTALLATION

A. Install blinds level and plumb and aligned with adjacent units according to manufacturer's written instructions, and located so exterior louver edges in any position are not closer than 2 inches to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances between adjacent blinds and for operating glazed opening's operation hardware, if any.

B. Head Mounted: Install headrail on face of opening head.

3.2 ADJUSTING

A. Adjust horizontal louver blinds to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.3 CLEANING AND PROTECTION

A. Clean blind surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged blinds that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 12491
SECTION 12494 - ROLLER SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes roller shades.
   1. Motorized roller shades.

B. Related Sections include the following:
   1. Division 16 Sections for electrical service and connections for motor operators, controls, limit switches, and other powered devices and for system disconnect switches for motorized shade operation.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
   1. Motorized Shade Operators: Include operating instructions.
   2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.

B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
   1. Motorized Shade Operators: Show locations and details for installing operator components. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions. Coordinate electrical requirements with electrical contractor.
   2. Wiring Diagrams: Power, system, and control wiring. Coordinate with electrical drawings and general contractor.

C. Samples for Initial Selection: For each colored component of each type of shade indicated.
   1. Include similar Samples of accessories involving color selection.

D. Samples for Verification:
   1. Complete, full-size operating unit not less than 16 inches (400 mm) wide for each type of roller shade indicated.
   2. For the following products:
a. Shade Material: Not less than 3 inches (76 mm) square, with specified treatments applied. Mark face of material.
b. Valance: Full-size unit, not less than 12 inches (300 mm) long.

E. Product Certificates: For each type of roller shade, signed by product manufacturer.
F. Product Test Reports: For each type of roller shade.
G. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
   1. Methods for maintaining roller shades and finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
   3. Operating hardware.
   4. Motorized shade operator.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed installation of roller shades similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
B. Source Limitations: Obtain roller shades through one source from a single manufacturer.
C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
E. Product Standard: Provide roller shades complying with WCMA A 100.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, lead-free designation, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
PART 2 - PRODUCTS

2.1 ROLLER SHADES

A. Products: Subject to compliance with requirements, provide one of the following:
   1. Draper Inc..
   3. Levolor; Levolor-Kirsch Window Fashions; a Newell Rubbermaid Company.
   4. Lutron Shading Solutions by VIMCO.
   5. MechoShade Systems, Inc..

B. Basis-of-Design Product: Subject to compliance with requirements, provide Mechoshade or a comparable product by other manufacturers.

C. Shade Band Material: Blackout Material: Fiberglass coated fabric 12 mils thick 0.750 lbs/sq. in.
   1. Fabric Width: As indicated on Drawings.
   2. Colors: color as selected by Architect.
   4. Trim: As indicated by manufacturer's designation for style and color.
   5. Fringe: As indicated by manufacturer's designation for style and color.

D. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging.

E. Direction of Roll: Regular, from back of roller.

F. Mounting Brackets: Fascia end caps, fabricated from steel finished to match fascia or headbox.

G. Fascia: L-shaped, formed-steel sheet or extruded aluminum; long edges returned or rolled; continuous panel concealing front and bottom of shade roller, brackets, and operating hardware and operators; length as indicated on Drawings.

H. Top/Back Cover: L-shaped; material and finish to match fascia; combining with fascia and end caps to form a six-sided headbox enclosure sized to fit shade roller and operating hardware inside.

I. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide [exposed-to-view, external -type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.

J. Valance: As indicated by manufacturer's designation for style and color.

K. Mounting: Inside mounting.

L. Shade Operation: Motorized operator where indicated. Control by Hubbell keyed switch to match District standard.

2.2 ROLLER SHADE FABRICATION

A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lifting Mechanism: With permanently lubricated moving parts.

C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch (6 mm) from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.

D. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

E. Colors of Metal and Plastic Components Exposed to View: Color as selected by Architect.

2.3 MOTORIZED ROLLER SHADE OPERATORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Mechoshade Electroshade motorized roller screens, single band, or a comparable product. Manufacturer's listed in Article 2.1.

B. General: Provide factory-assembled motorized shade operation systems designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics, and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, remote-control stations, remote-control devices, power disconnect switches, enclosures protecting controls and all operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system. Control by Hubbell switch to match School District standard.

C. Comply with NFPA 70.

D. Electric Motors: UL-approved or -recognized, totally enclosed, insulated motor, complying with NEMA MG 1, with thermal-overload protection, brake, permanently lubricated bearings, and limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings.

