ST. JUDE CATHOLIC CHURCH

MANSFIELD, TEXAS

PARISH HALL REMODEL & CONNECTOR

PROJECT MANUAL - Volume 1

ISSUE DATE: DECEMBER 20, 2023

ARCHITECTURE
Scott Martsolf, Architect
815 West Daggett Ave.
Fort Worth, Texas 76104

STRUCTURAL
HnH Engineering Inc.
105 Sproles Drive
Benbrook, Texas 76126

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VOLUME 1

SECTION 00100

BID SOLICITATION

DATE: **DECEMBER 20, 2023**

FROM:

THE OWNER (HEREINAFTER REFERRED TO AS OWNER):

Owner: **Michael F. Olson S.T.D, Bishop of the Catholic Diocese of Fort Worth**

800 West Loop 820 South
Fort Worth, Texas 76108

ST. JUDE CATHOLIC CHURCH
500 EAST DALLAS STREET
MANSFIELD, TEXAS 76063

AND THE ARCHITECT (HEREINAFTER REFERRED TO AS ARCHITECT):

SCOTT MARTSOLF- ARCHITECT
815 WEST DAGGETT AVENUE
FORT WORTH, TEXAS 76104

TO:

POTENTIAL BIDDERS

A. Your company is invited to submit an offer to the Owner for the construction of the proposed BUILDING REMODEL AND NEW ADDITION WITH SITEWORK, 500 EAST DALLAS STREET, MANSFIELD,TEXAS 76063, before 4**:00 pm local standard time,** **Tuesday, January 23, 2024.** Bids will be received by e-mail :**scott@marstolfarch.com**

B. The Owner reserves the right to accept or reject any or all offers.

C. Architect to submit Construction Documents to the City of Mansfield to begin permitting process. Selected General Contractor to finalize the Permit process, fees are reimbursable expenses paid by the Owner.

END OF BID SOLICITATION – 00100

SECTION 00300

INFORMATION AVAILABLE TO BIDDERS

EXISTING REPORTS AND SURVEYS

1.01 SUBSURFACE INVESTIGATION REPORT

A. A geotechnical report with respect to the building site has been completed. The results follow this section.

B. This report will identify properties of below grade conditions and offers recommendations

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

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

END OF INFORMATION AVAILABLE TO BIDDERS

GEOTECHNICAL ENGINEERING SERVICES
ADDITION TO ST. JUDE CATHOLIC CHURCH
MANSFIELD, TEXAS

Presented To:

Catholic Diocese of Fort Worth

Fort Worth, Texas

April 2011

PROJECT NO. 398-11-33

CMJ ENGINEERING, INC.

7636 Pebble Drive
Fort Worth, Texas 76118
www.cmjengr.com

April 8, 2011
Report No 398-11-33

Catholic Diocese of Fort Worth
800 West Loop 820 South
Fort Worth, Texas 76108

Attn: Mr Gary Fragosso

GEOTECHNICAL ENGINEERING SERVICES
ADDITION TO ST. JUDE CATHOLIC CHURCH
MANSFIELD, TEXAS

Dear Mr. Fragosso:

Submitted here are the results of a geotechnical engineering study for the referenced project. This study was performed in general accordance with our Proposal No 11-3452 dated February 21, 2011

Engineering analyses and recommendations are contained in the text section of the report. Results of our field and laboratory services are included in the appendix of the report. We would appreciate the opportunity to be considered for providing the construction material testing services during the construction phase of this project

We appreciate the opportunity to be of service to the Catholic Diocese of Fort Worth and its consultants Please contact us if you have any questions or if we may be of further service at this time.

Respectfully submitted,
CMJ ENGINEERING, INC.
Texas Firm Registration Number F-9177

Garrett E. Williams

STATE OF TEXAS
GARRETT E. WILLIAMS
52525
REGISTERED
PROFESSIONAL ENGINEER
4.8.11

Garrett E Williams, P.E.
President
Texas No 52525

copies submitted: (2) Mr. Gary Fragosso; Catholic Diocese of Fort Worth (mail & e-mail)
(1) Mr Raymond O'Connor, AIA; OA&ID (e-mail)

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APPENDIX A

APPENDIX B

1.0 INTRODUCTION

1.1 Project Description

The existing facility is located at 500 E. Dallas Street in Mansfield, Texas. The project, as currently planned, will consist of a new worship building, a new parking lot and new paving in front of the proposed worship building. No basements are planned.

1.2 Purpose and Scope

The purpose of this geotechnical engineering study has been to determine the general subsurface conditions, evaluate the engineering characteristics of the subsurface materials encountered, and develop recommendations for the type or types of foundations suitable for the project.

To accomplish its intended purposes, the study has been conducted in the following phases: (1) drilling sample borings to determine the general subsurface conditions and to obtain samples for testing; (2) performing laboratory tests on appropriate samples to determine pertinent engineering properties of the subsurface materials; and (3) performing engineering analyses, using the field and laboratory data to develop preliminary geotechnical recommendations for the proposed construction.

The design is currently in progress and the locations and/or elevations of the structure could change. Once the final design is near completion (80-percent to 90-percent stage), it is recommended that CMJ Engineering, Inc. be retained to review those portions of the construction documents pertaining to the geotechnical recommendations, as a means to determine that our recommendations have been interpreted as intended.

1.3 Report Format

The text of the report is contained in Sections 1 through 11. All plates and large tables are contained in Appendix A. The alpha-numeric plate and table numbers identify the appendix in which they appear. Small tables of less than one page in length may appear in the body of the text and are numbered according to the section in which they occur.

Units used in the report are based on the English system and may include tons per square foot (tsf), kips (1 kip = 1,000 pounds), kips per square foot (ksf), pounds per square foot (psf), pounds per cubic foot (pcf), and pounds per square inch (psi).

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Subsurface materials at the project site were explored by eight (8) vertical soil borings drilled on March 11, 2011. Borings B-1 through B-5 are associated with the proposed building and were extended to depths of 50 to 52 feet. The remaining borings, B-6 through B-8, are associated with area paving and were extended to a depth of 5 feet. The borings were drilled using continuous flight augers with a truck mounted drilling rig at the approximate locations shown on the Plan of Borings, Plate A.1. The boring logs are included on Plates A.4 through A.11 and keys to classifications and symbols used on the logs are provided on Plates A.2 and A.3.

Undisturbed samples of cohesive soils were obtained with nominal 3-inch diameter thin-walled (Shelby) tube samplers at the locations shown on the logs of borings. The Shelby tube sampler consists of a thin-walled steel tube with a sharp cutting edge connected to a head equipped with a ball valve threaded for rod connection. The tube is pushed into the soil by the hydraulic pulldown of the drilling rig. The soil specimens were extruded from the tube in the field, logged, tested for consistency with a hand penetrometer, sealed, and packaged to limit loss of moisture.

The consistency of cohesive soil samples was evaluated in the field using a calibrated hand penetrometer. In this test a 0.25-inch diameter piston is pushed into the relatively undisturbed sample at a constant rate to a depth of 0.25 inch. The results of these tests, in tsf, are tabulated at respective sample depths on the logs. When the capacity of the penetrometer is exceeded, the value is tabulated as 4.5+.

Disturbed samples of the noncohesive granular or stiff to hard cohesive materials were obtained utilizing a nominal 2-inch O.D. split-barrel (split-spoon) sampler in conjunction with the Standard Penetration Test (ASTM D 1586). This test employs a 140-pound hammer that drops a free fall vertical distance of 30 inches, driving the split-spoon sampler into the material. The number of blows required for 18 inches of penetration is recorded and the value for the last 12 inches, or the

penetration obtained from 50 blows, is reported as the Standard Penetration Value (N) at the appropriate depth on the log of boring.

To evaluate the relative density and consistency of the harder formations, a modified version of the Texas Cone Penetration test was performed at selected locations. Texas Department of Transportation (TxDOT) Test Method Tex-132-E specifies driving a 3-inch diameter cone with a 170-pound hammer freely falling 24 inches. This results in 340 foot-pounds of energy for each blow. This method was modified by utilizing a 140-pound hammer freely falling 30 inches. This results in 350 foot-pounds of energy for each hammer blow. In relatively soft materials, the penetrometer cone is driven 1 foot and the number of blows required for each 6-inch penetration is tabulated at respective test depths, as blows per 6 inches on the log. In hard materials (rock or rock-like), the penetrometer cone is driven with the resulting penetrations, in inches, recorded for the first and second 50 blows, a total of 100 blows. The penetration for the total 100 blows is recorded at the respective testing depths on the boring logs.

2.2 Laboratory Testing

Laboratory soil tests were performed on selected representative samples recovered from the borings. In addition to the classification tests (liquid limits and plastic limits), moisture content, unconfined compressive strength tests and unit weight tests were performed. Results of the laboratory classification tests, moisture content and unit weight tests conducted for this project are included on the boring logs.

Swell tests were performed on specimens from selected samples of the clays. These tests were performed to help in evaluating the swell potential of soils in the area of the proposed structure and pavements. The results of the swell tests are presented on Plate A.12.

The above laboratory tests were performed in general accordance with applicable ASTM procedures, or generally accepted practice.

3.0 SUBSURFACE CONDITIONS

3.1 Site Geology

The Dallas Sheet of the Geologic Atlas of Texas indicates the site is located in an outcropping of the Eagle Ford Formation near its contact with the Woodbine Formation. The clays of the Eagle Ford vary in color from dark brown, brown to tan, are highly expansive, and undergo large volumetric changes with climatic cycles. The clays are jointed and often contain silt and sand seams and partings, as well as bentonite seams. The shales of the Eagle Ford Formation are medium to dark gray in color and range from medium hard to hard. The shale is often limy. Soft bentonite seams and layers may also be present within the formation. The parent material in the underlying Woodbine Formation consists of sandy shale. Extremely hard sandstones can be present in and above the sandy shale.

3.2 Soil Conditions

Specific types and depths of subsurface strata encountered at the boring locations are shown on the boring logs in Appendix A. The generalized subsurface stratigraphy encountered in the borings is discussed below. Note that depths on the borings refer to the depth from the existing grade or ground surface present at the time of the investigation, and the boundaries between the various soil types are approximate.

Borings B-1, B-2 and B-6 were drilled in paved areas. The pavement consisted of 3 to 5 inches of asphalt. Dark brown, brown and grayish brown clays with calcareous nodules underlaid the pavement and were present at the surface in the remaining borings. Tan, reddish tan and grayish brown shaly clays with iron oxide stains were then encountered in Borings B-1 through B-5 at depths of 4 to 9 feet. The tan, reddish tan and grayish brown clays often contained silt seams and sand seams and occasionally sandstone seams with depth. Borings B-6, B-7 and B-8 were terminated in the clays at a depth of 5 feet.

The various clay soils encountered at this site were firm to hard (soil basis) with pocket penetrometer readings ranging from 1.0 to over 4.5 tsf. Tested values of Liquid Limit (LL) and Plasticity Index (PI) of the various clays typically ranged from 66 to 81, and 40 to 54, respectively. Tested values of unit dry weight varied from 89 to 115 pcf and unconfined strengths varied from 880 to 7,300 psf

Tan lightly cemented sands were next present at 18.5 to 25 feet below existing grade in Borings B-1 through B-5. The lightly cemented sands are very dense, with Standard Penetration Test results of 37 to 5 inches for 50 blows. Clayey sand seams and sandstone seams are present within the cemented sands in select reaches.

Gray sandy shale with sandstone and cemented sand seams was then present in Borings B-1 through B-5 at depths of 36 to 40 feet. Borings B-1 through B-5 were terminated in this stratum at depths of 50 to 52 feet. The gray shale was typically moderately hard (rock basis) with THD cone penetrometer values ranging from 0.5 to 1 inch of penetration per 100 blows.

The Atterberg Limits tests indicate the various clays encountered at this site are highly active with respect to moisture induced volume changes. Active clays can experience volume changes (expansion or contraction) with fluctuations in their moisture content.

3.3 Ground Water Observations

The borings were drilled using continuous flight augers. Ground water seepage was encountered during drilling in Borings B-1 through B-5 at depths of 23 to 31 feet with water levels of 22 to 27 feet measured at completion. Borings B-3 and B-5 caved to 40 feet following completion. Seepage was not encountered in Borings B-6, B-7 and B-8 during drilling and Borings B-6, B-7 and B-8 were dry at completion.

The observed seepage was typically encountered in the lightly cemented sands. Seepage can also occur in the sandy shale. Such seepage can complicate drilled shaft excavation as described below.

Fluctuations of the ground water level can occur due to seasonal variations in the amount of rainfall; site topography and runoff; hydraulic conductivity of soil strata; and other factors not evident at the time the borings were performed. The possibility of ground water level fluctuations should be considered when developing the design and construction plans for the project.

4.0 FOUNDATION RECOMMENDATIONS

4.1 General Foundation Considerations

Two independent design criteria must be satisfied in the selection of the type of foundation to support the proposed structures. First, the ultimate bearing capacity, reduced by a sufficient factor of safety, must not be exceeded by the bearing pressure transferred to the foundation bearing strata. Second, due to consolidation or expansion of the underlying soils during the operating life of the structure, total and differential vertical movements must be within tolerable limits. Foundation construction considerations are presented in Section 4.2.3.

Based on the anticipated column loads a deep foundation system is recommended. The gray sandy shale is the uppermost stratum which should be considered to support a deep foundation system. Straight drilled reinforced concrete shafts penetrating the unweathered gray sandy shale offer a positive foundation system and are recommended.

4.2 Straight Shaft Design Parameters

4.2.1 *Design Criteria*

Recommendations and parameters for the design of cast-in-place straight-shaft drilled piers are outlined below. Specific recommendations for the construction and installation of the drilled piers are included in the following section, and shall be followed during construction.

Bearing Stratum	Gray SANDY SHALE with cemented sand and sandstone seams
Depth of Bearing Stratum:	Approximately 36 to 40 feet below existing grades
Required Penetration/Depth:	All piers should extend through the weathered shale and penetrate into the unweathered gray sandy shale bearing stratum a minimum of 3 feet.
Allowable End Bearing Capacity:	24,000 psf
Allowable Skin Friction:	2,800 psf for compressive loads and 1,800 psf for tensile loads.

The maximum ratio of overall shaft length to shaft diameter is 20:1. The above values contain a safety factor of three (3).

Drilled shafts should extend through any weathered shale zones and bear only in competent, unweathered gray sandy shale with cemented sand and sandstone seams. A minimum pier diameter of 18 inches is recommended.

For lateral shaft resistance, an allowable passive resistance of 4,000 psf may be considered in the unweathered gray sandy shale.

It should be anticipated that ground water seepage will be encountered during installation of all the straight shafts. Temporary casing will be required for proper installation of the shafts; however, in the event the casing cannot seal off the ground water, underwater concrete placement techniques will be necessary to properly install the shafts. Seepage is possible in the shale. Where seepage occurs in the shale, extension of the temporary casing may be required to case through the water bearing zone resulting in deeper penetrations than would be designed. *In underwater concrete placement techniques, end bearing is neglected and the shaft design is based entirely on skin friction. This will also require deeper penetrations.*

In order to develop full load carrying capacity in skin friction, adjacent shafts should have a minimum center-to-center spacing of 3 times the diameter of the larger shaft. Closer spacing may require some reductions in skin friction and/or changes in installation sequences. Closely spaced shafts should be examined on a case-by-case basis. As a general guide, the design skin friction will vary linearly from the full value at a spacing of 3 diameters to 50 percent of the design value at 1 diameter.

Settlements for properly installed and constructed straight shafts in the unweathered gray sandy shale will be primarily elastic and are estimated to be one inch or less.

4.2.2 *Soil Induced Uplift Loads*

The drilled shafts could experience tensile loads as a result of post construction heave in the clays. The magnitude of these loads varies with the shaft diameter, soil parameters, and particularly the in-situ moisture levels at the time of construction. For design purposes, an uplift load of 1,800 psf over a shaft length of 10 feet is estimated. This load must be resisted by the dead load on the shaft, continuous vertical reinforcing steel in the shaft, and a shaft adhesion developed within the

bearing strata. In order to aid in the structural design of the reinforcement, minimum reinforcing should be equal to 0.5 percent of the shaft area.

4.2.3 *Drilled Shaft Construction Considerations*

Drilled pier construction should be monitored by a representative of the geotechnical engineer to observe, among other things, the following items:

- Identification of bearing material
- Adequate penetration of the shaft excavation into the bearing layer
- The base and sides of the shaft excavation are clean of loose cuttings
- If seepage is encountered, whether it is of sufficient amount to require the use of temporary steel casing. If casing is needed it is important that the field representative observe that a high head of plastic concrete is maintained within the casing at all times during their extraction to prevent the inflow of water

Precautions should be taken during the placement of reinforcing steel and concrete to prevent loose, excavated soil from falling into the excavation. Concrete should be placed as soon as practical after completion of the drilling, cleaning, and observation. Excavation for a drilled pier should be filled with concrete before the end of the workday, or sooner if required to prevent deterioration of the bearing material. Prolonged exposure or inundation of the bearing surface with water will result in changes in strength and compressibility characteristics. If delays occur, the drilled pier excavation should be deepened as necessary and cleaned, in order to provide a fresh bearing surface.

Excavations for the shafts should be maintained in the dry. It should be anticipated that ground water seepage will be encountered during shaft installation of all straight shafts and that temporary casing will be required for all straight shafts for proper shaft installation. The casing should be seated below the zone of seepage with all water and most loose material removed prior to beginning the design penetration. Care must then be taken that a sufficient head of plastic concrete is maintained within the casing during extraction.

If the water cannot be controlled, we recommend underwater concrete placement techniques be used. The concrete should be placed by a tremie or by using a concrete pump. If this method is utilized end bearing should be neglected and the shaft design based entirely on skin friction.

Tremied or pumped-in concrete for shafts should take place as continuously as possible until the concrete placement is complete. The bottom of the discharge pipe should always be kept below the surface of the concrete.

The concrete should have a slump of 6 inches plus or minus 1 inch. The concrete should be placed in a manner to prevent the concrete from striking the reinforcing cage or the sides of the excavation. Concrete should be tremied to the bottom of the excavation to control the maximum free fall of the plastic concrete to less than 10 feet, or focus concrete in the middle of the reinforcing cage to prevent segregation.

A drilling rig of sufficient size and weight will be necessary for drilling and/or coring through the hard layers to reach the desired bearing stratum and achieve the required penetration. It should be anticipated that hard to very hard zones can be present in the tan limestone. The hard to very hard layers can complicate pier drilling operations.

In addition to the above guidelines, the specifications from the Association of Drilled Shaft Contractors Inc. "Standards and Specifications for the Foundation Drilling Industry" as Revised 1999 or other recognized specifications for proper installation of drilled shaft foundation systems should be followed.

4.3 Grade Beams

All grade beams should be supported by the drilled shafts. A minimum 12-inch void space should be provided beneath all grade beams to prevent contact with the swelling clay soils. This void will erve to minimize distress resulting from swell pressures generated by the clays.

Grade beams may be cast on cardboard carton forms or formed above grade. If cardboard carton forms are used, care should be taken to not crush the carton forms, or allow the carton forms to become wet prior to or during concrete placement operations. A soil retainer or trapezoidal void forms should be provided to help prevent in-filling of this void.

Backfill against the exterior face of grade beams or panels should be properly compacted on-site clays. Compaction should be a minimum of 93 percent of ASTM D 698, at a minimum of 2

percentage points above the optimum moisture content determined by that test. This clay fill is intended to reduce surface water infiltration beneath the structures.

5.0 FLOOR SLABS & EXTERIOR FLATWORK

5.1 Potential Vertical Movements

Lightly loaded floor slabs and exterior flatwork placed on-grade will be subject to movement as a result of moisture induced volume changes in the highly active clays. The clays expand (heave) with increases in moisture and contract (shrink) with decreases in moisture. The movement typically occurs as post construction heave. The potential magnitude of the moisture induced movements is rather indeterminate. It is influenced by the soil properties, overburden pressures, thickness of clays and, to a great extent, by soil moisture levels at the time of construction. The greatest potential for post-construction movement occurs when the soils are in a dry condition at the time of construction.

Based on the conditions encountered in the borings the potential moisture induced movements are estimated to be on the order of up to 5.5 inches for soils in a dry condition. Surrounding site amenities such as flatwork will be subject to potential movements as described above. Subgrade preparation recommendations to reduce potential movements beneath flatwork areas are presented below in Section 5.3.

5.2 Structurally Suspended Floor Slab

The most positive method of preventing slab distress due to swelling soils is to structurally suspend the interior slab. Due to the expansion potential of the site clays we recommend that the suspended floor slab be constructed on carton forms with a minimum 12-inch void space.

Care should be taken to assure that the void boxes are not allowed to become wet or crushed prior to or during concrete placement and finishing operations. Corrugated steel, placed on the top of the carton forms, could be used to reduce the risk of crushing of the carton forms during concrete placement and finishing operations. As a quality control measure during construction, "actual" concrete quantities placed should be checked against "anticipated" quantities. Significant concrete "overage" would be an early indication of a collapsed void.

Provisions should be made to provide drainage from under the buildings Ventilation of the void below the floors should be provided if high humidity can cause problems with floor tile adhesives.

Vehicle or pedestrian ramps leading up to the buildings should be structurally connected to the building grade beams to avoid abrupt differential movement between the building slab and the ramps. Transitioning details will be required at the points where ramps connect with paving and slab on grade elements. In addition, ramp slabs should be constructed so that slopes sufficient for effective drainage of surface water are still provided after potential differential movements.

5.3 Interior Floor Slabs & Exterior Flatwork

In conjunction with drilled shafts, interior slabs can be placed on a prepared subgrade. Slab-on-grade construction should only be considered if slab movement can be tolerated. The level of acceptable movement varies with the user, but methods are normally selected with the goal of limiting slab movements to about one inch or less. Reductions in anticipated movements can be achieved by using methods developed in this area to reduce on-grade slab movements. The more commonly used methods consist of placing non-expansive select fill beneath the slab and moisture conditioning the soils. The use of these methods will not eliminate the risk of unacceptable movements.

Exterior flatwork situated on-grade will be subject to post construction heave as discussed above. Differential movements should also be anticipated between structurally suspended building slabs and exterior flatwork placed on-grade. The only method of avoiding differential movement in the exterior flatwork and between the building and the exterior flatwork is for both elements to be structurally suspended.

Based on the conditions encountered at this site the installation of a minimum of 2 feet of non-expansive select fill over a minimum of 10 feet of moisture conditioned clays should reduce potential movements to on the order of 1 to 1.5 inches for soils present in a dry condition. Moisture conditioning can be achieved by mechanically reworking the clays or water pressure injection as described below. Slabs not capable of tolerating this level of movement should be structurally suspended. These recommendations should be reviewed once a grading plan is finalized.

Care must be taken when excavating adjacent to existing pavement in conjunction with the mechanically reworking process. Generally, the excavation is benched several feet beyond the existing pavement perimeter and sloped at 1H:1V resulting in a zone of untreated soil with a higher movement potential. This office should be contacted for more details concerning moisture conditioning in this area if this method is selected.

Consideration should be given to extending the moisture conditioning process beyond the building line to include entrances or other areas sensitive to movement. Outside the building, a single lift of select fill (6 to 8 inches) is recommended to minimize drying during construction.

Soil treatments presented in this section are referenced as an alternative to the use of a structurally suspended floor slab. The owner must fully understand that if the floor slab is placed on-grade, some movement and resultant cracking within the floor and interior wall partitions may occur. This upward slab movement and cracking is usually difficult and costly to repair, and may require continued maintenance expense.

These methods of treatment are presented as an option for the owner's consideration. The options may or may not be practical or economically feasible, depending on the expected performance of the proposed structure. The owner should be aware that this method will not prevent movement of soil-supported foundation elements, and can only reduce the magnitude of the movement. Placement of the floor slab-on-grade represents a compromise between construction cost and risk of floor distress.

A properly engineered and constructed vapor barrier should be provided beneath slabs-on-grade which will be carpeted or receive moisture sensitive coverings or adhesives.

5.3.1 *Mechanical Reworking of Near-Surface Clays with 2' Select Fill Cap*

In general, the procedure is performed as follows:

1. Remove all existing pavements, surface vegetation, trees and associated root mats, organic topsoil and any other deleterious material.
2. Excavate to a minimum of 11.5 feet below finished grade. Scarify the exposed clay subgrade at the base of the excavation to a depth of 8 inches, adjust the moisture, and compact at a minimum of 3 percentage points above optimum moisture to between 93% and 98% Standard Proctor density (ASTM D 698). Over-compaction should not be allowed.

3. Fill pad to 2 feet below final grade using site excavated clay soils. Compact in maximum 9 inch loose lifts at a minimum of 3 percentage points above optimum moisture to between 93% and 98% Standard Proctor density (ASTM D 698). Over-compaction should not be allowed.
4. Complete pad fill using a minimum of 2 feet of sandy clay/clayey sand non-expansive select fill with a Liquid Limit less than 35 percent and a Plasticity Index (PI) between 5 and 16. The select fill should be compacted in maximum 9 inch loose lifts at minus 2 percent to plus 3 percent of the soil's optimum moisture content at a minimum of 95% of Standard Proctor density (ASTM D698). The select fill should be placed within 48 hours of completing the installation of the moisture conditioned soils.

5.3.2 *Water Pressure Injection with 2' Select Fill Cap*

Pre-swelling benefits could be achieved by means of water pressure injection. In general, the injection procedure is performed as follows:

1. Remove surface vegetation and organic topsoil.
2. Excavate to a minimum of 2 feet below final pad grade.
3. Proofroll the exposed subgrade at the base of the excavation. Proofrolling can generally be accomplished using a heavy (25 ton or greater total weight) pneumatic tired roller making several passes over the area. Soft or compressible zones should be removed to a firm subgrade and replaced with compacted on-site soils. Compact the exposed subgrade to a minimum of 3 percentage points above optimum moisture to between 93 and 98 percent of Standard Proctor density (ASTM D 698). Over-compaction should not be allowed.
4. Water pressure inject the exposed soils to a depth of 10 feet using methods outlined in Appendix B.
5. Rework subgrade to a depth of 8 inches and compact at a minimum of 3 percentage points above optimum moisture to between 93 and 98 percent of Standard Proctor density (ASTM D 698). Over-compaction should not be allowed.
6. Complete pad fill using 2 feet of sandy clay/clayey sand select fill with a liquid limit less than 35, and a plasticity index between 5 and 16. Select fill should be compacted in maximum 9-inch loose lifts at minus 2 to plus 3 percentage points above the optimum moisture content at a minimum of 95 percent of Standard Proctor Density (ASTM D 698). The initial lift of select fill should be placed within 48 hours after satisfactory compaction of the last compacted lift of on-site fill soil. The moisture condition within the completed pad shall be maintained during construction.

Initial penetration with the injection rods may be difficult for soils in a hard consistency. It should be expected that multiple injection passes (at least 3 and possibly more) will be required to obtain the desired moisture levels. The time and cost associated with the anticipated multiple injections should be included in the project budget and schedule. For these reasons moisture conditioning, as described above may be more expeditious.

Care must be taken when injecting in the vicinity of the existing pavement. Water from the injection process could generate movement in the existing pavement. Injections should be maintained a minimum of 10 feet away from the existing pavement. This office should be contacted for additional recommendations if this results in any portion of the building pad not being injected.

5.3.3 General Considerations

Soil treatments presented in this section are referenced as an alternative to the use of a structurally suspended slab. The owner must fully understand that if the slab and flatwork is placed on-grade, some movement and resultant cracking within the flatwork may occur. This upward slab movement and cracking is usually difficult and costly to repair, and may require continued maintenance expense.

The options may or may not be practical or economically feasible, depending on the expected performance of the proposed structure. The owner should be aware that this method will not prevent movement of soil-supported elements, and can only reduce the magnitude of the movement.

A properly engineered and constructed vapor barrier should be provided beneath slabs-on-grade which will be carpeted or receive moisture sensitive coverings or adhesives.

6.0 EXPANSIVE SOIL CONSIDERATIONS

6.1 Site Drainage

An important feature of the project is to provide positive drainage away from the proposed buildings. If water is permitted to stand next to or below the structure, excessive soil movements (heave) can occur. This could result in differential floor slab or foundation movement.

A well-designed site drainage plan is of utmost importance and surface drainage should be provided during construction and maintained throughout the life of the structure. Consideration should be given to the design and location of gutter downspouts, planting areas, or other features which would produce moisture concentration adjacent to or beneath the structure or paving.

Consideration should be given to the use of self-contained, watertight planters. Joints next to the structure should be sealed with a flexible joint sealer to prevent infiltration of surface water. Proper maintenance should include periodic inspection for open joints and cracks and resealing as necessary.

Rainwater collected by the gutter system should be transported by pipe to a storm drain or to a paved area. If downspouts discharge next to the structure onto flatwork or paved areas, the area should be watertight in order to eliminate infiltration next to the buildings.

6.2 Additional Design Considerations

The following information has been assimilated after examination of numerous projects constructed in active soils throughout the area. It is presented here for your convenience. If these features are incorporated in the overall design of the project, the performance of the structures should be improved.

- Special consideration should be given to completion items outside the building areas, such as stairs, sidewalks, signs, etc. They should be adequately designed to sustain the potential vertical movements mentioned in the report.

- Roof drainage should be collected by a system of gutters and downspouts and transmitted away from the structures where the water can drain away without entering the building subgrade.

- Sidewalks should not be structurally connected to any buildings. They should be sloped away from the buildings so that water will drain away from the structures.

- The paving and the general ground surface should be sloped away from the buildings on all sides so that water will always drain away from the structures. Water should not be allowed to pond near the buildings after a slab has been placed.

- Every attempt should be made to limit the extreme wetting or drying of the subsurface soils since swelling and shrinkage will result. Standard construction practices of providing good surface water drainage should be used. A positive slope of the ground away from foundations should be provided to carry off the run-off water both during and after construction.

- Backfill for utility lines or along the perimeter beams should consist of on-site material so that they will be stable. If the backfill is too dense or too dry, swelling may form a mound along the ditch line. If the backfill is too loose or too wet, settlement may form a sink along the ditch line. Either case is undesirable since several inches of movement is possible and floor cracks are likely to result. The soils should be processed using the previously discussed compaction criteria.

7.0 SEISMIC CONSIDERATIONS

Based on the conditions encountered in the borings for the above referenced project the IBC-2006 site classification is TYPE D for seismic evaluation.

8.0 EARTHWORK

8.1 Site Preparation

The subgrade should be firm and able to support the construction equipment without displacement. Soft or yielding subgrade should be corrected and made stable before construction proceeds. The subgrade should be proof rolled to detect soft spots, which if exist, should be excavated to provide a firm and otherwise suitable subgrade. Proof rolling should be performed using a heavy pneumatic tired roller, loaded dump truck, or similar piece of equipment. The proof rolling operations should be observed by the project geotechnical engineer or his/her representative.

8.2 Placement and Compaction

Fill material should be placed in loose lifts not exceeding 8 inches in uncompacted thickness. The uncompacted lift thickness should be reduced to 4 inches for structure backfill zones requiring hand-operated power compactors or small self-propelled compactors. The fill material should be uniform with respect to material type and moisture content. Clods and chunks of material should be broken down and the fill material mixed by disking, blading, or plowing, as necessary, so that a material of uniform moisture and density is obtained for each lift. Water required for sprinkling to bring the fill material to the proper moisture content should be applied evenly through each layer.

The on-site soils are suitable for use in site grading. Imported fill material should be clean soil with a Liquid Limit less than 60 and no rock greater than 4 inches in maximum dimension. The fill materials should be free of vegetation and debris.

The fill material should be compacted to a density ranging from 95 to 100 percent of maximum dry density as determined by ASTM D 698, Standard Proctor. In conjunction with the compacting operation, the fill material should be brought to the proper moisture content. The moisture content for general earth fill should range from 2 percentage points below optimum to 5 percentage points above optimum (-2 to +5). These ranges of moisture contents are given as maximum recommended ranges. For some soils and under some conditions, the contractor may have to

maintain a more narrow range of moisture content (within the recommended range) in order to consistently achieve the recommended density.

Field density tests should be taken as each lift of fill material is placed. As a guide, one field density test per lift for each 5,000 square feet of compacted area is recommended. For small areas or critical areas the frequency of testing may need to be increased to one test per 2,500 square feet. A minimum of 2 tests per lift should be required. The earthwork operations should be observed and tested on a continuing basis by an experienced geotechnician working in conjunction with the project geotechnical engineer.

Each lift should be compacted, tested, and approved before another lift is added. The purpose of the field density tests is to provide some indication that uniform and adequate compaction is being obtained. The actual quality of the fill, as compacted, should be the responsibility of the contractor and satisfactory results from the tests should not be considered as a guarantee of the quality of the contractor's filling operations.

8.3 Trench Backfill

Trench backfill for pipelines or other utilities should be properly placed and compacted. Overly dense or dry backfill can swell and create a mound along the completed trench line. Loose or wet backfill can settle and form a depression along the completed trench line. Distress to overlying structures, pavements, etc. is likely if heaving or settlement occurs. On-site soil fill material is recommended for trench backfill. Care should be taken not to use free draining granular material, to prevent the backfilled trench from becoming a french drain and piping surface or subsurface water beneath structures, pipelines, or pavements. If a higher class bedding material is required for the pipelines, a lean concrete bedding will limit water intrusion into the trench and will not require compaction after placement. The soil backfill should be placed in approximately 4- to 6-inch loose lifts. The density and moisture content should be as recommended for fill in Section 8.2, Placement and Compaction, of this report. A minimum of one field density test should be taken per lift for each 150 linear feet of trench, with a minimum of 2 tests per lift.

8.4 Excavation/Fills

The side slopes of excavations through the overburden soils should be made in such a manner to provide for their stability during construction. Existing structures, pipelines or other facilities, which

are constructed prior to or during the currently proposed construction and which require excavation, should be protected from loss of end bearing or lateral support.

Temporary construction slopes and/or permanent embankment slopes should be protected from surface runoff water. Site grading should be designed to allow drainage at planned areas where erosion protection is provided, instead of allowing surface water to flow down unprotected slopes.

If fill is to be placed on existing slopes that are steeper than five horizontal to one vertical, then the fill materials should be benched into the existing slopes in such a manner as to provide a good contact between the two materials and allow relatively horizontal lift placement.

Permanent slopes at the site should be as flat as practical to reduce creep and occurrence of shallow slides. The following slope angles are recommended as maximums.

TABLE 8.4-1 Maximum Slope Angles	
Height (ft.)	**Horizontal to Vertical**
0 – 3	1:1
3 – 6	2:1
6 – 9	3:1
> 9	4:1

The above angles refer to the total height of a slope. Site improvement should be maintained away from the top of the slope to reduce the possibility of damage due to creep or shallow slides.

Trench safety recommendations are beyond the scope of this report. The contractor must comply with all applicable safety regulations concerning trench safety and excavations including, but not limited to, OSHA regulations.

8.5 Acceptance of Imported Fill

Any soil imported from off-site sources should be tested for compliance with the recommendations for the particular application and approved by the project geotechnical engineer prior to the materials being used. The owner should also require the contractor to obtain a written, notarized certification from the landowner of each proposed off-site soil borrow source stating that to the best of the landowner's knowledge and belief there has never been contamination of the borrow source

site with hazardous or toxic materials. The certification should be furnished to the owner prior to proceeding to furnish soils to the site. Soil materials derived from the excavation of underground petroleum storage tanks should not be used as fill on this project.

8.6 Soil Corrosion Potential

Specific testing for soil corrosion potential was not included in the scope of this study. However, based upon past experience on other projects in the vicinity, the soils at this site may be corrosive. Standard construction practices for protecting metal pipe and similar facilities in contact with these soils should be used.

8.7 Erosion and Sediment Control

All disturbed areas should be protected from erosion and sedimentation during construction, and all permanent slopes and other areas subject to erosion or sedimentation should be provided with permanent erosion and sediment control facilities. All applicable ordinances and codes regarding erosion and sediment control should be followed.

9.0 PAVEMENTS

9.1 Pavement Subgrade Preparation

The surface soils are anticipated to consist of highly active clays. These clays are subject to loss in support value with the moisture increases which occur beneath pavement sections. They react with hydrated lime, which serves to improve and maintain their support value. Treatment of these soils with hydrated lime will improve their subgrade characteristics to support area paving.

Lime treatment is recommended to support Portland cement concrete subject to heavy truck or bus traffic, although concrete paving subject to automobile and light truck traffic only generally will perform satisfactorily if placed on a prepared (untreated) subgrade.

Prior to lime stabilization or compaction, the subgrade should be proofrolled with heavy pneumatic equipment. Any soft or pumping areas should be undercut to a firm subgrade and properly backfilled as described in the Earthwork section. The subgrade, stabilized or unstabilized, should be scarified to a minimum depth of 6 inches and uniformly compacted to a minimum of 95 percent of ASTM D 698 near, -2 to +4 percent, the optimum moisture content determined by that test. It should then be

protected and maintained in a moist condition until the pavement is placed. The presence of rock fragments in the surficial soils can complicate mixing of the soil and lime.

We recommend a minimum of 8 percent hydrated lime be used to modify the clay subgrade soils. The amount of hydrated lime required to stabilize the subgrade should be on the order of 32 pounds per square yard for a 6-inch depth. The hydrated lime should be thoroughly mixed and blended with the upper 6 inches of the clay subgrade (TxDOT Item 260). The hydrated lime should meet the requirements of Item 264 (Type A) in the Texas Department of Transportation (TxDOT) Standard Specifications for Construction of Highways, Streets and Bridges, 1993 Edition. Lime treatment should extend beyond exposed pavement edges to reduce the effects of shrinkage and associated loss of subgrade support.

We recommend that subgrade stabilization extend to at least one foot beyond pavement edges to aid in reducing pavement movements and cracking along the curb line due to seasonal moisture variations after construction. Each construction area should be shaped to allow drainage of surface water during earthwork operations, and surface water should be pumped immediately from each construction area after each rain and a firm subgrade condition maintained. Water should not be allowed to pond in order to prevent percolation and subgrade softening, and lime should be added to the subgrade after removal of all surface vegetation and debris. Sand should be specifically prohibited beneath pavement areas, since these more porous soils can allow water inflow, resulting in heave and strength loss of subgrade soils (lime stabilized soil will be allowed for fine grading). After fine grading each area in preparation for paving, the subgrade surface should be lightly moistened, as needed, and recompacted to obtain a tight non-yielding subgrade.

Surface drainage is critical to the performance of this pavement. Water should be allowed to exit the pavement surface quickly. This can be accomplished by maintaining at least 1 percent slope of the finished grades and discharging the water into drainage structures. All pavement construction should be performed in accordance with the following procedures:

9.2 Pavement Sections

The project will include the construction of parking lots and/or drives. At the time of this investigation, site paving plans or vehicle traffic studies were not available. Therefore, several rigid and flexible pavement sections for parking lots and/or drives are presented for a 20-year design life

based on our experience with similar facilities for Light Duty Parking Areas, Medium Duty Parking Areas, and Medium to Heavy Duty Drives. In general, these areas are defined as follows:

Light-Duty Parking Areas are those lots and drives subjected almost exclusively to passenger cars, with an occasional bus or light- to medium-duty trucks (2 to 3 per week)

Medium-Duty Parking Areas are those lots subjected to a variety of light-duty vehicles to medium-duty vehicles (such as buses) and an occasional heavy-duty vehicle (1 to 2 per week).

Medium to Heavy-Duty Drives are those drives subjected to a variety of light to heavy-duty vehicles. These pavements include areas significant bus traffic or trash vehicles.

We recommend that rigid pavements be utilized at this project whenever possible, since they tend to provide better long-term performance when subjected to significant slow moving and turning traffic.

If asphaltic concrete pavement is used, we recommend a full depth asphaltic concrete section having a minimum total thickness of 5 inches for light-duty parking areas, 6 inches for medium-duty parking areas, and 8 inches for medium- to heavy-duty drives. A minimum surface course thickness of 2 inches is recommended for asphaltic concrete pavements. If Portland cement concrete pavement is used, a minimum thickness of 5 inches of concrete is recommended for light-duty parking areas, 6 inches for medium-duty parking areas, and 7 inches for medium- to heavy-duty areas.

A California Bearing Ratio or other strength tests were not performed because they were not within the scope of our services on this project. A subgrade modulus of 100 psi was considered appropriate for the near-surface soils. If heavier vehicles are planned, the above cross sections can be confirmed by performing strength tests on the subgrade materials once the traffic characteristics are established. Periodic maintenance of pavement structures normally improves the durability of the overall pavement and enhances its expected life.