1. Service Factor: According to NEMA MG 1, unless otherwise indicated.

E. Position of Motor and Electrical Connection: Left side of roller, as determined by hand of user facing shade from inside, unless otherwise indicated on electrical drawings.

F. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop shade at fully raised and fully lowered positions. Hubbel keyed switches.

G. Operating Function: Stop and hold shade at any position.

H. Operating Features: Include the following:

1. Group switching with integrated switch control.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Connections: Connect motorized operators to building electrical system.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades. Refer to Division 1 Section Demonstration and Training.

END OF SECTION 12494
DIVISION 13 – SPECIAL CONSTRUCTION
13123 Greenhouse
SECTION 13123 - GREENHOUSE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Approved greenhouse supplier to furnish materials and equipment necessary for the greenhouse system described in this section and contract drawings.

2. No fabrication of the structure or ordering of equipment shall commence until drawings and equipment have been approved.

1.2 QUALITY ASSURANCE

A. Design Criteria:

1. Greenhouse frame shall be designed in accordance with American Institute of Steel Construction Specifications and 2012 IBC Building Code.
   a. Frost depth: 36 inches
   b. Seismic zone: D1

B. Design Loads

1. Design structure to carry the following loads:
   a. Dead Load: Structure and Equipment
   b. Roof Snow Load: 37 lbs. / sq. ft.
   c. Wind Load: 90 mph, exposure C, 3 second gust
   d. Special Loads: (Determine if needed.)

2. Load Combinations (Determine if needed)
   a. D.L. + S.L.
   b. D.L. + W.L.
   c. D.L. + ½ S.L. + W.L. or ( ½ W.L. + S.L.)

Engineering Certification

1. Provide written structural analysis prepared by a Professional Engineer registered in the state of Utah certifying that the greenhouse meets the required loads.

D. Structure Type

1. The greenhouse shall be a Vail structure as manufactured by Nexus Corporation, or approved equal.

1.3 WARRANTIES

A. Greenhouse shall be free from all defects in materials and workmanship for one year from receipt by customer.

B. All equipment will carry the respective manufacturer’s warranties.
1.4 SUBMITTALS

A. Complete erection and installation drawings shall be submitted and approved before fabrication of project.

B. Submit structural analysis and design after contract has been awarded, certified by a Professional Engineer registered in the state of Utah.

PART 2 - PRODUCTS

2.1 STRUCTURE

A. Approved Supplier: Basis of design is Winandy GHSE Co., Richmond, Indiana (765)935-2111.

1. Supplier Qualifications: Packaged Greenhouse System supplier shall be available to inventory greenhouse parts on site within 14 days of delivery with owner or designated representative.

2. Supplier shall also be available during the erection of the greenhouse systems for consultation with the Contractor, Architect and Installer. Consultation will consist of telephone and e-mail communication. Minimum two site visits required in addition to inventorying greenhouse parts and owners training. See Section 3.2.

B. Components:

1. Primary structural members shall be fabricated from square galvanized steel tubing with a minimum 50,000 p.s.i. tensile strength. No roll formed sections allowed.

2. Aluminum extrusions used for bars, vents, or other secondary framing members shall be 6063-T6 alloy.

3. Roof trusses shall be factory welded using square galvanized tubing. Minimum size are 2" square, 16 gauge top chord, 1 1/2" square, 18 gauge bottom chord, and 1 1/2" square,19 gauge secondary members. Welds will be re-galvanized with a flame spray process. No painting of weld areas.

4. Columns shall be fabricated from 4" square galvanized steel tubing, they are to be set in caissons filled with concrete to 5" of finished grade. *Size of caissons determined by local code requirements.

5. Truss to column connection will be made with a column cap and gutter saddle assembly made from Tenzaloy, a high strength alloy.

6. Roof purlins shall be manufactured from 2” square 16 gauge galvanized steel tubing as a minimum. Purlins shall be bolted to truss top chords. No screw attachments are allowed.

7. Horizontal and vertical framing shall be fabricated from 2” square 16 gauge tube (minimum).

8. Glazing extrusions for structural sheeting shall be made of aluminum and consistent with the Manufacturer’s standard shapes. A two-piece gasketed extrusion shall be used on roof areas.