The above sections should be considered minimum pavement thicknesses and higher traffic volumes and heavy trucks may require thicker pavement sections. Additional recommendations can be provided after traffic volumes and loads are known. Periodic maintenance should be anticipated for minimum pavement thickness. This maintenance should consist of sealing cracks and timely repair of isolated distressed areas.

9.3 Pavement Material Requirements

Reinforced Portland Cement Concrete: Reinforced Portland cement concrete pavement should consist of Portland cement concrete having a 28-day compressive strength of at least 3,500 psi. The mix should be designed in accordance with the ACI Code 318 using 3 to 6 percent air entrainment. The pavement should be adequately reinforced with temperature steel and all construction joints or expansion/contraction joints should be provided with load transfer dowels. The spacing of the joints will depend primarily on the type of steel used in the pavement. We recommend using No. 3 steel rebar spaced at 18 inches on center in both the longitudinal and transverse direction. Control joints formed by sawing are recommended every 12 to 15 feet in both the longitudinal and transverse direction. The cutting of the joints should be performed as soon as the concrete has "set-up" enough to allow for sawing operations.

Hot Mix Asphaltic Concrete Surface Course: Item 340, Type D, Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2004 Edition.

Hot Mix Asphaltic Concrete Base Course: Item 340, Type A or B, Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2004 Edition.

9.4 General Pavement Considerations

The design of the pavement drainage and grading should consider the potential for differential ground movement due to future soil swelling of up to 5.5 inches. In order to minimize rainwater infiltration through the pavement surface, and thereby minimizing future upward movement of the pavement slabs, all cracks and joints in the pavement should be sealed on a routine basis after construction.

10.0 CONSTRUCTION OBSERVATIONS

In any geotechnical investigation, the design recommendations are based on a limited amount of information about the subsurface conditions. In the analysis, the geotechnical engineer must assume the subsurface conditions are similar to the conditions encountered in the borings. However, quite often during construction anomalies in the subsurface conditions are revealed.

Therefore, it is recommended that CMJ Engineering, Inc. be retained to observe earthwork and foundation installation and perform materials evaluation during the construction phase of the project. This enables the geotechnical engineer to stay abreast of the project and to be readily available to evaluate unanticipated conditions, to conduct additional tests if required and, when necessary, to recommend alternative solutions to unanticipated conditions. Until these construction phase services are performed by the project geotechnical engineer, the recommendations contained in this report on such items as final foundation bearing elevations, proper soil moisture condition, and other such subsurface related recommendations should be considered as preliminary.

It is proposed that construction phase observation and materials testing commence by the project geotechnical engineer at the outset of the project. Experience has shown that the most suitable method for procuring these services is for the owner or the owner's design engineers to contract directly with the project geotechnical engineer. This results in a clear, direct line of communication between the owner and the owner's design engineers and the geotechnical engineer.

11.0 REPORT CLOSURE

The boring logs shown in this report contain information related to the types of soil encountered at specific locations and times and show lines delineating the interface between these materials. The logs also contain our field representative's interpretation of conditions that are believed to exist in those depth intervals between the actual samples taken. Therefore, these boring logs contain both factual and interpretive information. Laboratory soil classification tests were also performed on samples from selected depths in the borings. The results of these tests, along with visual-manual procedures were used to generally classify each stratum. Therefore, it should be understood that the classification data on the logs of borings represent visual estimates of classifications for those portions of each stratum on which the full range of laboratory soil classification tests were not performed. It is not implied that these logs are representative of subsurface conditions at other locations and times.

With regard to ground-water conditions, this report presents data on ground-water levels as they were observed during the course of the field work. In particular, water level readings have been made in the borings at the times and under conditions stated in the text of the report and on the boring logs. It should be noted that fluctuations in the level of the ground-water table can occur

with passage of time due to variations in rainfall, temperature and other factors. Also, this report does not include quantitative information on rates of flow of ground water into excavations, on pumping capacities necessary to dewater the excavations, or on methods of dewatering excavations. Unanticipated soil conditions at a construction site are commonly encountered and cannot be fully predicted by mere soil samples, test borings or test pits. Such unexpected conditions frequently require that additional expenditures be made by the owner to attain a properly designed and constructed project. Therefore, provision for some contingency fund is recommended to accommodate such potential extra cost.

The analyses, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our field investigation and further on the assumption that the exploratory borings are representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the borings at the time they were completed. If, during construction, different subsurface conditions from those encountered in our borings are observed, or appear to be present in excavations, we must be advised promptly so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between submission of this report and the start of the work at the site, if conditions have changed due either to natural causes or to construction operations at or adjacent to the site, or if structure locations, structural loads or finish grades are changed, we urge that we be promptly informed and retained to review our report to determine the applicability of the conclusions and recommendations, considering the changed conditions and/or time lapse.

Further, it is urged that CMJ Engineering, Inc. be retained to review those portions of the plans and specifications for this particular project that pertain to earthwork and foundations as a means to determine whether the plans and specifications are consistent with the recommendations contained in this report. In addition, we are available to observe construction, particularly the compaction of structural fill, or backfill and the construction of foundations as recommended in the report, and such other field observations as might be necessary.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, ground water or air, on or below or around the site.

This report has been prepared for use in developing an overall design concept. Paragraphs, statements, test results, boring logs, diagrams, etc. should not be taken out of context, nor utilized without a knowledge and awareness of their intent within the overall concept of this report. The reproduction of this report, or any part thereof, supplied to persons other than the owner, should indicate that this study was made for design purposes only and that verification of the subsurface conditions for purposes of determining difficulty of excavation, trafficability, etc. are responsibilities of the contractor.

This report has been prepared for the exclusive use of Catholic Diocese of Fort Worth and their consultants for specific application to design of this project. The only warranty made by us in connection with the services provided is that we have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No other warranty, expressed or implied, is made or intended. These recommendations should be reviewed once a grading plan is finalized.

* * * *

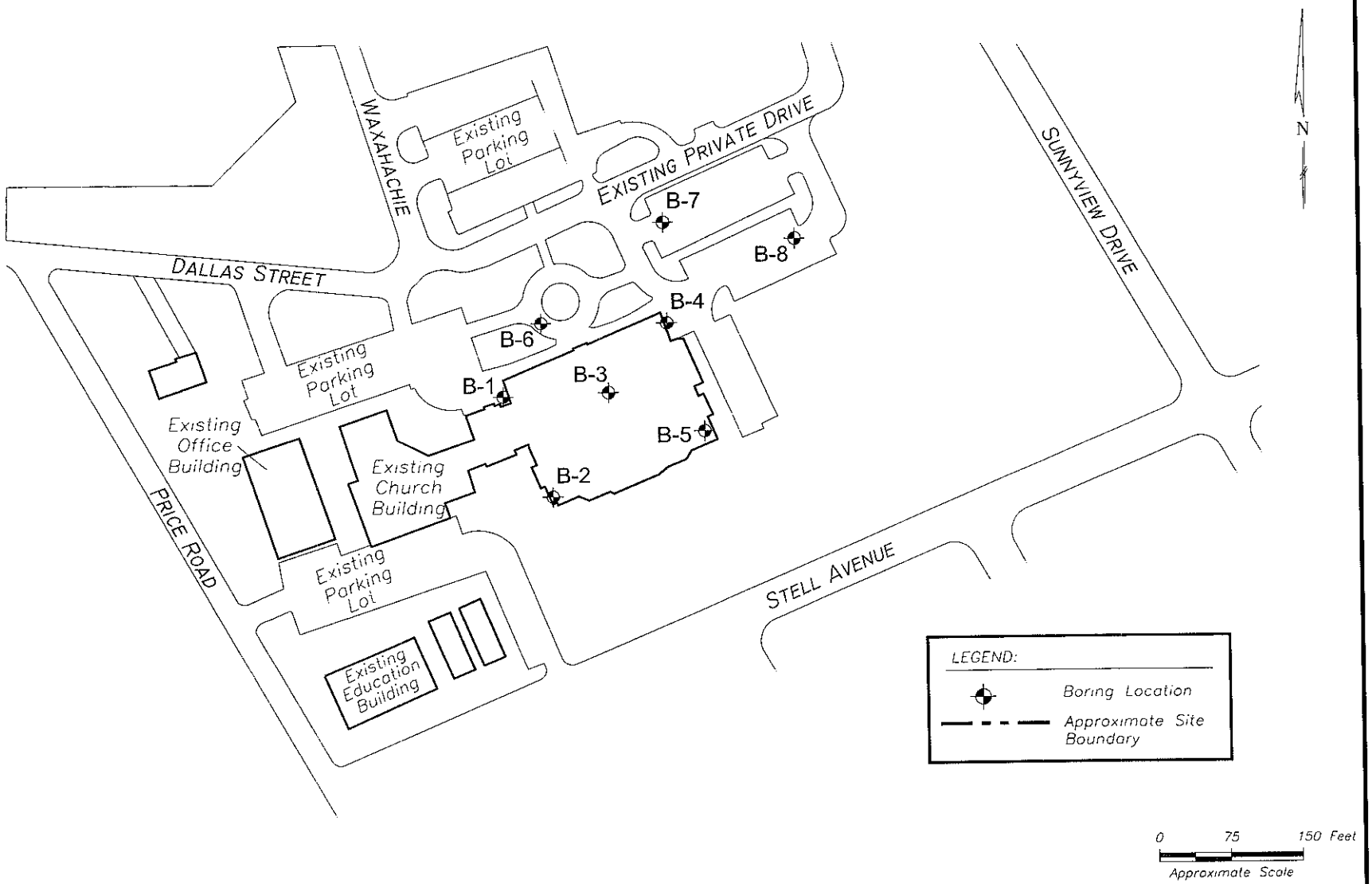


PLATE A1

PLAN OF BORINGS

ADDITION TO ST. JUDE CATHOLIC CHURCH
MANSFIELD, TEXAS

CMJ ENGINEERING, INC.

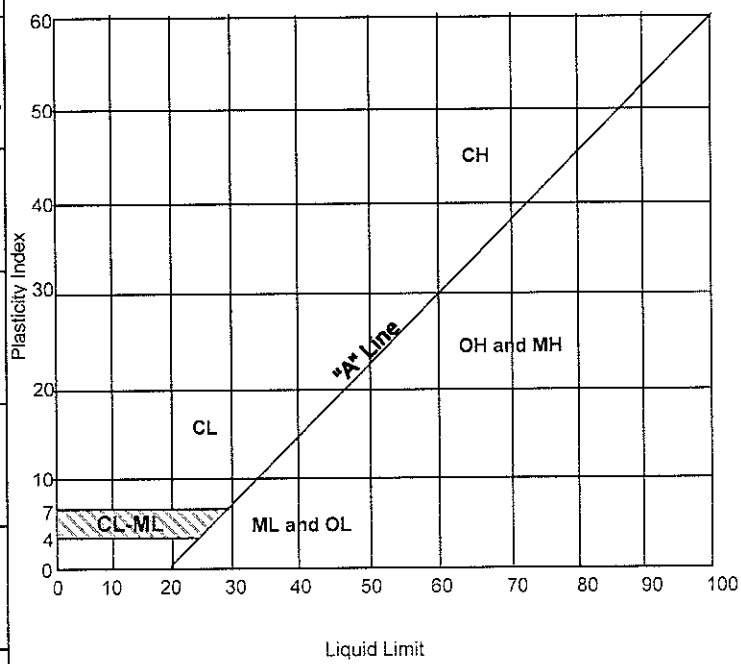
CMJ PROJECT NO. 398-11-33

Major Divisions			Grp Sym.	Typical Names	Laboratory Classification Criteria
Coarse-grained soils (more than half of the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Liquid and Plastic limits below "A" line or P.I. greater than 4
			GC	Clayey gravels, gravel-sand-clay mixtures	Liquid and Plastic limits above "A" line with P.I. greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly graded sands; gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Liquid and Plastic limits below "A" line or P.I. less than 4
			SC	Clayey sands, sand-clay mixtures	Liquid and Plastic limits above "A" line with P.I. greater than 7
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, and lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic soils		Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain size curve.
Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 percent.....GW, GP, SW, SP
More than 12 percent.....GM, GC, SM, SC
5 to 12 percent.....*Borderline* cases requiring dual symbols

Liquid and plastic limits plotting in hatched zone between 4 and 7 are borderline cases requiring use of dual symbols

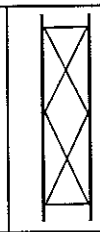
Liquid and plastic limits plotting between 4 and 7 are borderline cases requiring use of dual symbols



Plasticity Chart

UNIFIED SOIL CLASSIFICATION SYSTEM **PLATE A.2**

SOIL OR ROCK TYPES

GRAVEL	LEAN CLAY	LIMESTONE							
SAND	SANDY	SHALE									
SILT	SILTY	SANDSTONE									
HIGHLY PLASTIC CLAY	CLAYEY	CONGLOMERATE	Shelby Tube	Auger	Split Spoon	Rock Core	Cone Pen	No Recovery			

TERMS DESCRIBING CONSISTENCY, CONDITION, AND STRUCTURE OF SOIL

Fine Grained Soils (More than 50% Passing No 200 Sieve)

Descriptive Item	Penetrometer Reading, (tsf)
Soft	0.0 to 1.0
Firm	1.0 to 1.5
Stiff	1.5 to 3.0
Very Stiff	3.0 to 4.5
Hard	4.5+

Coarse Grained Soils (More than 50% Retained on No 200 Sieve)

Penetration Resistance (blows/foot)	Descriptive Item	Relative Density
0 to 4	Very Loose	0 to 20%
4 to 10	Loose	20 to 40%
10 to 30	Medium Dense	40 to 70%
30 to 50	Dense	70 to 90%
Over 50	Very Dense	90 to 100%

Soil Structure

Calcareous	Contains appreciable deposits of calcium carbonate; generally nodular
Slickensided	Having inclined planes of weakness that are slick and glossy in appearance
Laminated	Composed of thin layers of varying color or texture
Fissured	Containing cracks, sometimes filled with fine sand or silt
Interbedded	Composed of alternate layers of different soil types, usually in approximately equal proportions

TERMS DESCRIBING PHYSICAL PROPERTIES OF ROCK

Hardness and Degree of Cementation

Very Soft or Plastic	Can be remolded in hand; corresponds in consistency up to very stiff in soils
Soft	Can be scratched with fingernail
Moderately Hard	Can be scratched easily with knife; cannot be scratched with fingernail
Hard	Difficult to scratch with knife
Very Hard	Cannot be scratched with knife
Poorly Cemented or Friable	Easily crumbled
Cemented	Bound together by chemically precipitated material; Quartz, calcite, dolomite, siderite, and iron oxide are common cementing materials.

Degree of Weathering

Unweathered	Rock in its natural state before being exposed to atmospheric agents
Slightly Weathered	Noted predominantly by color change with no disintegrated zones
Weathered	Complete color change with zones of slightly decomposed rock
Extremely Weathered	Complete color change with consistency, texture, and general appearance approaching soil

CMJ ENGINEERING INC

Project No	Boring No	Project
398-11-33	B-1	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Seepage at 26' during drilling, water at 27' at completion

Completion Depth	Completion Date
50.0'	3-11-11

Surface Elevation

Type: Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			ASPHALT, 5" thick			2.5							
			CLAY, dark brown, w/ calcareous nodules, stiff			2.5		68	24	44	31		
						1.5							
						2.5							
			SHALY CLAY tan, reddish-tan and grayish-brown, w/ iron oxide stains, stiff to hard			2.0					50		
5													
						3.5							
						4.5+					21		
10													
						4.5+					19		
15			- w/ tan silt seams above 17										
			- w/ tan sand seams below 17'			4.5+					25		
20													
						4.5+							
25			**SAND**, tan and reddish-tan, lightly cemented, w/ sandstone seams, very dense										
						50/4.5"							
30													
						50/4.75"							
35													
						50/0.5"							
40			**SANDY SHALE** gray w/ gray sandstone seams, moderately hard										
						100/0.75"							
45													
						100/0.75"							
50													

LOG OF BORING 398-11-33.GPJ CMJ.GDT 4/7/11

LOG OF BORING NO. B-1

PLATE A.4

CMJ ENGINEERING INC

Project No	Boring No.	Project
398-11-33	B-2	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Seepage at 31' during drilling, water at 26' at completion

Completion Depth	Completion Date	Surface Elevation	Type
52.0'	3-11-11		Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			ASHPALT, 3" thick over 3" base			4.5+					21		
			CLAY, grayish-brown and brown, stiff			1.5							
			- lime modified above 1', hard			1.5					31		
			SHALY CLAY tan, reddish-tan and grayish-brown, w/ iron oxide stains			2.5							
						3.5					32		
5													
						3.5		81	27	54	32	89	
			- w/ sandstone seams below 7'			4.5+							
10													
			- w/ sand below 12'			3.75					30	115	7300
15													
						4.5+							
20													
			SAND, tan and reddish-tan, lightly cemented, very dense			50/5"							
25													
						50/4.75"							
30													
						50/3.5"							
35													
			SANDY SHALE gray w/ gray sandstone seams, moderately hard			100/0.5"							
40													
						100/0.5"							
45													
50													

LOG OF BORING 398-11-33.GPJ CMJ.GDT 4/7/11

LOG OF BORING NO. B-2

PLATE A.5

CMJ ENGINEERING INC

Project No	Boring No.	Project
398-11-33	B-3	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Seepage at 26' during drilling, water at 22' at completion, water at 21' several hours after completion; caved to 40'

Completion Depth	Completion Date
50.0'	3-11-11

Surface Elevation

Type: Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			CLAY grayish-brown and brown, firm to stiff			2.75					24		
						1.0							
						1.0		79	25	54	28		
						1.5							
						3.0							
5			**SHALY CLAY** tan, reddish-tan and grayish brown w/ iron oxide stains and silt seams very stiff										
						3.0					29		
			- w/ sandstone seam at 8'										
						4.0							
10													
						4.0					26		
15													
						4.0					16		
20													
			SAND, tan and reddish-tan, lightly cemented w/ occasional clay seams very dense										
						50/2"							
25													
						50/1.5"							
30													
						50/3"							
35													
			SANDY SHALE gray, w/ cemented sand and lignite seams and layers, moderately hard										
						100/0.625"							
40													
						100/1"							
45													
						100/0.75"							
50													

LOG OF BORING 398-11-33.GPJ CMJ.GDT 4/7/11

LOG OF BORING NO. B-3

PLATE A.6

CMJ ENGINEERING INC

Project No.	Boring No	Project
398-11-33	B-4	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Seepage at 30' during drilling, water at 27' at completion

Completion Depth	Completion Date	Surface Elevation	Type
51.0'	3-11-11		Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			CLAY, dark brown, w/ calcareous nodules stiff to hard			4.5+					25		
						2.0							
						2.5					26		
						4.0		79	26	53	26	96	
						3.5							
5			**SHALY CLAY**, tan, reddish-tan and grayish-brown w/ iron oxide stains, very stiff to hard										
						4.5+					23		
			- w/ rock fragments above 9'										
						3.5							
10													
						3.5					35	106	4600
15													
			- firm below 19'			1.0							
20			**SAND**, tan and reddish-tan, lightly cemented, w/ occasional clayey sand seams dense to very dense										
						37							
25													
						50/5"							
30													
						50/5"							
35													
			SANDY SHALE gray, w/ cemented sand seams moderately hard										
						100/1"							
40													
						100/0.75"							
45													
50						100/0.75"							

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LOG OF BORING NO. B-4

PLATE A.7

CMJ ENGINEERING INC

Project No	Boring No	Project
398-11-33	B-5	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Seepage at 23' during drilling, water at 22' at completion, water at 21' several hours after completion; caved to 40'

Completion Depth	Completion Date	Surface Elevation	Type
50.0'	3-11-11		Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
0			**CLAY**, dark brown, w/ calcareous nodules firm to stiff			1.5					28		
						1.0							
						1.25					31		
						1.0							
5						2.0					28		
						3.0							
			SHALY CLAY, tan, reddish-tan and grayish-brown, w/ iron oxide stains, very stiff			3.0		66	26	40	30		
10													
						3.0							
15													
			SAND, tan and reddish-tan, lightly cemented, w/ occasional clayey sand seams very dense			2.5					16	99	880
20													
						50/3"							
25													
						50/1.75"							
30													
						50/3"							
35													
			SANDY SHALE gray, w/ cemented sand and lignite seams moderately hard			100/1"							
40													
						100/0.625"							
45													
						100/0.75"							
50													

LOG OF BORING 398-11-33.GPJ CMJ.GDT 4/7/11

LOG OF BORING NO. B-5

PLATE A.8

CMJ ENGINEERING INC

Project No.	Boring No.	Project
398-11-33	B-6	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Dry during drilling, dry at completion

Completion Depth	Completion Date
5.0'	3-11-11

Surface Elevation

Type: Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			ASPHALT, 5" thick			3.0		72	25	47	28	90	
			CLAY, dark brown to brown, w/ calcareous nodules very stiff			3.5							
			- fill above 1 5'			3.0					26		
						3.5							
5			**SHALY CLAY** tan and reddish-tan, very stiff			4.5					26		

LOG OF BORING 398-11-33.GPJ CMJ.GDT 4/7/11

LOG OF BORING NO. B-6

PLATE A.9

CMJ ENGINEERING INC

Project No.	Boring No.	Project
398-11-33	B-7	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Dry during drilling, dry at completion

Completion Depth	Completion Date
5.0'	3-11-11

Surface Elevation

Type: Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			CLAY, dark brown, w/ calcareous nodules, firm to very stiff			4.25		74	25	49	26	93	
			- fill above 1'			2.25					30		
						3.0					29		
						3.0							
5						3.0							

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LOG OF BORING NO. B-7

PLATE A.10

CMJ ENGINEERING INC

Project No.	Boring No.	Project
398-11-33	B-8	Addition to St. Jude Catholic Church Mansfield, Texas

Location	Water Observations
See Plate A.1	Dry during drilling, dry at completion

Completion Depth	Completion Date
5.0'	3-11-11

Surface Elevation

Type: Auger

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	RQD %	Blows/Ft. or Pen Reading, T.S.F.	Passing No 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Unit Dry Wt. Lbs./Cu. Ft.	Unconfined Compression Pounds/Sq. Ft.
			CLAY, dark brown, w/ calcareous nodules, stiff to hard			2.0					28	91	
			- fill above 1'			2.5					28		
						2.0							
						4.5+							
5						4.5+							

LOG OF BORING 398-11-33.GPJ CMJ.GDT 4/7/11

LOG OF BORING NO. B-8

PLATE A.11

FREE SWELL TEST RESULTS

PROJECT: ADDITION TO ST. JUDE CATHOLIC CHURCH
MANSFIELD, TEXAS

PROJECT NO.: 398-11-33

Boring No.	Depth Interval (ft.)	Sample Description	Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Moisture Content %		Percent Swell (%)
						Initial	Final	
B – 2	7 - 8	Shaly Clay	81	27	54	31 8	35 1	2 0
B – 4	3 - 4	Clay	79	26	53	25.7	27 4	0 9

Free swell tests performed at approximate overburden pressure

APPENDIX B

SOIL MODIFICATION
WATER PRESSURE INJECTION
Guidelines

GEOTECHNICAL INVESTIGATION
ADDITION TO ST. JUDE CATHOLIC CHURCH
MANSFIELD, TEXAS

CMJ REPORT NO. 398-11-33

Purpose

The purpose of these recommendations is to obtain a relatively uniform, moist, stable zone of soil beneath the proposed structure. Due to the wide variation in quality of injection subcontractors, water pressure injection is not recommended as a soil moistening technique unless a full-time laboratory inspector of CMJ Engineering, Inc. is retained.

Material

1. The slurry is to consist of clean fresh water and surfactant and shall be continuously agitated to ensure uniformity of mixture.

2. A nonionic surfactant (wetting agent) should be used according to manufacturer's recommendations, but in no case should proportions be less than one part (undiluted) per 3,500 gallons water.

Application

1. Provide injection work after the subgrade has been under cut to the desired depths and prior to fill placement, installation of underground utilities and pavement.

2. Injection vehicle should have injection pipes spaced on 5-foot center, and each injection pipe should be capable of exerting a minimum penetration force of 10,000 psi. Force injection pipe into the soil; do not wash down by scouring action of fluid. Furnish track-mounted injection vehicle in order to traverse the ground under its own power, or if rubber tire-mounted vehicle is used, provide a track-mounted machine where necessary to pull injection vehicle through mud.

3. Continue injection of fluid until refusal at all probes (i.e., until soil will not take any more and fluid is running freely on the surface, either out of previous injection holes or has fractured the ground in several places around refusal). If this occurs around any probe, cut this probe off so that water can be properly injected through the remaining probes until refusal occurs for all probes.

4. Injection pipes should penetrate the soil in approximately 12-inch intervals, injecting to refusal at each interval to a total depth of 10 feet.

5. Lower portion of injection pipe should consist of a hole pattern that will uniformly disperse fluid throughout the entire depth. Injection vehicle should be fitted with individual cutoff valves for each probe. At each 12-inch interval, each valve should be cut off and on to assure that each probe is not blocked and that injection fluid is flowing. If one of two probes are blocked, cut the others off so that the added pressure will clear out the blockage.

6. Do not exceed five feet on center each way for injection spacing. Each consecutive injection should be five feet in center and spaced 2-1/2 feet offset in two orthogonal directions from the previous injection.

7. Adjust injection pressures to inject the greatest quantity of fluid possible within a pressure range of 50 - 100 psi. In order to assure that pressure is within this specified range, equip each injection vehicle with an accurate pressure gauge attached to the manifold (the pipe fitting on which the probe valves are attached).

8. Extend injection five feet outside the perimeter of the structure.

9. At a minimum, three water injections should be performed prior to testing.

10. The swell potential, moisture content, and other soil properties will be evaluated to determine acceptance of injected areas. The test results should be used to determine if additional water injections are required.

12. Repeat injections with water and surfactant five feet on center. Each consecutive water and surfactant injection should extend to a depth of 10 feet, injected as described above.

13. A minimum of 24 hours should elapse between each injection application in any one area to allow for moisture absorption.

14. Upon completion of the final pressure injection, compact the exposed surface to between 93% and 98% percent of the maximum dry density at a minimum of three percentage points above the optimum value.

Observation and Testing

1. A full-time laboratory technician should be present throughout the injection operations. Undisturbed samples should be taken at one-foot intervals to the total depth injected from one test hole per 5,000 square feet of injected area (minimum of two test borings per building). Adjustments in the testing program should be at the discretion of the testing engineer.

2. The moisture content of the soils shall be evaluated by the owner's designated geotechnical engineer on the basis of laboratory tests on tube samples (not cuttings) obtained from the borings. A minimum of two free swell tests should be performed per test hole. Samples will be tested at the approximate overburden pressure of the sample depth. The water pressure injections could be terminated when the results of the free swell tests extrapolated over a depth of 10 feet indicate that post-construction movement will be limited to one inch or less.

CMJ ENGINEERING, INC.

7636 Pebble Drive
Fort Worth, Texas 76118
www.cmjengr.com

October 5, 2011

Catholic Diocese of Fort Worth
800 West Loop 820 South
Fort Worth, Texas 76108

Attn: Mr. Gary Fragosso:

RE: ADDENDUM 1
ADDITION TO ST. JUDE CATHOLIC CHURCH
MANSFIELD, TEXAS
CMJ PROJECT NO. 398-11-33

Dear Mr. Fragosso:

CMJ previously issued CMJ Report No. 398-11-33 dated April 8, 2011 for the above referenced project. Recommendations for a deep foundation system consisting of straight drilled reinforced concrete shafts penetrating the gray sandy shale were presented in Section 4.0 of the referenced report. Supplemental recommendations have been requested for a drilled and underreamed reinforced concrete shaft foundation system. The following supplemental recommendations are provided below:

Drilled and Underreamed Shaft Design Parameters

Recommendations and parameters for design of the piers are outlined below, while specific recommendations for the construction and installation of the piers are included in the following section.

Bearing Stratum	SHALY CLAYS, tan, reddish tan & grayish brown
Required Depth:	17 feet below finished grade, or on the surface of sand if encountered above 17 feet
Allowable End Bearing Capacity:	6,000 psf
Allowable Bell/Diameter Ratio:	Minimum base to shaft diameter ratio of 2 to 1 to resist uplifts loads described below. In addition, the bell diameter should be a minimum of 30 inches larger than the shaft.

A maximum bell shaft diameter of 72 inches is recommended.

Adjustments of the shaft depths may become necessary to maintain the bottom of the shafts above sand which could cave during shaft excavation. Shafts must not be extended into sand.

The above values contain a safety factor of three (3). All piers should be spaced a minimum of 2 shaft diameters apart, edge-to-edge. Piers founded as close as 1 shaft diameter, edge-to-edge, should be designed for 75 percent of the total anticipated load capacity due to overlapping stress effects. The weight of the piers below the final ground surface may be neglected in determining the design loads

During construction one of the more important responsibilities of the pier excavation contractor and the construction materials inspection laboratory will be to verify the presence of the bearing materials encountered during construction, and that the pier excavation has not caved prior to concrete placement.

Settlement of properly constructed shafts should be primarily elastic and are estimated to be less than 1.0 inch.

Soil Induced Uplift Loads

The drilled shafts could experience tensile loads as a result of post construction heave in the site soils. The magnitude of these loads varies with the shaft diameter, soil parameters, and particularly the in-situ moisture levels at the time of construction. In order to aid in the structural design of the reinforcement, the reinforcement quantity should be adequate to resist tensile forces based on soil adhesion equal to 1,800 psf acting over the upper 10 feet of the pier shaft. This load must be resisted by the dead load on the shaft, continuous vertical reinforcing steel in the shaft, and a shaft adhesion developed within the bearing strata as previously discussed.

Drilled Shaft Construction Considerations

Drilled pier construction should be monitored by a representative of the geotechnical engineer to observe, among other things, the following items:

- Identification of bearing material
- Adequate penetration of the shaft excavation into the bearing layer
- The base and sides of the shaft excavation are clean of loose cuttings
- If seepage is encountered, whether it is of sufficient amount to require the use of temporary steel casing. If casing is needed it is important that the field representative observe that a high head of plastic concrete is maintained within the casing at all times during their extraction to prevent the inflow of water

Precautions should be taken during the placement of reinforcing steel and concrete to prevent loose, excavated soil from falling into the excavation. Concrete should be placed as soon as practical after completion of the drilling, cleaning, and observation. Excavation for a drilled pier should be filled with concrete before the end of the workday, or sooner if required to prevent deterioration of the bearing material. Prolonged exposure or inundation of the bearing surface with water will result in changes in strength and compressibility characteristics. If delays occur,

the drilled pier excavation should be deepened as necessary and cleaned, in order to provide a fresh bearing surface.

The concrete should have a slump of 6 inches plus or minus 1 inch. The concrete should be placed in a manner to prevent the concrete from striking the reinforcing cage or the sides of the excavation. Concrete should be tremied to the bottom of the excavation to control the maximum free fall of the plastic concrete to less than 10 feet, or funneled between reinforcing steel to prevent concrete segregation.

In addition to the above guidelines, the specifications from the Association of Drilled Shaft Contractors Inc. "Standards and Specifications for the Foundation Drilling Industry" as Revised 1999 or other recognized specifications for proper installation of drilled shaft foundation systems should be followed.

We appreciate the opportunity to provide this information. Please contact us should questions arise on information contained herein.

Respectfully,
CMJ ENGINEERING, INC.
Texas Firm Registration No. F-9177

STATE OF TEXAS
GARRETT E. WILLIAMS
52525
REGISTERED
PROFESSIONAL ENGINEER

Garrett E. Williams, P.E.
President

10.05.11

copies submitted:
(1) Mr. Gary Fragosso, Catholic Diocese of Fort Worth (mail & email)
(1) Mr. Raymond O'Connor, AIA; OA&ID (mail & email)
(1) Mr. Igor Teplitskiy, P.E.; Charles Gojer & Associates, Inc. (email)

DRAFT

AIA® Document A101™ – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the «Nineteenth » day of «February » in the year «Two Thousand Nineteen »
(In words, indicate day, month and year.)

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

«St. Stephen Catholic Church
1802 Bethel Road
Weatherford, Texas 76086

THE OWNER:
(Name, legal status and address)

« Michael F. Olson, S.T.D., Bishop of the Catholic Diocese of Fort Worth »« »
« 800 West Loop 820 South
Fort Worth, TX 76108 »

THE CONTRACTOR:
(Name, legal status and address)

«TBD

TABLE OF ARTICLES

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

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.

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

This document is intended to be used in conjunction with AIA Document A201™–2017, General Conditions of the Contract for Construction. Article 11 of A201™–2017 contains additional insurance provisions.

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§ A.2.2 Liability Insurance
The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance
§ A.2.3.1 ~~Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, t~~The ~~Owner~~Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "special causes of risk"~~"all-risks" completed value~~ or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The ~~Owner's~~ property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures
If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure

against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.
The Owner shall purchase and maintain the insurance selected and described below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[« »] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

« »

[« »] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

« »

[« »] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

« »

[« »] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

« »

[« »] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

« »

[« »] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

« »

[« »] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

« »

§ A.2.5 Other Optional Insurance.
The Owner shall purchase and maintain the insurance selected below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[« »] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

« »

[« »] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS
§ A.3.1 General
§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage 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 for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage
§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.2.2 Commercial General Liability
§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than « two million and no/100 dollars » ($ « 2,000,000.00 ») each occurrence, « two~~four~~ million and no/100 dollars » ($ « 24,000,000.00 ») general aggregate, and « two~~four~~ million and no/100 dollars » ($ « 42,000,000.00 ») aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
.2 personal injury and advertising injury;
.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
.4 bodily injury or property damage arising out of completed operations; and
.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
.3 Claims for bodily injury other than to employees of the insured.
.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
.8 Claims related to roofing, if the Work involves roofing.
.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
.10 Claims related to earth subsidence or movement, where the Work involves such hazards.
.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Comprehensive ~~A~~automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than « one million and no/100 dollars » ($ « 1,000,000.00 ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 ~~Workers' Compensation at statutory limits.~~Workers' compensation insurance shall be provided covering all employees of Contractor directly or indirectly engaged in any on-site and off-site activities in connection with the Contract in accordance with all statutory requirements (whether now existing or hereafter imposed) of all states with jurisdiction over such employee-employer relationship. Such insurance shall be written for the required statutory amounts and be endorsed to include voluntary compensation and all states coverage.

§ A.3.2.6 Employers' Liability with policy limits not less than « one million and no/100 dollars » ($ « 1,000,000.00 ») each accident, « one million and no/100 dollars » ($ « 1,000,000.00 ») each employee, and « two~~one~~ million and no/100 dollars » ($ « ~~1~~2,000,000.00 ») policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than «One Million » ($ «1,000,000.00 ») per claim and «Two Million » ($ «2,000,000.00 ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[« X »] **§ A.3.3.2.1** Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

« »

[«N/A »] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

[«N/A »] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than « » ($ « »)

per claim and « » ($ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[«X »] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[«N/A »] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[«N/A »] **§ A.3.3.2.6 Other Insurance**

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	$2,537,700.00
Performance Bond	$2,537,700.00

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

« »

DRAFT

AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

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

«»
«»

THE OWNER:
(Name, legal status and address)

« Michael F. Olson, S.T.D., Bishop of the Catholic Diocese of Fort Worth »« »
« 800 West Loop 820 South
Fort Worth, TX 76108 »

THE ARCHITECT:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

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.

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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INDEX
(Topics and numbers in bold are Section headings.)

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 or proposal 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 and the Contractor's subcontractors and sub-subcontractors and suppliers 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. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.9 Current Editions

Unless otherwise specified in writing by the Owner or the Architect, when the Work is governed by reference to standards, building codes, manufacturer's instructions or other reference documents, the current edition shall apply subject to any changes by governing authorities.

§ 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. Any differences between the requirements of the Drawings and Specifications or any differences noted within the Drawings themselves or within the Specifications themselves will be referred to the Owner and Architect by Contractor and will be clarified by Architect and Owner.

§ 1.2.1.1 The Drawings and Specifications show the extent of the Work. All Work shall, insofar as possible, be installed in accordance with the Project Drawings and Specifications. The Contractor shall be required to submit material data and/or drawings on all equipment which may vary from the Drawings and Specifications and any interferences must be eliminated before Work proceeds.

§ 1.2.1.2 Except as otherwise provided in the Contract Documents, the most recently issued document takes precedence over previously issued forms of the same document. All dimensions shall be verified by Contractor.

§ 1.2.1.3~~1~~ The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 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.

§ 1.2.4 Where noted in the Drawings and Specifications, certain products, manufacturer's trade names, or catalog numbers are given, it is done for the express purpose of establishing a standard of function, dimension, and appearance, and quality of design, in harmony with the Work, and is not intended for the purpose of limiting competition. Materials or equipment shall not be substituted unless the Architect has specifically accepted such substitution for use on this Project~~, which acceptance will not be withheld or unreasonably delayed if the proposed substitution is equivalent in function, quality, design, and acceptable in appearance.~~

§ 1.2.5 Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements.

§ 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 retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights.~~ The Contractor, Subcontractors, Sub-subcontractors, and 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 the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights. Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers agree to keep all Instruments of Service and any other confidential know how or trade secrets strictly confidential and shall not disclose such information to any

third party for any purpose other than in connection with the performance of Work hereunder. Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers and will enter into non-disclosure agreements as may be required by the Owner.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, 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 suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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 [Intentionally omitted.]~~Evidence of the Owner's Financial Arrangements~~

~~**§ 2.2.1** Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~

~~**§ 2.2.2** Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract~~

~~Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, 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 in the Contract Documents.~~

~~**§ 2.2.3** After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~

~~**§ 2.2.4** Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.~~

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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; provided, however, that any approvals, easements, assessments, and charges required in connection with Contractor's construction means, methods, techniques, sequences, or procedures are solely the responsibility of Contractor.

§ 2.3.2 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.

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

§ 2.3.4 At the Contractor's request, ~~T~~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. Notwithstanding the preceding sentences and the delivery of a survey by the Owner, Contractor shall perform all work in such a non-negligent manner so as to avoid damaging any known and/or identified utility lines, cables, pipes, or pipelines on the property. Contractor shall be responsible for any damage done to such lines, cables, pipes, and pipelines during its construction work caused by or resulting from its conduct. Contractor shall be responsible for timely notification to, and coordination with, all utility companies regarding all utilities.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.4 Owner's Right to Stop the Work

§ 2.4.1 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.

§ 2.3.2 If suspension of the Work is warranted by reason of unforeseen conditions which may adversely affect the quality of the Work if such Work were continued, Owner or Architect may suspend the Work by written notice to Contractor. If Contractor, in its reasonable judgment, believes that a suspension is warranted by reason of unforeseen circumstances which may adversely affect the quality of the Work if the Work were continued, Contractor shall immediately notify Owner and Architect of such belief.

§ 2.5 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 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 default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for 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. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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. The Contractor shall perform the Work in a good and workmanlike manner except to the extent the Contract Documents expressly specify a higher degree of finish or workmanship. Workmanship shall be of a quality to produce results consistent with the Contract Documents. This shall mean that all material shall be installed in a true and straight alignment, level and plumb, patterns shall be uniform, and jointing of materials shall be flush and level unless otherwise directed by the Architect.

§ 3.1.3 The Contractor shall not be relieved of its 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.

§ 3.2.1.1 Contractor understands there are existing utility lines (including plumbing and/or electrical lines) in the area of the Work. Contractor agrees that it will take all proper steps to locate such lines and will exercise the highest level of diligence to protect persons and property, including, but not limited to, hand digging only in the vicinity of existing underground lines. All dimensions and clearances necessary to do the Work, as indicated on the Drawings and contained in the Specifications, shall be verified by Contractor at the job site and Contractor shall report any discrepancies to Architect for adjustment before any Work affected thereby is prosecuted.

§ 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 2.3.4, shall take 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. If Contractor performs any Work in conformity with any Contract Document knowing it to be inconsistent with any other Contract Document, without first specifically requesting and obtaining from Architect written instructions on how to proceed with respect to such inconsistency, Contractor shall be obligated to correct such Work according to the direction of Architect, without cost to Owner, including Contractor bearing the full amount of the attributable costs for correction as well as any other loss or expense arising out of such performance. 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 submit 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, subject to Section 15.1.7, 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be 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 notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative 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. As part of that responsibility, Contractor shall enforce the Owner's alcohol-free, drug-free, tobacco-free, and weapon-free policies and zones, which will require compliance with those policies and zones by Contractor's employees, subcontractors, and all other persons carrying out the Contract. Contractor shall also require adequate and appropriate dress of Contractor's employees, subcontractors, and all other persons carrying out the Contract and/or the Work.