9. Roof Pitch is to be 6:12.

10. Structure to be a Nexus Vail, or approved equal.
a. The greenhouse to be 30' wide x 70' long and have one (1) internal partition wall, making two (2) compartments. See drawings.

11. Structure will have 10'-0" o.c. column spacing and under gutter height to be 12'-0".

12. Wall member spacing will 4'-0" o.c.

13. Gutters shall be galvanized steel with baked-on enamel paint as an extra coating protection. (Exterior side only). The gutter will be designed for water drainage only. No fixed truss or bow attachments are allowed. Two (2) runs of gutter with two (2) end caps and two (2) end caps with down spout transitions. Downspouts by others.

14. See drawings for Greenhouse Compartment vents. Wadsworth vent controller and motor are to be provided for each vent. There are no roof vents in any of the compartments.

C. LOADING

1. Must meet 37 # min roof snow load, 90 mph, Exposure C wind load.

D. GREENHOUSE GLAZING

1. Roof, gable ends and sidewall covering for Greenhouse is to be 8mm clear triple wall polycarbonate 48" wide with an anti-condensate surface. Accessories per manufacturer's standard recommendations. Partition wall to be covered with 8mm clear triple wall polycarbonate 48" wide

2. Headhouse roof and sidewalls are to be covered with insulated Metlspan. Color to be determined by Owner. Accessories per manufacturer's standard recommendations.

3. Approved polycarbonate glazing by Polygal.

E. GREENHOUSE DOORS AND FRAMES

1. Plyco Series 88 doors/with windows are to be used for all walk doors.
   a. Four (4) 48" wide x 90" tall swing doors with windows and with standard greenhouse hardware and lever/lever locksets, see drawings for location.
   b. Three (3) 3'-6" tall x 7'-0" wide swing doors on the north, east and between the headhouse and greenhouse. Locksets provided by others. See drawing for locations.

2.2 EQUIPMENT

A. Heating

1. Both compartments to be heated using Modine Effinity 93 High Efficiency Unit Heaters.

2. Greenhouse to have two (4) 12" VP12-PA Schaefer HAF fans. See drawings for location.

B. Cooling System

1. Greenhouse will each have one (1) 3'-0" tall x 40'-0" long Quietaire TR58-4 Stainless Steel cooling system located in the west sidewall, Four (4) Quietaire AGCS2450 fans (angle housing, 24", 1/2 hp, 2 speed exhaust fans) located on the east sidewall. See drawing for location.
C. Energy Curtain

1. Greenhouse will have Wadsworth heat retention curtains. It will be motorized with Wadsworth motor and Wadsworth motor controllers. Material for all curtain systems will be Aluninet 50% Flame Retardant Shade/Energy cloth.

D. Benches

1. Greenhouse will have a total of eleven (11) - 5’ wide x 12’ long stationary Ebb and Flow benches. The bench top and frames to have an aluminum perimeter top rail and galvanized square steel top supports. The bench base to be sq. galvanized steel with anchor plates to attach the bench to the floor.
   a. Benches to be rated to carry a weight of 40 pounds per sq. ft. Cross supports for Ebb and Flow Tray to be placed 6” apart down length of the bench.

2. Headhouse to have a total of two (2) 5’ wide x 12’ long stationary Ebb and Flow benches. The bench top and frames to have aluminum perimeter top rail and galvanized square steel top supports. The bench base to be sq. galvanized steel with anchor plates to attach the bench to the floor. The Ebb and Flow tray for each bench to be provided by Trueleaf Technologies.
   a. All benches in headhouse to be rated to carry 26 pounds per sq. ft. Cross supports for the Ebb and Flow tray to be placed 12” apart down the length of the bench.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installer Qualifications: An experienced installer who has completed greenhouse packaged systems similar in material, design and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance. Installer must be accepted, in writing by the packaged greenhouse systems supplier.

B. Greenhouse shall be erected in accordance with manufacturer’s drawings and instructions.

C. General: Install equipment in accordance with manufacturer’s installation instructions and recognized industry practices to insure intended function. Equipment will be installed in place by the Greenhouse Contractor. All mechanical connections (electrical or plumbing) will be performed by electrical, plumbing or mechanical contractor. The Control Contractor or electrician will be responsible for equipment startup, control wiring and calibration.

3.2 OWNER’S TRAINING

A. Minimum of one (1) site visit by greenhouse and systems supplier for the purpose of training owner or owners representative of greenhouse on use of greenhouse and systems.

END OF SECTION