§ 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 approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 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. All personnel used in the performance of the Work shall be qualified to perform their assigned tasks. At the request of Owner, Contractor shall not use or permit to be used in the performance of the Work personnel who are incompetent, careless, unqualified, or otherwise unsatisfactory to Owner in the exercise of reasonable judgment. Owner, however, shall have no right of control or supervision of Contractor's employees and other persons carrying out the Work.

§ 3.5 Warranty

§ 3.5.1 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. Contractor shall warrant to repair, at no cost to Owner, for a period of one (1) year after the Substantial Completion Date, any building(s) that are not watertight and leakproof at every point and in every area (designed by the Architect to be watertight and leakproof). Contractor shall, immediately upon notification by Owner of water penetration, determine the source of water penetration and, at its own expense, do any work necessary to make the building(s) watertight (so long as such building was designed by the Architect to be watertight). Contractor shall also, at its own expense, repair or replace any other damaged material, finishes, Mechanical and electrical components and furnishings, damaged as a result of this water penetration, to return the building(s) to its (their) original condition.

§ 3.5.2 Except where otherwise stipulated in the Contract Documents, the Contractor shall warrant all materials and workmanship furnished under this Contract for a period of one (1) year after the date of Substantial Completion and shall repair and make good, without expense to the Owner, any and all defects in his work which may develop within that time. Upon payment by Owner, Contractor warrants that it shall deliver good title to all materials, supplies, and equipment installed or incorporated in the Work and upon completion thereof shall deliver the premises with all improvements constructed or placed thereon by Contractor, to Owner, free and clear from any claims, liens or charges.

§ 3.5.23 All material, equipment, or other special warranties required by the Contract Documents or that it otherwise obtains shall be issued in the name of the Owner, or shall be assigned or transferredable to the Owner, and shall commence in accordance with Section 9.8.4. Contractor's delivery to Owner of all warranties required by the Specifications is required as a prerequisite to the final payment. Neither inspection nor payment (including final payment) by Owner, shall be deemed to be a waiver or release of Contractor with respect to its obligations to remedy any defect in the Work in accordance with the Contract Documents.

§ 3.5.4 The warranties set out in Section 3.5 of this agreement are not exclusive of, but are in addition to, any other warranties or guarantees set out in other places in the Contract Documents or required or implied by applicable law. All such required or implied warranties remain in effect.

§ 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. Certificates of inspection, use and occupancy shall be delivered to Owner upon completion of the Work in sufficient time for occupation of the Project in accordance with the approved schedule of the Work.

§ 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 14 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 that an equitable adjustment be made 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, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim 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. Contractor shall keep separate and accurate records of all allowances and shall submit such records with the Application for Payment therefor. Owner shall be responsible for costs in excess of the allowances only if approved in writing, in advance. Any such items shall be considered part of the Work and Contractor shall be fully responsible for such Work, regardless of who selected such person to do such Work. Contractor shall not solicit or accept any unreported secret commissions or kickbacks from vendors, suppliers or subcontractors. All price reductions due to rebates, refunds, and discounts should be applied for and obtained by Contractor and credited to Owner. Allowances are to be priced at the net cost to Contractor including all sales taxes and delivery to the site.

§ 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 notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice 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 and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals (but in no event less than monthly) as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably 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, or fails to provide submittals in accordance with the approved 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 Time is of the essence of this Contract. The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.10.4 Contractor's updates to the construction schedule will reflect any authorized changes in the Contract Time and shall provide a chart showing the progress of each separate segment of the Work and the new projected completion dates for each segment and the entire Project. The allocation of time extensions authorized by the Contract Documents among different segments of the Work in the construction schedule shall be subject to the reasonable approval of Owner. The construction schedule at a minimum shall specify whether the Project is on schedule, and if not, the reasons therefor and the terms of the new schedule. Projected completion times in the updated construction schedule shall not relieve Contractor from its obligation to complete the Project within the Contract Time substantially in accordance with the original construction schedule, and only changes to the construction schedule necessitated by authorized changes to the Contract Time shall cause a permanent revision to the construction schedule. Contractor shall hold weekly progress meetings at the Project site, or at such other time and frequency as are acceptable to Owner and shall report the progress of the Work to Owner and Architect in detail with reference to the constructions schedule.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 Contractor shall at all times maintain records, including, but not limited to, invoices, payment records, payroll records, daily reports, logs, diaries, and job meeting minutes, applicable to the Project. Contractor shall make such reports and records available for inspection by the Owner, Architect, or persons with written authorization, within five (5) working days of request by Owner, Architect, or their respective agents. Such records shall be maintained by Contractor for at least 10 years following Final Completion of the Project.

§ 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 how 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 the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect 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. Owner shall be notified by Contractor in advance, to the extent possible (and if not possible in advance then as soon thereafter as reasonably possible) of any requested deviations from requirements of the Contract Documents.

§ 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 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.

§ 3.12.10.1 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 be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately 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 and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and 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. In the event that Contractor retains a licensed design professional under the terms of this paragraph, Contractor shall require that the licensed design professional to carry comprehensive general liability and errors and omissions insurance coverage with policy limits of at least $5,000,000.00 (unless specifically noted otherwise). In the event that the licensed design professional retained by the Contractor will be conducting on-site services or observations, the licensed design professional shall also carry worker's compensation insurance and comprehensive automobile liability in the same amounts and forms as required of the Architect on this Project.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 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, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of Contractor.

§ 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or 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 construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its 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 and 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 do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.15.3 The Contractor shall be responsible for damaged or broken glass within Contractor's work area, and at completion of the Work shall replace such damaged or broken glass, unless broken by Owner, Owner's vendors or Owner's agents and/or employees. The Contractor shall perform the following final cleaning at completion of the Work:

a) remove all temporary protections;
b) remove marks, stains, fingerprints and other soils or dirt from all surface and other work;
c) remove spots, mortar, plaster, soil and paint from ceramic title, marble, and other finish materials from all surface and other Work;
d) clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust and leave in an undamaged and new condition;
e) clean all surfaces and other Work in accordance with recommendations of the manufacturer; and
f) generally and additionally cause all portions of the Work to be in "broom clean" condition.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with 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 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 an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 TO THE FULLEST EXTENT PERMITTED BY LAW, INCLUDING BUT NOT LIMITED TO CHAPTER 151 OF THE TEXAS INSURANCE CODE, AND EXCEPT AS SET OUT IN ARTICLE 3.18.2 BELOW, CONTRACTOR SHALL AND DOES HEREBY AGREE TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE OWNER AND ITS AFFILIATES, THE DIOCESE, ALL DIOCESAN EMPLOYEES AND COMMISSIONS, THE PARISH PRIESTS, THE PARISH, ALL PARISH ORGANIZATIONS, INCLUDING, BUT NOT LIMITED TO, THE BUILDING COMMITTEE, ARCHITECT, ARCHITECT'S CONSULTANT'S, AND ALL EMPLOYEES, OFFICERS, DIRECTORS, AGENTS AND REPRESENTATIVES, SUCCESSORS AND ASSIGNS OF ANY OF THE ABOVE-MENTIONED PARTIES (THE "INDEMNIFIED PARTIES"), FROM, AGAINST AND IN RESPECT OF ANY AND ALL CLAIMS, DEMANDS, SUITS, PROCEEDINGS, ATTACHMENTS, LEVIES, PENALTIES, DAMAGES AND LOSSES, LIABILITIES, LIENS, CLAIMS FOR INDEMNIFICATION OR CONTRIBUTION, AND ANY OTHER MATTER WHATSOEVER, AND ALL DAMAGES, COSTS AND EXPENSES INCURRED IN CONNECTION THEREWITH, INCLUDING ATTORNEY'S FEES (COLLECTIVELY, "CLAIMS"), ARISING OUT OF OR RESULTING FROM (A) INJURIES TO, OR SICKNESS, DISEASE OR DEATH OF, ANY PERSON AND FOR DAMAGE, INJURY, DESTRUCTION OR LOSS OF PROPERTY, ARISING DIRECTLY OR INDIRECTLY, IN WHOLE OR IN PART, OUT OF OR IN ANY WAY RELATING TO THE CONTRACTOR'S WORK OR THE CONTRACT DOCUMENTS, BUT ONLY TO THE EXTENT CAUSED BY THE NEGLIGENT ACTS OR OMISSIONS OR FAULT OF CONTRACTOR OR ANY OF ITS CONTRACTORS, CONSULTANTS, SUBCONTRACTORS, EMPLOYEES, AGENTS, SUCCESSORS OR ASSIGNS, OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE (COLLECTIVELY, THE "CONTRACTOR PARTIES") OR (B) ANY BREACH OF THE PROVISIONS OR COVENANTS OF THE CONTRACT DOCUMENTS BY CONTRACTOR OR ANY OF THE CONTRACTOR PARTIES.

§ 3.18.2 IN ADDITION TO THE FOREGOING INDEMNITY AND TO THE FULLEST EXTENT PERMITTED BY LAW, INCLUDING BUT NOT LIMITED TO CHAPTER 151 OF THE TEXAS INSURANCE CODE, CONTRACTOR SHALL AND DOES HEREBY AGREE TO INDEMNIFY, HOLD HARMLESS, AND DEFEND THE INDEMNIFIED PARTIES FROM AND AGAINST ALL CLAIMS ARISING OUT OF OR RESULTING FROM BODILY INJURY TO, OR SICKNESS, DISEASE OR DEATH OF, ANY EMPLOYEE, AGENT OR REPRESENTATIVE OF THE CONTRACTOR PARTIES, REGARDLESS OF WHETHER SUCH CLAIM,

DAMAGE, LOSS OR EXPENSE IS CAUSED, OR IS ALLEGED TO BE CAUSED, IN WHOLE OR IN PART BY THE NEGLIGENCE OF ANY INDEMNIFIED PARTIES, IT BEING THE EXPRESSED INTENT OF OWNER AND CONTRACTOR THAT IN SUCH EVENT THE CONTRACTOR IS TO INDEMNIFY, HOLD HARMLESS AND DEFEND THE INDEMNIFIED PARTIES FROM THE CONSEQUENCES OF THEIR OWN NEGLIGENCE, WHETHER THEY ARE OR ARE ALLEGED TO BE THE SOLE OR CONCURRING CAUSE OF THE BODILY INJURY, SICKNESS, DISEASE OR DEATH OF ANY EMPLOYEE OF THE CONTRACTOR PARTIES.

§ 3.18.3 FURTHER, CONTRACTOR SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS THE OWNER AND THE PROPERTY FROM ALL CLAIMS, LOSSES, DEMANDS, CAUSES OF ACTIONS OR SUITS OF WHATEVER NATURE ARISING OUT OF OR INCURRED IN CONNECTION WITH ANY LIEN CLAIM, UNLESS SUCH LIEN CLAIM SHALL HAVE ARISEN SOLELY ON ACCOUNT OF THE OWNER'S FAILURE TO PAY SUMS WHICH ARE DUE AND OWING TO THE CONTRACTOR UNDER THE TERMS OF THE CONTRACT DOCUMENTS.

§ 3.18.4 The obligations set forth in this Article 3.18 shall survive expiration or termination of this Agreement.

§ 3.18.5 Contractor shall cause all contracts for subcontracted services to include a like indemnity that shall cover the Owner and its officers, directors, employees and representatives. Nothing herein shall limit the insurance requirements or applicability of same set forth in this Agreement and the Contract Documents.

§ 3.18.6 The foregoing indemnity obligations shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section. The foregoing indemnity obligations are a business understanding between the parties and applies to all different theories of recovery, including breach of contract or warranty, tort including negligence, statutory liability or any other cause of action.

~~**§ 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 that would otherwise exist as to a party or person described in this Section 3.18.~~

§ 3.18.72 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 Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 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.

§ 4.2 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. Nothing in this provision, however, shall limit the Architect's obligations, duties and responsibilities to Owner as set forth in the Contract Documents, including in the AIA Document B101-2017 Agreement, as amended.

§ 4.2.2.1 Owner's and Owner's inspectors shall at all times have access to the Work wherever it is in preparation and progress.

§ 4.2.2.2 The Contractor shall reimburse the Owner for reasonable compensation paid to the Architect for additional site visits made necessary by the fault, neglect or request of the Contractor. Owner may offset such reimbursements against payments which would otherwise be due to Contractor.

§ 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 promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) 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

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 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 Owner (with Architect's advice)~~Architect~~ considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the 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, 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 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 Subject to the Owner's written approval and the change order procedures identified herein, ~~T~~the Architect will prepare Change Orders and Construction Change Directives, and may order 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 Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 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 and if approved in writing by the Owner without delay to the project schedule and performance of Contractor's Work.

§ 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.

§ 4.2.15 The Owner has no responsibility to assist the Contractor in the supervision or performance of the Work. Unless otherwise expressly agreed in writing by Owner in each instance, no action, approval or omission to act or failure to advise the Contractor as to any matter by the Owner shall in any way relieve the Contractor from its responsibility for the performance of the Work in strict accordance with the Contract Documents.

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 the 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.

§ 5.1.3 This Contract is for Owner's benefit, its successors and assigns who, as well as Contractor, may directly enforce all rights and warranties, express or implied herein, but subcontractors shall have recourse only against Contractor and not against Owner.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of

receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice 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 for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.5 If any Subcontractor withdraws, becomes insolvent or otherwise incapacitated, abandons the Work or is dismissed by Contractor, then Contractor shall submit substitute Subcontractors to Owner for Owner's reasonable approval.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, 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 that the Contractor, by these Contract 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.

§ 5.3.2 Further, Contractor will obtain the Subcontractors' written agreement to the following:

.1 require that such Work be performed in accordance with the requirements of the Contract Documents;
.2 require the Subcontractor to carry and maintain its existing insurance coverage and name the Contractor and Owner as an additional insureds on the Subcontractor's commercial general liability insurance policy; and
.3 require the Subcontractor to furnish such certificates, waivers and releases as Owner may reasonably request.

§ 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; 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. Such assignment shall not constitute a waiver by Owner of its right against Contractor, because of defaults, delays, and defects for which a Subcontractor or material vendor may also be liable.

§ 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 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 term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right, but shall not be obligated, to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 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 any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its 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 [Intentionally omitted.]~~Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has 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 notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work 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. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 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 that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor 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 written 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. The Contractor shall proceed promptly with changes in the Work, 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.

§ 7.2.2 Acceptance of a Change Order by the Contractor shall constitute full accord and satisfaction for any and all Claims, whether direct or indirect, including but not limited to impact or delay damages, arising from the subject matter of the Change Order; and/or attorney's fees and costs arising from a dispute with any person over the Change Order.

§ 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
- **.4** As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine 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 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

.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, directly related to the change; and

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

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 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.

§ 7.3.7 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.

§ 7.3.8 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 may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

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, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 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 (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended 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

§ 9.1.1 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.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent 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 Owner and 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. All Applications for Payment will show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of Completion shall be the percentage of the Work which has actually been completed. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from

Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents. In addition to the other required items, each Application for Payment shall be accompanied by the following, all in form and substance satisfactory to the Owner:

(1) A current sworn statement from the Contractor setting forth all contractors, subcontractors and material suppliers with whom the Contractor has contracted or subcontracted, the amount of each contract or subcontract, the amount requested for any Contractor, subcontractor or material supplier in the Application for Payment, and the amount to be paid by the Contractor from such progress payment to contractors, subcontractors and material suppliers, together with a current duly executed waiver of mechanics' and material suppliers' liens from the Contractor establishing receipt of payment for satisfaction of the payments requested by the Contractor in the current Application for Payment. In its sole discretion, the Owner shall be entitled to pay directly any or all of the Contractor's contractors, subcontractors and material suppliers and charge those payments against the Contract Sum. In the event the amounts paid by Owner to Contractor's contractors, subcontractors, and material suppliers exceed the amounts remaining due under the Contract to Contractor, then Owner shall be entitled to collect from Contractor those amounts.

(2) Commencing with the second Application for Payment submitted by Contractor, duly executed so-called "after-the-fact" waivers of mechanics' and material suppliers' liens from all contractors, subcontractors, material suppliers, and, when appropriate, lower-tier subcontractors providing more than $2,000 of labor, materials and/or services to the Project, acknowledging receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment, plus sworn statements from all contractors, subcontractors, material suppliers, and where appropriate, lower tier subcontractors, covering all amounts described in this Subparagraph.

(3) Such other information, documentation, and materials as the Owner may reasonably require.

(4) If at any time there shall be evidence of a lien or claim of lien which, if established, the Owner might become liable, and that is for Work within the scope of this Contract, or if the Contractor shall incur any liability to the Owner, or the Owner shall have any claim or demand against the Contractor of any kind or for any reason, whether reduced to judgment or award, the Owner shall have the right to retain out of any payment due, or to become due under this Agreement, an amount sufficient to indemnify the Owner against any lien or claim, or to fully satisfy such liability, claim or demand. The Owner shall also be entitled to charge against or deduct from any such payment all costs of defense or collection with respect thereto, including reasonable attorneys' fees and expenses. Should any claim or lien develop after all payments are made hereunder, the Contractor shall refund to the Owner within ten (10) days of demand therefor all monies that the Owner shall be compelled to pay in discharging or satisfying such claims or liens and all costs, including reasonable attorneys' fees incurred in collecting said monies from the Contractor. Owner shall have the right in its sole judgment to satisfy or file a bond to discharge a claim of lien or other claim and to deduct all amounts paid to satisfy or discharge a claim of lien or other claim plus Owner's attorneys' fees and expenses from any amounts remaining due under the Contract to Contractor or to collect from Contractor those amounts to the extent those amounts exceed the amount remaining in the Contract Sum.

(5) No progress payments made under this Agreement shall be conclusive evidence of the performance of this Agreement either in whole or in part, and no such payment shall be construed to be acceptance of defective work or improper materials.

§ 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 supplier, unless such Work has been performed by others 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, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work. CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD OWNER HARMLESS FROM ANY LIENS, BOND CLAIMS, SECURITY INTEREST, CLAIMS OR ENCUMBRANCES FILED BY THE CONTRACTOR, SUBCONTRACTORS, OR ANYONE CLAIMING BY, THROUGH OR UNDER THE CONTRACTOR OR SUBCONTRACTOR(S) FOR ITEMS COVERED BY PAYMENTS MADE BY THE OWNER TO CONTRACTOR.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole 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 in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. 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. 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 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;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor;
- **.6** 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
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 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 supplier 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 Contractor shall reflect such payment on its next Application for Payment.

§ 9.5.5 Notwithstanding any provision hereof to the contrary, Owner shall not be obligated to make any payment to Contractor hereunder if any one or more of the following conditions exist and Owner has given Contractor written notice of such condition with reasonable detail to enable Contractor to correct such condition:

.1 Contractor has failed to perform any of its obligations hereunder or otherwise is in default under any of the Contract Documents, provided, however, if such default may be cured by the payment of a liquidated sum of money, then such payment shall be made as to the part thereof not affected by such default and Owner shall retain the remainder of such payment until such default has been cured;

.2 Any part of such payment is attributable to Work which is defective or not performed in accordance with the Contract Documents; provided, however, such payment shall be made as to the part thereof attributable to Work which is performed in accordance with the Contract Documents and is not defective; or

.3 Contractor has failed to make payments promptly to the Contractor's subcontractors or for material or labor used in the Work except as to claims for payment for material or labor used in the Work, the validity of which Contractor is contesting in good faith by appropriate action diligently pursued, provided Contractor has notified Owner of the nature of such claims and informed Owner of the type of action being pursued by Contractor and, if requested by Owner, has provided Owner with a surety bond satisfactory to Owner sufficient to cover such claim in the event Contractor is unsuccessful in contesting same or has made other arrangements satisfactory to Owner; or

No partial payment made hereunder shall be or construed to be final acceptance or approval of that part of the Work to which such partial payment relates or relieves Contractor of any of its obligations hereunder with respect thereto.

§ 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.

§ 9.6.1.1 Once each month, the Owner shall make a progress payment to the Contractor on the basis of a duly certified and approved estimate of the work performed during the preceding month under this Contract. To insure the proper performance of the Contract, the Owner will retain ten percent (10%) of the amount of each estimate of the completed work.

§ 9.6.1.2 All materials and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made, or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the Agreement. Payments to the Contractor shall not be construed as releasing the Contractor or his Surety from any obligations under this Contract.

§ 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 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 and suppliers 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 or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to 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 or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 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' 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. The Work will not be considered suitable for Substantial Completion review until all Project systems are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and approved, instruction of Owner in the operation of systems has been completed, and all final finishes provided for in the Contract Documents are in place. In general, the only remaining Work shall be minor in nature, so that Owner could occupy the Property on that date, and the completion of the Work by Contractor would not materially interfere or hamper Owner's use of the Property. As a further condition of Substantial Completion acceptance, Contractor shall certify that all remaining Work, the same being solely of a "punchlist" nature, will be completed within thirty (30) consecutive calendar days or as otherwise agreed upon following the date of Substantial Completion ("Final Completion"), or, if such punchlist Work cannot be completed within thirty (30) consecutive calendar days, that such punchlist Work will be commenced within such thirty (30) day period and diligently prosecuted until completion.

§ 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; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and 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 the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the 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 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 notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. 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 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, (3) a written statement that the Contractor knows of no 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, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance 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 the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees. With respect to punch list or incomplete items, Owner shall be entitled to withhold 150% of the cost, estimated by Owner, to complete such punch list or incomplete items until all of the punch list items have been completed by the Contractor. Owner shall pay Contractor the amount withheld for all of the punch list or incomplete items which have been fully and property completed.

§ 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, corrected, 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 the 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;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a 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, a Subcontractor, or a Sub-subcontractor; 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 implement, 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 the owners and users of adjacent sites and utilities of

the safeguards. Contractor shall also be responsible, at Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements thereon. Any damage to such property or improvements shall be promptly and fully repaired by Contractor, at no cost to Owner, and to Owner's reasonable satisfaction.

§ 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 and fully remedy, at no cost to Owner and to Owner's satisfaction, 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. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is 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, notice of the 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.

§ 10.2.9 When all or a portion of the Work is suspended for any reason, Contractor shall securely fasten down all coverings and protect the Work, as necessary, from injury by any cause.

§ 10.2.10 Contractor shall promptly report in writing to Owner all accidents known to Contractor arising out of or in connection with the Work which cause death, personal injury or property damage, giving full details and statements of any witnesses. In addition, if death, personal injuries, or property damages are caused, the accident shall be reported immediately by telephone or messenger to Owner.

§ 10.3 Hazardous Materials and Substances
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. 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 notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's 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 Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the 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 by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 [Intentionally omitted.]~~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 hazardous 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 hazardous 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 reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances 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 THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS THE OWNER FOR ANY AND ALL COST AND/OR EXPENSE THE OWNER INCURS FOR ANY INJURY OR DAMAGE ARISING OUT OF A HAZARDOUS MATERIALS, BUT ONLY TO THE EXTENT SUCH INJURY OR DAMAGE WAS CAUSED BY CONTRACTOR OR ANY SUBCONTRACTOR. ~~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 reimburse 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 Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 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.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from

an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 [Intentionally omitted.]~~Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement 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 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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 or Owner, 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, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or Owner or failing to conform to the requirements of the Contract Documents, discovered before 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 any 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 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 2.5.

§ 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 of the Owner or Separate Contractors, whether completed or partially completed, 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

§ 12.3.1 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.

§ 12.3.2 No change in the Work, whether by way of alteration or addition to the Work, shall be the basis of an addition to the Contract Sum or a change in the Contract Time unless and until such alteration or addition has been authorized by a Change Order executed and issued in accordance with Article 7 and in strict compliance with the requirements of the Contract Documents. This requirement is of the essence of the Contract Documents. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is in fact any such unjust enrichment, shall be the basis for any claim to an increase in the Contract Sum or change in the Contract Time.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. 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 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 the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

§ 13.3.2 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 upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 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 tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 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 13.4.1, 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 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 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.

§ 13.4.4 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.

§ 13.4.5 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.

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties 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. No interest shall be due on retainage or other amount properlty withheld by Owner.

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, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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;
- **.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 reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work 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' 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 or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.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 reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner 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' 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 under 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 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 Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

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, a change in the Contract Time, 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. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the 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 15.1.2. If any action at law or in equity is necessary to enforce or interpret the terms of the Contract Documents, the prevailing party shall be entitled to reasonable attorneys' fees, costs, and necessary disbursements in addition to any relief to which it may be entitled.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by 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 under this Section 15.1.3.1 shall 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.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

§ 15.1.6.2 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.

§ 15.1.7 Waiver of 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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, 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. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a 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 the 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 receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, 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 15.1.7, 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 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 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. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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 those of the Owner and Contractor under this Agreement.

SECTION 00410 - BID FORM

CHURCH: SAINT JUDE CATHOLIC CHURCH
500 EAST DALLAS STREET
MANSFIELD, TEXAS

PROJECT: PARISH HALL REMODEL & CONNECTOR

Date:_____

Submitted by: (Bidder to enter date)

Firm Name _____

Address _____

City, State, Zip _____

Submitted by _____
Signature Date

The undersigned, having visited the site and examined the Bid Documents and Specifications entitled St. Jude Catholic Church, Parish Hall & Connector, dated : December 20, 2023, as prepared by Scott A. Martsolf, Architect, Inc.,815 West Daggett, Fort Worth, Texas,76104, propose to furnish all materials, labor, and supervision required to complete the Work as set forth in the above mentioned documents for the GMP.
of_____

($_____)

Alternate No. 1: ($_____)

Alternate No. 2: ($_____)

Please provide Itemized Cost Estimate to support proposed GMP.

The undersigned proposes to commence construction no later than _____ days after receipt of signed Owner –Contractor Agreement and complete the Work in _____ calendar days or less.

The undersigned acknowledges receipt of the following addenda:

Addenda No._____ Dated_____
Addenda No._____ Dated_____
Addenda No._____ Dated_____
Addenda No._____ Dated_____
Addenda No._____ Dated_____

For Change Orders adding to the Contract Sum the undersigned will add ___% for overhead & profit.

For Change Orders reducing the contract Sum the undersigned will credit ___% for overhead & profit.

UNIT PRICING

For changing quantities of work items from those indicated, the following unit pricing prevail. These unit prices include all charges for labor, material, layout, fee, supervision, general administration expenses, insurance, overhead and profit.

DESCRIPTION

Drilled Piers: Per linear foot, for depths greater or less than those shown on drawings, including drilling, casing, reinforcing and concrete.

SIZE	EXTRA	CREDIT
18” dia.	$	$
24” dia.	$	$

END OF BID FORM - 00410

SECTION 01100

SUMMARY

PART 1 - GENERAL

1.01 PROJECT

A. Project Name**: ST. JUDE CATHOLIC CHURCH, PARISH HALL & CONNECTOR**

Architect's Name: Scott A. Martsolf, Architect, Inc.

815 West Daggett Avenue

Fort Worth, Texas 76104

Owner: Michael F. Olson S.T.D, Bishop of the Catholic Diocese of Fort Worth

800 West Loop 820 South

Fort Worth, Texas 76108

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract, AIA Document A101, 2017 Edition with AIA (MODIFIED) Document A201 General Conditions. (see attached exhibit)

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

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

B. Change procedures.

C. Correlation of Contractor submittals based on changes.

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

1.02 RELATED SECTIONS

A. Standard Form of Agreement Between Owner and Contractor.

1.03 SCHEDULE OF VALUES

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

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

C. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

D. Revise schedule to list approved Change Orders, with each Application for Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion.
   9. Balance to Finish.
   10. Retainage.

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

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

D. Include the following with the application:
   1. Transmittal letter as specified for Submittals in Section 01300.
   2. Construction progress schedule, revised and current as specified in Section 01300.
   3. Partial release of liens from major Subcontractors and vendors.
   4. Project record documents as specified in Section 01780, for review by Owner which will be returned to the Contractor.

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

1.05 MODIFICATION PROCEDURES

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

B. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01600.

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

D. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

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

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

G. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

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

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01700.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01210

ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash allowances.

1.03 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.

B. Architect Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

C. Contractor Responsibilities:
   1. Assist Architect in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
   4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

D. Differences in costs will be adjusted by Change Order.

1.04 ALLOWANCES SCHEDULE

A. $25,000 allowance for the door hardware in Section 08710 – Hardware Schedule.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01230

ALTERNATIVES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Alternative submission procedures.

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

1.02 RELATED SECTIONS

A. Section 00500 - Agreement.

1.03 ACCEPTANCE OF ALTERNATIVES

A. Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.

B. Accepted alternatives will be identified in the Owner – Contractor Agreement.

C. Coordinate related work and modify surrounding work to integrate the Work of each alternative.

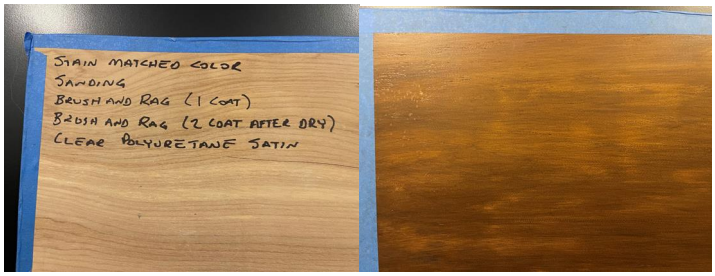
1.04 SCHEDULE OF ALTERNATIVES

A. The list below is intended to make the Contractor aware of the alternates contained in the bid package. The scope of work for the alternates are described in detail on the drawings.

1. **<u>Alternate Number One:</u> Paint existing exterior brick to match stucco color – see sheet A2.1 for location of work.**

2. **Glaze (DARKEN) all existing exposed laminated frames and wood deck in Parish Hall- see architect for glaze sample.**

   Contact : CS RENOVATIONS FOR GLAZING SPECIALIST , 817-721-9998



PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01270

UNIT PRICNG

PART 1 - GENERAL

1.01 SUMMARY

A. Sections Includes:

1. Measurements

2. Payment.

B. Related Sections:

1. Individual specification sections

1.02 UNIT PRICES

A. Provide unit prices for items listed, for inclusion Contract, guaranteed to apply for duration of Project as basis for additions to or deductions from Contract Summary.

B. Take measurements and compute quantities.

C. Quantities and measurements indicated are for Contract purposes only. Actual quantities and measurements supplied or placed in the Work will determine payment.

D. Payment includes full compensation for all required labor, Products, tools, plant, transportation, services, and incidentals, and erection, application, or installation of an item of the Work.

E. Adjustments to Contract Sum will be made by Change Order based on net cumulative change for each item of the Work

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE

A. Drilled Concrete Piers:

1. Pier Depth

a. Unit of measure: By the linear foot shaft drilling, dewatering, reinforcement, and concrete.

b. Basis of Payment:

1) Contract Sum to be based on design depths indicated on Drawings.

2) Adjustments to Contract Sum will be made using actual pier depth measured from top of piers to the top of bearing strata. Payment for penetration into bearing strata is not included in unit price, and is to be included in Contract Sum.

2. Temporary Casing

a. Unit of measure: By linear foot including placement and removal.

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Construction progress schedule.

D. Coordination drawings.

E. Submittals for review, information, and project closeout.

F. Number of copies of submittals.

G. Submittal procedures.

1.02 RELATED SECTIONS

A. Section 05500 - Agreement.

B. Section 01700 - Execution Requirements: Additional coordination requirements.

C. Section 01780 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Cooperate with the Owner in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.

B. Make the following types of submittals to Architect:
   1. Requests for interpretation.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Manufacturer's instructions and field reports.
   6. Applications for payment and change order requests.
   7. Progress schedules.
   8. Coordination drawings.
   9. Closeout submittals.

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Contractor will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract, and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications

for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Use of premises by Owner and Contractor.
9. Owner's requirements and occupancy prior to completion.
10. Construction facilities and controls provided by Owner.
11. Temporary utilities provided by Owner.
12. Survey and building layout.
13. Security and housekeeping procedures.
14. Schedules.
15. Application for payment procedures.
16. Procedures for testing.
17. Procedures for maintaining record documents.
18. Requirements for start-up of equipment.
19. Inspection and acceptance of equipment put into service during construction period.

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

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

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

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

3.03 CONSTRUCTION PROGRESS SCHEDULE

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

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

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

D. Submit updated schedule with each Application for Payment.

3.04 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection.

4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

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

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

3.05 SUBMITTALS FOR INFORMATION

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

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

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

3.07 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit four copies; three copies will be returned to the Contractor.
2. Larger Sheets, Not Larger Than 36 x 48 inches: Submit four copies; three copies will be returned to the Contractor.

B. Documents for Information: Submit four copies; three copies will be returned to the Contractor.

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

D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.
2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

A. Transmit each submittal with AIA Form G810 or approved cover sheet.

B. Sequentially number all submittals and use the submittal number on the transmittal form. The sequential numbering is to occur within each specification section of the project. The submittal number will consist of the submittal’s five-digit specification section number as a prefix, followed by the sequential number. Revise submittals with original number and a sequential alphabetic suffix.

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

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals will not be accepted by the Architect until after they have been thoroughly reviewed by the Contractor and stamped as such.

E. Deliver submittals to Architect at business address or electronically.

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

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

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

I. Provide space for Contractor and Architect review stamps.

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

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

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

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Mock-ups.

D. Control of installation.

E. Tolerances.

F. Manufacturers' field services.

1.02 RELATED SECTIONS

A. Standard Form of Agreement between Owner and Contractor.

B. Section 01300 - Administrative Requirements: Submittal procedures.

1.03 SUBMITTALS

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

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

C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.
   2. Test reports are submitted for Architect's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

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

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit report in duplicate within 30 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

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

1.04 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform specified testing.

B. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform testing required by initial failures of installed products or materials.

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

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 CONTROL OF INSTALLATION

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

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

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

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

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

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

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

3.02 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

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

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

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

3.03 TOLERANCES

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

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

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

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing required.

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

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

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

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

3.05 MANUFACTURERS' FIELD SERVICES

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

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

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

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

END OF SECTION

SECTION 01410

APPROVAL MOCK-UP

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Approval Mock-ups.

B. Inspection.

PART 3 - EXECUTION

3.01 MOCK-UPS

A. Tilt-wall reveals and paint color - Assemble and erect 4’ X 4’ MOCK-UP with specified attachment and anchorage devices.

B. Stained concrete floor sample – Show stain colors and sealing

C. Stained concrete flatwork – Show stain color and scoring

D. Accepted mock-ups shall be a comparison standard for the remaining Work.

E. Following acceptance of the mock-up by Architect, protect erected components from damage or discoloration for the duration of the Work.

3.02 CONTRACTOR DUTIES

A. Contractor Responsibilities:
   1. Cooperate with Architect and Owner in construction of mock-ups.
   2. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   3. Promptly notify Architect and Owner when mock-up is ready for inspection.
   4. Perform additional work required to secure approval of mock-up prior to erection of any materials contained in the mock-up.

3.03 DEFECT ASSESSMENT

A. Replace portions of the mock-up not conforming to specified requirements. Replace components of the mock-up under the written direction of the Architect.

END OF SECTION

SECTION 01410

APPROVAL MOCK-UP

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Approval Mock-ups.

B. Inspection.

PART 3 - EXECUTION

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A. Contractor Responsibilities:
   1. Cooperate with Architect and Owner in construction of mock-ups.
   2. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   3. Promptly notify Architect and Owner when mock-up is ready for inspection.
   4. Perform additional work required to secure approval of mock-up prior to erection of any materials contained in the mock-up.

3.03 DEFECT ASSESSMENT

A. Replace portions of the mock-up not conforming to specified requirements. Replace components of the mock-up under the written direction of the Architect.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary sanitary facilities.

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

D. Vehicular access and parking.

E. Waste removal facilities and services.

F. Project identification sign.

1.02 TEMPORARY UTILITIES

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

B. New permanent facilities may be used.

C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELEPHONE SERVICE

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

1.04 TEMPORARY SANITARY FACILITIES

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

B. Maintain daily in clean and sanitary condition.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

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

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

1.06 EXTERIOR ENCLOSURES

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

1.07 VEHICULAR ACCESS AND PARKING

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

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

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

D. Existing parking areas designated by Owner may be used for construction parking.

1.08 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

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

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

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

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

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

B. Remove underground installations to a minimum depth of 2 feet.

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

D. Restore existing facilities used during construction to original condition.

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

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

F. Procedures for Owner-supplied products.

G. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Requirements: Product quality monitoring.

1.03 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2002.

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

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

C. Shop Drawing Submittals: Prepared specifically for this Project.

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

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

PART 2 - PRODUCTS

2.01 NEW PRODUCTS

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

B. Do not use products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.

C. Provide interchangeable components of the same manufacture for components being replaced.

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

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

2.02 PRODUCT OPTIONS

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

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named. Utilize Substitution Request Forms included in the Project Manual.

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.

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

PART 3 - EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. The request form specifies the time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

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

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

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

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

3.02 OWNER-SUPPLIED PRODUCTS

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

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

3.03 TRANSPORTATION AND HANDLING

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

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

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

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

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

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

3.04 STORAGE AND PROTECTION

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

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

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

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

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

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

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

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

END OF SECTION

PRODUCT SUBSTITUTION REQUEST FORM

(During the Bidding Phase – Must be submitted a minimum of 5 days before the bid date)

Project: _____ Substitution Request No: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project No: _____

Reference: _____ Contract For: _____

Specification Title: _____

Section: _____ Page: _____ Article / Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____

Telephone: _____ Proposed Model No.: _____

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

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

The undersigned certifies:

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

Submitted By: _____ Signed :_____

Firm: _____ Address: _____

Phone: _____ _____

A/E's REVIEW & ACTION

☐ Substitution approved – Make submittals in accordance with Project Manual requirements.
☐ Substitution approved as noted – Make submittals in accordance with Project Manual requirements.
☐ Substitution rejected – Use specified materials.
☐ Substitution Request received too late – Use specified materials.

A/E Signature: _____ Date: _____

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

END OF REQUEST FORM

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cutting and patching.

D. Cleaning and protection.

E. Closeout procedures, except payment procedures.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01300 - Administrative Requirements: Submittals procedures.

C. Section 01400 – Quality Requirements: Testing and inspection procedures.

D. Section 01500 - Temporary Facilities and Controls: Temporary interior partitions.

E. Section 01780 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

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

1.04 PROJECT CONDITIONS

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

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

D. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.05 COORDINATION

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

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

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

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

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

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

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

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

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

B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 - EXECUTION

3.01 EXAMINATION

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

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

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

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

3.02 PREPARATION

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

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

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

3.03 PREINSTALLATION MEETINGS

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

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

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

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

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

3.04 GENERAL INSTALLATION REQUIREMENTS

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

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

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

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

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

3.05 CUTTING AND PATCHING

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

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

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

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

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

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

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.

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

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

J. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.06 PROGRESS CLEANING

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

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

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

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

3.07 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

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

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

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

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

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

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

3.08 ADJUSTING

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

3.09 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

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

E. Clean filters of operating equipment.

F. Remove dust from all surfaces. Remove dust from the inside of concealed spaces, including but not limited to cabinets and drawers

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

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

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

3.10 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect.
   2. Provide copies to Owner.

B. Notify Architect when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

E. Notify Architect when work is considered finally complete.

F. Complete items of work determined by Architect's final inspection.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED SECTIONS

A. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data, and warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

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

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

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

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

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

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

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

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

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

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

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

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

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

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

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

F. Include sequence of operation by controls manufacturer.

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

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

3.05 OPERATION AND MAINTENANCE MANUALS

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

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

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

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

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24-pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Warranties submitted shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

END OF SECTION

SECTION 02230

SITE CLEARING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01500 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01700 - Execution Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

D. Section 02930 - Exterior Plants: Relocation of existing trees, shrubs, and other plants.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Vegetation removal limits.
   2. Areas for temporary construction and field offices.

1.04 QUALITY ASSURANCE

A. Clearing Firm: Company specializing in the type of work required.
   1. Minimum of five years of documented experience.

1.05 PROJECT CONDITIONS

A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

B. Comply with other requirements specified in Section 01700.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 02201 – Earthwork.

PART 3 - EXECUTION

3.01 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.02 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building

structure, paving, playing fields, lawns, and planting beds.

B. Do not begin clearing until vegetation to be relocated has been removed.

C. Do not remove or damage vegetation beyond the following limits:
   1. 40 feet outside the building perimeter.
   2. 5 feet each side of roadway curbs, walkways, and main utility trenches.
   3. Exception: Specific trees and vegetation indicated on drawings to be removed.

D. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.
   2. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
   3. Around other vegetation to remain within vegetation removal limits.

E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   4. Sod: Re-use on site if possible; if not, treat as specified for other vegetation removed.
   5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

F. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.03 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 02361

SOIL TREATMENT FOR TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical soil treatment.

1.02 REFERENCES

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; United States Code; 1947 (Revised 1988).

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Test Reports: Indicate regulatory agency approval reports when required.

D. Manufacturer's Application Instructions: Indicate caution requirements and application rates.

E. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements.

F. Warranty: Submit warranty and ensure that forms have been completed in Owner 's name.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work.
   1. Having minimum of 2 years documented experience.
   2. Licensed in the State in which the Project is located.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for application, and comply with EPA regulations.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of toxicants.

1.06 SEQUENCING

A. Apply toxicant immediately prior to finish grading work outside foundations.

1.07 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide five year installer's warranty against damage to building caused to termites.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manufacturers:
   1. Agrotec, Inc.
   2. Bayer Corp.
   3. Chas. H Lilly Co.

4. Substitutions: See Section 01600 - Product Requirements.

B. Toxicant Chemical: EPA approved; synthetically color dyed topermit visual identification of treated soil.

C. Diluent: Recommended by toxicant manufacturer.

2.02 MIXES

A. Mix toxicant to manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

3.02 APPLICATION

A. Spray apply toxicant in accordance with manufacturer's instructions.

B. Apply toxicant at following locations:
1. Under Slabs-on-Grade.
2. In Crawl Spaces.
3. At Both Sides of Foundation Surface.

C. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

D. Re-treat disturbed treated soil with same toxicant as original treatment.

E. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.03 PROTECTION OF FINISHED WORK

A. Do not permit soil grading over treated work.

END OF SECTION

SECTION 02470

DRILLED CONCRETE PIERS AND SHAFTS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: Genaeral and Supplemental Conditions of the Contract, Division 1 – General Requirements, and Drawings are applicable to this Section.

B. Section Includes:
1. Bored, straight shaft cast-in-place concrete piers with steel shaft liners as required to retard groundwater.

C. Unit Prices:
1. Work specified in this Section is affected by the requirements of Section 01270.

1.2 SUBMITTALS

A. Submit shop drawings under provisions of Section 01300. Indicate details and schedules of pier installation, identify recommended pier lengths and diameters to suit design loads, and reinforcing requirements.

B. Submit drilling logs showing identification marks, shaft diameter, bell diameter, bottom elevation, top elevation, description of bearing strata, nature and location of obstructions, and wall conditions during drilling and concrete placement.

1.3 INSPECTION CONTROL

A. Notify Architect, Owner/PM, and testing laboratory when drilling is to begin.

B. Testing laboratory will be paid in accordance with Section 01400.

1.4 DRILLED PIER RECORD

A. Drilled Piers complete, to depths indicated, including drilling, concrete, reinforcement, and casing, if required, are a part of the base bid contract amount.

B. Keep a complete record showing the actual elevation of the bottom of each drilled pier and the difference in linear feet between actual and estimated depths. The difference between the accumulated total of lesser and greater depths from the estimated depths shall be used to determine the total amount of variation. Total variation times the Unit Price shall be used to adjust the Contract Amount. Refer to Section 01270.

1.5 UNIT PRICES

A. Refer to Bid Form.

B. Actual Pier Length: Determined by length of piers identified in Project Record Documents.

C. Adjustments in Contract Price will be made due to changes in number and length of piers, based on unit prices established in the Agreement.

1.6 QUALITY ASSURANCE

A. Contractor Qualifications: Minimum 3 years experience in drilled pier construction with similar subsurface materials, pier sizes and special techniques required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Shaft Liners: ASTM A 252, Grade T1; single length straight steel pipe; of diameters and weight per lineal foot as required for intended use.

B. Concrete Materials and Mix: Specified in Section 03300.

C. Reinforcement: Specified in Section 03200.

D. Equipment: Appropriate to dewater excavated shaft.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions will support equipment for performance of pier placement operations.

3.2 PREPARATION

A. Use placement method which will not cause damage to nearby structures.

B. Protect structures near the Work from damage.

3.3 INSTALLATION

A. Construct piers in accordance with ACI 336.1, and as specified herein.

B. Drill concentric pier shafts. Drill pier holes with a power auger foundation drilling rig especially designed for that purpose. Base Bids on drilling to Bid depths shown. Accurately locate foundation pier holes, and drill to size and soil strata shown on Drawings.

C. Where required to restrict water infiltration, place steel shaft liners immediately after drilling and inspection of pier shafts. Jack firmly in place.

D. Clean pier bottom of loose material immediately after drilling and placing shaft liners.

E. Allow inspection of pier shafts prior to reinforcing steel and concrete placement. Prevent foreign matter from falling into shaft.

3.4 PLACING PIER REINFORCEMENT

A. Clean reinforcing cage of foreign materials which will destroy or reduce the bond with concrete.

A. Install reinforcing cage indicated on Drawings as follows:
   1. Support cage off bottom of hole the distance indicated on Drawings.
   2. Firmly secure the cage in place, free of contact with sides of pier hole. Provide positive means to maintain the proper clear distance on all sides.

B. Provide dowels or anchor bolts in piers as indicated on Drawings. Provide positive means of support for dowels or anchor bolts prior to concreting. Stabbing of dowels or anchor bolts into fresh concrete is not acceptable.

3.5 CONCRETING

A. Maximum allowable water in hole the time of concreting is 3 inches.

B. Place concrete to fill holes drilled.

C. The method used for placing concrete shall avoid segregation of concrete and splashing against reinforcing cage and sides of pier hole. Provide adequate runways, chutes, tremies, and other means of conveying concrete into place. Use chutes, tremies, or bottom dump trucks for placing concrete. Thoroughly vibrate the top five (5) feet of concrete in shaft and remove excess water.

D. Place concrete in shaft excavation as soon as practicable after drilling, seating, and cleaning has been completed. Concrete is to be placed within 8 hours of shaft excavation.

E. During removal of temporary casing from hole during concrete operation, exercise extreme care in removal in order to ensure that the hydrostatic head of plastic concrete is, at all times, greater than hydrostatic head of surrounding ground water, and that no rotation or jerking of casing is permitted during withdrawal. Monitor the elevations of concrete and rebar cage as casing is extracted to observe that no sudden rise occurs indicating concrete or cage hanging up in the casing.

F. If water in shaft exceeds 3 inches, place concrete under water as follows:
   1. Place concrete using flexible pipe (tremie or concrete pump hose) with adequate strength, weight, and water tightness to perform desired operation and with a diameter approximately eight times the size of the largest aggregate.
   2. Proportion concrete mix as follows:
      a. Slump 6 to 9 inches.
      b. Water/cement ratio: .44 (5 gallon / sack of cement).
      c. Admixtures: water reducing, set controlling conforming to ASTM C494 and air-entrainment conforming to ASTM C260.
   3. Deposit concrete in a slow, smooth and continuous operation.
   4. Plug end of pipe with adequate seal before lowering into water. Exercise care to assure concrete does not segregate as it pushes water out of the bottom of the hole.
   5. Bottom of pipe shall remain in plastic concrete at all times after placement has begun. When concrete flow must be stopped for a short time, lower pipe deeper into plastic concrete.
   6. Vibration, agitation and adverse movement of pipe in plastic concrete is not permitted. Provide adequate equipment to lift pipe from excavation.

7. Placement is to be controlled by qualified personnel through continuous observation.

3.6 CONCRETE TESTING

A. Perform concrete testing under provisions of Section 01400 and Section 03300.

3.7 TOLERANCES

A. Maximum permissible variation of location: Not more than 1/24th of shaft diameter or 3 inches, whichever is less.

B. Shafts out of Plumb: Not more than 12.5 percent of shaft diameter or 2% of full depth, whichever is less.

C. Concrete cut-off elevation: Plus 1 inch to minus 3 inches.

D. Shaft and bell diameters at any cross section: Within 1 inch of specified dimensions.

3.8 FIELD QUALITY CONTROL

A. Accurately record the following information immediately upon completion of drilling.
1. Sizes, lengths, and locations of piers.
2. Sequence of placement.
3. Final base and top elevations.
4. Deviation from indicated locations.
5. Depth of penetration into substrate.

B. Make continuous inspections of pier drilling operation to determine that the proper strata is being obtained and that shafts are properly clean and dry before placing concrete.
1. Maintain a pier log for each pier showing design requirements and actual in place size and depth.
2. Verify that the excavation is of the proper size and adequately clean and dry.
3. Verify that each shaft is founded at a satisfactory depth and at the proper bearing strata.
4. Verify that the reinforcing and concrete are properly placed in accordance with other testing provisions specified herein.
5. Notify Architect of soil or water conditions require casing of piers.

C. Inspection reports of pier drilling shall contain the following:
1. Pier Mark.
2. Pier Depth.
3. Depth of penetration into bearing strata.
4. Plumbness deviation.
5. Description of unusual conditions encountered, including groundwater.
6. Record of deviations from contract document requirements.

3.9 NON-CONFORMING PIERS

A. Non-conforming Piers: Piers that are placed out of position or are damaged.

B. Provide additional piers or supplement piers to meet specified requirements. Consult with Engineer before proceeding with any corrective or remedial measures.

3.10 UNACCEPTABLE PIERS

A. Unacceptable Piers: Piers that fail, are placed out of position, are below elevations, or are damaged.

B. Provide additional piers or replace piers failing to conform to specified requirements.

C. Receive Engineer's approval prior to taking any corrective action.

END OF SECTION 02470

SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

The work of this section includes all labor, materials and equipment required to form all cast-in-place concrete shown on the drawings including but not limited to all slabs, joists, beams, columns, walls, stairs, and equipment pads.

1.3 CODES AND STANDARDS

Comply with the provision of the following codes, specifications and standards except where more stringent requirements are shown or specified:

A. ACI 301 "Specifications for Structural Concrete for Buildings"

B. ACI 318 "Building Code Requirements for Reinforced Concrete"

C. Concrete Reinforcing Steel Institute "Reinforced Concrete, Manual of Standard Practice"

D. ACI SP-4 "Formwork for Concrete"

In addition, all formwork shall be designed, erected, supported, braced, and maintained as a minimum according to ACI Standard 347 "Guide to Formwork".

1.4 RESPONSIBILITY

The design, construction and safety of all formwork shall be the responsibility of the General Contractor. All forms, shores, backshores, falsework, bracing, and other temporary supports shall be engineered to support all loads imposed including the wet weight of concrete, construction equipment, live loads, lateral loads due to wind and wet concrete imbalance. The Contractor shall also be responsible for determining when temporary supports, shores, backshores, and other bracing may be safely removed.

1.5 DESIGN RESPONSIBILITY

The design of all concrete formwork, formwork removal, shoring, and backshoring requirements shall be performed by a registered professional engineer in the state where the project is located and experienced in the design of concrete formwork. The formwork engineer shall be employed by the Contractor. Calculations, sealed by the registered professional engineer, shall be issued for Owner's record but will not be reviewed or returned.

1.6 SUBMITTALS

A. Design Calculations:

Submit for record calculations of all concrete formwork sealed by a registered engineer in the state where the project is located.

B. Formwork Drawings:

Formwork Drawings, prepared under the supervision and sealed by a registered professional engineer in the state where the project is located, shall be submitted for Owners record and shall be reviewed by the Engineer for conformance to structural drawing layout only. Such shop drawings shall indicate types of materials, sizes, lengths, connection details, design allowance for construction loads, anchors, form ties, shores, braces, construction joints, reveals, camber, openings, formwork coatings and all other pertinent information as specified in ACI 347.

C. Shoring Plan:

Submit drawings to indicate the number of levels of shoring, proposed time and sequence of formwork and shore removal, minimum concrete strength for stripping of forms and shore removal, assumed construction loads, amount and layout of shores (specify whether backshores or reshores), and length of time shores are to be left in place. This plan shall be strictly followed by the Contractor. Shoring plans are to be submitted for Owner's record only and will not be reviewed or returned.

PART 2 - PRODUCTS

2.1 FORMS FOR EXPOSED FINISH CONCRETE

Unless otherwise specified, formwork for exposed concrete surfaces shall consist of plywood, metal, metal framed plywood, or other acceptable surface. Formwork shall provide a continuous straight and smooth surface conforming to the joint system as specified on the Architect's drawings. Form material shall have sufficient thickness to withstand pressure of concrete without bow or deflection. Plywood shall be overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form", Class I, or plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge sealed, with each piece bearing legible inspection trademark.

2.2 FORMS FOR UNEXPOSED FINISH CONCRETE

Unless otherwise specified, formwork for unexposed concrete surfaces shall be constructed with plywood, lumber, metal or other acceptable material. Lumber shall be dressed on at least two edges and one side for tight fit.

2.4 FORMS FOR TEXTURE FINISHED CONCRETE

Units of concrete face design, size, arrangement and configuration shall match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners. See Architect's drawings, specifications and control sample for special form textured finish concrete.

2.5 CYLINDRICAL COLUMNS AND SUPPORTS

Round section members shall be formed with metal, fiberglass, reinforced plastic, paper or fiber tubes, unless otherwise specified. Paper or fiber tubes shall be constructed of laminated plies using water resistant adhesive with wax impregnated exterior for weather and moisture

protection. Units shall have sufficient wall thickness to resist loads imposed by wet concrete without deformation.

2.6 FORMWORK COATINGS

Formwork coatings shall be a commercial formulation that will not bond with, stain, nor adversely affect concrete surfaces or impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede curing with water or curing compounds. Provide a product that has a maximum VOC (Volatile Organic Compounds) of 350 mg/l but not greater than permitted by the local government agency having jurisdiction in the area where the project is located.

2.7 NAILS AND FASTENERS

Use only galvanized nails and fasteners for securing formwork in structures exposed to weather or unconditioned spaces such as garages, canopies and porte-cocheres.

PART 3 - EXECUTION

3.1 FABRICATION AND CONSTRUCTION

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and patch forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Form Ties:

Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal. Unless

otherwise indicated, provide ties so portion remaining within concrete after removal is 1 1/2" inside concrete and will not leave holes larger than 1" diameter in concrete surface. Provide only galvanized form ties in structures exposed to weather or unconditioned spaces.

H. Provisions for Other Trades:

Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

3.2 CLEANING AND TIGHTENING

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and all other debris just prior to concrete placement. Retighten forms and bracing prior to concrete placement as required to prevent mortar leaks and maintain proper alignment.

3.3 CLEANING AND RE-USE OF FORMS

Forms reused in the work shall be repaired and cleaned. Split, frayed, delaminated, or otherwise damaged facing material will not be acceptable for exposed surfaces. Forms intended for successive concrete placement shall have surfaces cleaned, fins and laitance removed, and joints tightened to avoid surface offsets. New form coating compound shall be applied to reused forms. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.4 TOLERANCES

Unless specified otherwise, all tolerances for concrete formwork shall conform to ACI Standard 117, "Standard Tolerances for Concrete Construction and Materials". Before concrete placement the Contractor shall check lines and levels of erected formwork and make any corrections and adjustments as required to ensure proper size and location of concrete members and stability of forming systems. During concrete placement the Contractor shall check formwork and supports to ensure that forms have not displaced and that completed work will be within specified tolerances.

The Owner should be given the opportunity to hire an independent qualified surveyor to verify the proper form, line, position, and elevation of the finished concrete work. If provided, the results of each survey shall be sent to the Owner, Architect/Engineer, and Contractor and shall identify any deviation from specified tolerances. All work not in conformance with specified tolerances shall removed at the Contractor's sole expense if so specified by the Owner.

3.5 SHORES AND SUPPORTS

A. Definitions

1. Shores: Vertical or inclined support members designed to carry the weight of formwork, concrete, and construction loads above.

2. Reshores: Shores placed snugly under a stripped concrete structural member after the original forms and shores have been removed from the member, thus requiring the member to carry its own weight and superimposed construction

loads at the time of installation. Reshores are assumed to carry no load at the time of installation. After the installation of reshores, superimposed construction loads are assumed to be distributed among all members connected by reshores.

3. Backshores: Shores placed snugly under a stripped concrete structural member after the original formwork and shores have been removed from a small area without allowing the structural member to deflect or support its own weight or superimposed construction loads. It is assumed that backshores carry the same load as that carried by the original shores they replace.

Comply with ACI 347 for shoring, reshoring and backshoring in concrete construction and as herein specified where more stringent:

B. Structures with Three Supported Levels or Less:

Extend shoring from soil supported slab or suitable subgrade to uppermost level for structures with three structurally supported levels or less.

3.6 REMOVAL OF FORMS AND SUPPORTS

A. Determination by Contractor's Registered Engineer:

The Contractor's registered engineer shall determine and submit for Owner's record the time and sequence of formwork and shore removal subject to the criteria as specified below. The submittal shall clearly distinguish between reshoring and backshoring procedures.

B. Curing and Stripping Concrete Cylinders:

The General Contractor shall be responsible for making and curing stripping concrete cylinders, cured under field conditions, for the purpose of determining concrete strength at time of form and shore removal. Such cylinders shall be made by the Contractor and tested by his testing laboratory.

C. Records of Weather Conditions:

The General Contractor shall be responsible for keeping records of weather conditions to be used in the decision on when to remove forms.

D. Formwork Not Supporting Concrete:

Formwork not supporting concrete such as sides of beams, walls, columns and similar parts of the structure, may be removed after cumulatively (not necessarily consecutively) curing at not less than 50°F for 12 hours after placing concrete, provided the concrete is sufficiently hard so as not to be damaged by form removal operations and provided curing and protection operations are maintained. If ambient air temperatures remain below 50°F or if retarding agents are used, then this specified minimum period should be increased as required to safely remove the forms without damage to the concrete. Where such forms also support formwork for slab or beam soffits, the removal times of the latter shall govern.

E. Formwork Supporting Weight of Concrete:

Formwork supporting weight of concrete such as beam soffits, joists, slabs and other structural elements shall not be removed until concrete has attained at least 75% (2800 psi min) of the design minimum 28 day compressive strength:

F. Placing Reshores and Backshores:

1. All shoring operations shall be carried out in accordance with a planned sequence as determined by the Contractor's shoring engineer.

2. Shoring operations shall be performed so that at no time will areas of new construction be required to support combined dead and construction loads in excess of the available strength as determined by the design loads (as specified in the General Notes) and the developed concrete strength (as determined by field cured cylinders) at the time of stripping and reshoring or backshoring.

3. Shores (backshores or reshores) shall not be removed until the structural member supported has sufficient strength to support all applied loads.

4. For backshoring operations, the forms shall be removed in such a manner that individual structural members are not allowed to deflect and carry load.

5. Reshoring operations require that the structural members be strong enough to safely support their own weight before stripping of formwork.

6. For reshoring operations, no structural member shall be overstressed under its own dead weight plus the weight of the floors above and construction loads assigned to the structural member by a rational analysis that accounts for the relative stiffness of each floor with due consideration of concrete age and strength. While reshoring is underway, no construction loads shall be permitted on the new construction unless it can safely support the construction loads.

7. Where possible, shores shall be located in the same position on each floor so that they will be continuous in their support from floor to floor.

END OF SECTION 03100

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

The work of this section includes labor, materials, hardware, equipment, transportation and services required to fabricate and place all reinforcement for cast-in-place concrete including bars, welded wire fabric, ties and supports shown on the drawings and as specified. Prestressing reinforcement is specified in Precast Concrete sections of the specifications.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

Comply with all provisions of the following codes, specifications and standards except where more stringent requirements are shown or specified:

1. ACI 315, "ACI Manual of Standard Practice for Detailing Reinforced Concrete Structures".

2. ACI 318, "Building Code Requirements for Reinforced Concrete."

3. Concrete Reinforcing Steel Institute, "Reinforced Concrete, Manual of Standard Practice".

4. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."

1.4 SHOP DRAWINGS

A. Shop drawings and samples for all reinforcing steel and related accessories shall be submitted for the Engineer's approval.

B. Shop Drawings shall show layout, bending and assembly diagrams, bar schedules, stirrup spacing, splicing and laps of bars and shall be prepared in accordance with ACI 315 Standards.

1.5 TESTING AND INSPECTION

Perform all tests and inspections as specified in the Laboratory Testing Section of these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcement:

1. Reinforcing Steel:
   All reinforcing steel shall conform to the " Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," ASTM A615 Grade 60 unless noted otherwise on the drawings. All reinforcing steel required to be welded shall conform to ASTM A 706 "Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement".

2. Welded Wire Fabric:
   Welded smooth wire fabric for concrete reinforcement shall conform to the "Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement," ASTM A 185 with a yield strength of 65,000 PSI. Welded deformed wire fabric for concrete reinforcement shall conform to the "Standard Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement," ASTM A 497 with a yield strength of 70,000 PSI. All welded wire fabric shall be furnished in flat sheets only.

3. Tie Wire:
   Tie wire shall be annealed steel tie wire, minimum 16 gauge. Provide only plastic coated or stainless steel tie wire in exposed concrete structures and all architectural concrete.

B. Supports for Reinforcement:

Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations.

1. Slabs-on-Grade:

   Use supports with sand plates or horizontal runners.

2.2 SPLICES

A. Splice Type and Lap Lengths:

Required splice type and lap lengths are defined on the drawings. Lap splice lengths for unscheduled bars not shown otherwise on the drawings shall be 40 bar diameters minimum.

B. Dowel Bar Replacement:

All reinforcing steel bars shown on the drawings crossing concrete construction joint surfaces with inserts cast flush against the form and having dowels connected to the insert in a subsequent concrete pour shall conform to the following:

1. Splice connection at insert shall develop the full tensile capacity of the reinforcing steel.

2. Inserts shall be one of the following:

   "Lenton Form Saver", tapered thread dowel
   and insert, as manufactured
   by Erico Products, Inc.

   "Dowel Bar Splicer", dowel bar substitution
   and rebar splice system
   (DB-SAE Splicer) as manufactured

by Richmond Screw Anchor Co., Inc.

Other splice assemblies may be used only if approved by the Engineer.

PART 3 - EXECUTION

3.1 FABRICATION AND DELIVERY

A. Bending and Forming:

Fabricate bars of indicated sizes and accurately form to shapes and lengths indicated and required, by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not scheduled will be rejected.

B. Marking and Shipping:

Bundle reinforcement and tag with suitable identification to facilitate sorting and placing. Transport and store at site so as not to damage material. Keep sufficient supply of tested, approved and proper reinforcement at the site to avoid delays. Maintain reinforcing bars free of mud, dirt, grease, or other coating.

3.2 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports and as herein specified.

B. Before placing and again before concrete is placed, clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required. Exercise particular care to maintain proper distance and clearance between parallel bars and between bars and forms. Provide metal spreaders and spacers to hold steel in position. Support steel at proper height upon approved chairs.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh plus two inches and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction. Welded wire fabric shall be furnished and placed in flat sheets only.

F. Coordinate with other trades and expedite materials and labor to avoid omissions and delay.

G. Install waterproof membrane or moisture barrier as specified prior to placing steel for concrete slabs-on-grade.

H. Extend reinforcement continuous through construction joints or, if approved on the shop drawings, provide dowels of sufficient length to develop the full tension or compression strength of the bar as applicable.

I. Provide and place additional reinforcing steel at all sleeves and openings in beams, slabs and walls as specified on the drawings. Where reinforcement is interrupted by sleeves or openings not shown on the drawings, consult with Engineer for instructions for placing and splicing of bars. Provide required additional reinforcing steel at no additional cost to the Owners.

3.3 REINFORCING STEEL SPACING AND COVERAGE

A. Reinforcing Steel Coverage

Reinforcing steel coverage should conform to the requirements specified in the General Notes. Cover specified shall be considered minimums that may require increasing where reinforcing steel intersects for different member types. Cover in structural members not specified in the General Notes shall conform to the requirements of ACI 318-83 Section 7.7 unless specified otherwise on the drawings.

B. Reinforcing Steel Spacing:
The clear distance between parallel bars in a layer shall be not less than the bar diameter nor 1". Where parallel reinforcement is placed in 2 or more layers, bars in the upper layer shall be placed directly above bars in the lower layer with clear distance between layers of not less than 1".

3.4 SPLICING REINFORCING STEEL

A. All lap splices in reinforcing steel shall be contact lap splices unless detailed otherwise on the drawings.

B. Maintain proper cover between reinforcing bars at splices.

C. Lap unscheduled reinforcing bars not otherwise specified a minimum of 40 bar diameters at splices. Lap welded wire fabric a minimum of one full wire mesh plus two inches.

3.5 WELDING REINFORCING STEEL

A. Welding reinforcing steel is permitted only where specifically shown on the drawings. All welding shall conform to AWS D1.4 "Structural Welding Code - Reinforcing Steel". Only weldable reinforcing steel conforming to ASTM A706 or deformed bar anchors conforming to ASTM A496 shall be permitted. ASTM A615 Grade 40 or Grade 60 bars may not be welded for structural use.

B. Scheduled or detailed reinforcing steel shall not be tack welded for any reason.

3.6 SHRINKAGE AND TEMPERATURE REINFORCEMENT

Provide shrinkage and temperature reinforcement at right angles to main top and bottom bars for all structural slabs unless detailed otherwise on the drawings. See drawings for sizes and spacings.

3.7 PLACEMENT OF WELDED WIRE FABRIC

Wherever welded wire fabric is specified as reinforcement in slabs, it shall be continuous and properly lapped one full wire spacing plus 2" across the entire concrete surface and not interrupted by beam or girders.

3.8 MECHANICAL AND PLUMBING REQUIREMENTS

Refer to Mechanical and Plumbing Drawings for formed concrete requiring reinforcing steel. Such reinforcement shall be furnished as part of the work of this section.

3.9 QUALITY CONTROL TESTING DURING CONSTRUCTION

See Testing Laboratory Services section of these specifications 01 45 29 for concrete reinforcement inspection and test requirements.

END OF SECTION 03200

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of concrete work is shown on drawings, including schedules, notes and details which show size and location of members and type of concrete to be poured. Furnish all labor, materials, services, equipment and hardware required in conjunction with or related to the forming, delivery and pouring of all poured-in-place concrete work.

B. Architectural Concrete is specified in other Division-3 sections.

1.3 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. ACI 301 - "Specifications for Structural Concrete for Buildings".
2. ACI 302 - "Guide for Concrete Floor and Slab Construction".
3. ACI 304 - "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
4. ACI 305 - "Recommended Practice for Hot Weather Concreting".
5. ACI 306 - "Recommended Practice for Cold Weather Concreting".
6. ACI 309 – “Guide for Consolidation of Concrete”
7. ACI 318 - "Building Code Requirements for Reinforced Concrete".

B. Document Precedence: In case of conflict among documents, including architectural and structural drawings and specifications, notify the Architect prior to submitting proposal. In case of conflict between the structural drawings and specifications, the strictest interpretation shall govern.

C. Materials and installed work may require testing and retesting, as directed by the Architect/Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests, not specifically indicated to be done at the Owner's expense, including retesting of rejected materials and installed work, shall be done at the Contractor's expense. See Testing Laboratory section of the Specifications 01400.

Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable Building Code.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including admixtures, patching compounds, epoxies, grouts, waterstops, joint systems, curing compounds, dry-shake finish materials, hardeners, sealers and others as requested by Architect/Engineer.

B. Samples: Submit samples of materials specified if requested by Architect/ Engineer, including names, sources and descriptions.

C. Laboratory Test Reports and Mix Designs: Submit laboratory test reports for concrete materials and mix designs as specified in the Testing Laboratory section of the Specifications.

D. Material and Mill Certificates: Provide material and mill certificates as specified herein and in the Testing Laboratory section of the Specifications. Material and mill certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

E. Submit shop drawings indicating control joints, expansion joints, construction joints and embed locations.

1.6 PROVISION FOR OTHER WORK

Provide for installation of inserts, hangers, metal ties, anchors, bolts, angle guards, dowels, thimbles, slots, nailing strips, blocking, grounds and other fastening devices required for attachment of work. Properly locate in cooperation with other trades and secure in position before concrete is poured. Do not install sleeves in any concrete slabs, beams or columns except where shown on the drawings or upon written approval of the Architect/Engineer.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

Refer to the drawings for classes and strengths of concrete required.

A. Portland Cement:
ANSI/ASTM C 150, Type I or Type III, unless otherwise approved by the Architect/Engineer.

Use one brand of cement, for each class of concrete, throughout the project, unless approved otherwise by the Architect/Engineer and the Owner's Testing Laboratory.

B. Coarse Aggregate: ASTM C 33, hard, durable, uncoated, crushed limestone or other approved aggregate. Provide aggregates from a single source for exposed concrete.

C. Fine Aggregate: ASTM C 33, clean, hard, durable, natural sand free from silt, loam or clay.

D. Water: Clean, fresh, drinkable, free of oils, acids or organic matter.

E. Fly Ash: ASTM C 618, Class C or F. Fly ash replacement of cement shall not exceed 20% (one part fly ash max. to four parts cement) by weight.

2.2 ADMIXTURES

A. Water-Reducing Admixture: ANSI/ASTM C 494, Type A. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

B. Water-Reducing Admixture (Super Plasticizer):
ASTM C 494, Type F or Type G (high range). See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

C. Water-Reducing, Accelerator Admixture (Non-Corrosive, Non-Chloride): ASTM C 494, Type C or E. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

D. Water-Reducing, Retarding Admixture: ASTM C 494, Type D. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

E. Admixtures containing Chloride Ions: Admixtures containing chloride ions shall not be used in prestressed concrete, concrete containing galvanized or aluminum embedments, concrete containing high early strength cement (Type III), concrete on metal deck floors or roofs, or concrete exposed to sulfate containing solutions such as soils with a water soluble sulfate content more than 0.20 percent by weight and all water with a sulfate content more than 1500 parts per million. Admixtures containing more than 0.05% chloride ions shall not be permitted. The maximum chloride ion content in concrete for corrosion protection shall be as follows:

Type of Member of Cement	Max. Water Soluble Chloride Ion in Concrete at 28 Days, % by weight
Prestressed Concrete	0.06
Reinforced Concrete and other structures, which may be exposed to chloride in service	0.15
Reinforced Concrete in buildings and other structures that will be dry or protected from moisture in service	1.00
All other reinforced concrete construction	0.30

The Contractor shall have the Concrete Supplier's Testing Laboratory verify in a written submittal to the Architect/Engineer and Owner's Testing Laboratory that the chloride ion content in all concrete mix designs used on the project will not exceed limits stated above.

F. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.

G. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.

2.2 RELATED MATERIALS

A. Waterstops: Provide waterstops at all construction joints and other joints in all foundation walls below grade and where shown on the drawings. Size to suit joints.

1. Rubber waterstops: Corps of Engineers CRD-C 513.

2. Polyvinyl chloride (PVC) waterstops: Corps of Engineers CRD-C 572.

3. Preformed Plastic Waterstops: Federal Specifications SS-S-210A "Sealing Compound for Expansion Joints".
Manufacturers:

B. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials, which are resistant to decay when tested in accordance with ANSI/ASTM E 154, as follows:

1. Polyethylene sheet not less than 10 mils thick.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. Moisture-Retaining Cover:
One of the following, complying with ANSI/ASTM C 171:

1. Waterproof paper.

2. Polyethylene film.

3. White-burlap-polyethylene sheet.

E. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rust-proof and non-glazing, and is unaffected by freezing, moisture and cleaning materials.

F. Colored Wear-Resistant Finish: Packaged, dry, combination of materials, consisting of portland cement, graded quartz aggregate, coloring pigments (if required) and plasticizing admixtures. Use coloring pigments that are finely ground, non-fading mineral oxides, interground with cement. Color, as selected by Architect, unless otherwise indicated.

G. Liquid Membrane-Forming Curing Compound:
Liquid type membrane forming curing compound complying with ANSI/ASTM C 309, Type I, Class A unless otherwise acceptable to the Architect/Engineer. Submit manufacturer's certification that product conforms to the requirements specified.

H. Chemical Curing/Floor Hardener Compound: A clear liquid chemically acting compound of sodium silicate that performs as a curing agent with a penetrating compound that changes the free lime in the concrete to calcium silicate, resulting in a surface having a maximum abrasion coefficient of 0.25 cm^3/cm^2 when tested in accordance with ASTM C 118. Submit manufacturer's certification that product conforms to the requirements specified.

I. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lb. of fluosilicates per gal. Submit manufacturer's certification that product conforms to the requirements specified.

J. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type for use in cosmetic nonstructural repairs.

K. Epoxy Products: Two component material suitable for use on dry or damp surface, complying with ASTM C 881, for use in all structural concrete repairs.

L. Expansion Bolts in Concrete:
1. ICBO Approval: Only concrete anchors approved by the International Conference of Building Officials (ICBO) with a published Research Report shall be approved for use.

2. Type: All expansion bolts in concrete shall be only wedge type expansion bolts.

3. Interior Use: All expansion bolts, nuts and washers for use in interior conditioned environments free of potential moisture shall be manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325C, Type II, Class 3.

4. Exterior or Exposed Use: All expansion bolts, nuts and washers for use in exposed or potentially wet environments, or for attachment of exterior cladding materials shall be galvanized or stainless steel. Galvanized bolts, nuts and washers shall conform to ASTM A 153. Stainless steel bolts shall be manufactured from 300 series stainless steel and nuts and washers from 300 series or Type 18-8 stainless steel.

5. Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the bolts.

M. Adhesive Bolts in Concrete:
1. Type: Adhesive bolts in concrete shall consist of a threaded steel rod meeting the requirements of ASTM A 307 and a sealed glass capsule containing polyester resin, quartz sand aggregate and a hardener.

2. Exterior Use: Adhesive bolts used in exterior, exposed, potentially wet environments and for attachment of exterior cladding materials shall have threaded rods manufactured from ASTM A 153 galvanized steel or 300 series stainless steel. Nuts and washers shall also be galvanized or stainless steel.

3. Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the bolts.

O. Non-Shrink Grout:
1. Type: Grout for base plates and bearing plates shall be a non-metallic, shrinkage resistant, premixed, non-corrosive, non-staining product containing Portland cement, silica sands, shrinkage compensating agents and fluidity improving compounds.

2. Specifications: Non-shrink grout shall conform to Corps of Engineers Specification for Non-Shrink Grout, CRD-C621-83.

3. Compressive Strength: Twenty-eight day compressive strength as determined by grout cube tests, shall be 10,000 psi.

2.3 PROPORTIONING AND DESIGN OF MIXES

A. Refer to Testing Laboratory section of the Specifications.

2.4 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Compressive Strength: As indicated on drawings when tested in accordance with ASTM C 39 at 28 days.

C. Selection of Concrete Proportions: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

D. Fly Ash: Limit fly ash to a maximum of 20 percent of cement content by weight.

E. Maximum Aggregate Size: 1 inch.

F. Admixtures:
1. Use air-entraining admixture for exterior exposed concrete. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content of 4.5 percent. Tolerance on air content as delivered shall be +/- 1.5 percent tested per ASTM C 173.
2. Do not use air-entraining admixtures for concrete slabs that are to receive a hard steel trowel finish.
3. Use water-reducing admixtures in strict compliance with the manufacturer's directions.

2.4 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C 94.

PART 3 - EXECUTION

3.1 JOINTS IN CONCRETE

A. Construction Joints: Locate and install construction joints as indicated on the drawings or if not shown on drawings, located so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer.

1. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings, accepted bulkheads designed for this purpose may be used for slabs. See details on the drawings.

2. Place construction joints in the center one third of spans unless specified otherwise. Continue reinforcement across construction joints. Submit construction joint locations not shown on the drawings for Engineer's approval.

3. Waterstops: Provide waterstops in construction joints as indicated on the Architectural and Structural Drawings. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.

4. Isolation Joints in Slabs-on-Ground: Construct isolation joints (without dowels) in slabs-on-ground at points of contact between slabs on ground and vertical surfaces only where specifically detailed on the drawings. Provide construction joints with dowels at all location unless isolation joints are detailed.

5. Contraction (Control) Joints in Slabs-on-Ground:
Construct contraction joints in slabs-on-ground to form panels of patterns as shown in slab-on-grade details on the drawings. Use shear keys, dowels and joint filler as indicated. Form contraction joints by inserting premolded plastic hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris. Contraction joints may be formed by saw cuts as soon after slab finishing without dislodging aggregate.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.3 PREPARATION OF FORM SURFACES

A. Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

C. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.4 CONCRETE PLACEMENT

A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

B. Notify Architect, Engineer, Owner/PM, and testing laboratory a minimum of 48 hours prior to commencement of concreting operations.

C. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

D. Comply with ACI 304, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete, and as herein specified.

1. Do not place concrete, under any circumstances, except in presence of testing laboratory.

2. Unless protection is provided, do not place concrete in rain, sleet, or snow.

3. Maximum height of concrete free fall is 5 feet. Where longer drops are necessary, use a chute, tremie or other approved conveyance to assist the concrete into place without separation. Do not place directly into any excavations, including piers, where water is standing. If the place of deposit cannot be successfully pumped dry, place through a tremie with its outlet end near the bottom of the place of deposit.

4. Regulate rate of placement so concrete remains plastic and flows into position.

5. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

6. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

7. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309 recommended practices.

8. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

9. Honeycombing caused by improper consolidation is unacceptable.

10. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

12. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

13. Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedges, bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

14. Maintain reinforcing, inserts, embedded parts, and formed joints in proper position during concrete placement operations.

15. Maintain concrete cover around reinforcing as indicated on drawings.

E. Cold Weather Placement: Do not place concrete when temperature is below 40 degrees F unless cold weather concrete procedures are followed as specified in ACI 306. Calcium chloride shall not be used.

F. Hot Weather Placement: Exercise special care to prevent high temperature in fresh concrete during hot weather in accordance with ACI 305. Use water reducing set retarding admixtures in such quantities as specifically recommended by manufacturer to assure that concrete remains workable and lift lines will not be visible.

G. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, thoroughly roughen and clean the surfaces of the latter of all foreign matter, scum, and laitance. Retighten forms and re coat the surface of the previously deposited concrete with specified bonding agent per manufacturer's directions.

H. Maintain record of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.5 FINISH OF FORMED SURFACES

A. Rough Form Finish: Provide rough form finish for formed concrete surfaces not exposed-to-view in the finish work and in parking garages unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: Provide smooth form finish for formed concrete surfaces exposed-to-view (except parking garage, unless noted otherwise), or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces, which have received smooth form finish treatment.

1. Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.

2. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets surfaces occurring 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.

3.6 SLAB FINISHES

A. Monitoring and Adjustment: Provide continuous cycle of placement, measurement, evaluation and adjustment of procedures to produce slabs within specified tolerances.

B. Set perimeter forms to serve as screed using either optical or laser instruments. For slabs on grade, wet screeds may be used to establish initial grade during strike-off, unless this method proves insufficient to meet required finish tolerances whereby rigid screed guides are to be used. Where wet screeds are used, they shall be placed using grade stakes set by optical or laser instruments. Use rigid screed guides, as opposed to wet screeds, to control strike-off elevation for all types of elevated (non slab-on-grade) slabs. Divide bays into halves or thirds by hard screeds. Adjust as necessary where monitoring of previous placements indicates unshored structural steel deflections to other than a level profile.

C. Place slabs monolithically. Once slab placement commences, complete finishing operations within same day. Slope finished slab to floor drains where they occur, whether shown or not.

D. Use straightedges specifically made for screeding, such as hollow magnesium straightedges or power strike-offs. Do not use pieces of dimensioned lumber. Strike off and screed slab to a true surface at required elevations. Use optical or laser instruments to check concrete finished surface grade after strike-off. Repeat strike-off as necessary. Complete screeding before any excess moisture or bleeding water is present on surface. Do not sprinkle dry cement on the surface.

E. Immediately following screeding, and before any bleed water appears, use a 10 foot wide highway straightedge in a cutting and filling operation to achieve surface flatness. Do not use bull floats or darbys, except that darbying may be allowed for narrow slabs and restricted spaces.

F. Wait until water sheen disappears and surface stiffens before proceeding further. Do not perform subsequent operations until concrete will sustain foot pressure with maximum of 1/4 inch indentation.

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerance specified below. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance as specified below. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thinfilm finish coating system. After floating, begin first trowel finish operation using power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface to a tolerance as specified below. Grind smooth surface defects, which would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified above, then immediately follow with slightly scarifying surface by fine brooming.

E. Non-Slip Broom Finish: Apply non-slip broom finish to ramps less than 6% exterior concrete platforms, steps and elsewhere as indicated. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

F. Rake Finish: Provide a rake finish to all ramps exceeding a 6% slope. Finish shall be applied perpendicular to direction of traffic.

G. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat and allow 24 hours for drying between coats.

Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

H. Non-slip Aggregate Finish: Apply non-slip aggregate finish to concrete stair treads, platforms, ramps and elsewhere as indicated on the Architect's or Structural Drawings.

After completion of float finishing, and before starting trowel finish, uniformly spread 25 lb. of dampened non-slip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified.

After curing, lightly work surface with a steel wire brush, or an abrasive stone, and water to expose non-slip aggregate.

I. Colored Wear-Resistant Finish: Provide colored wear-resistant finish to monolithic slab surface indicated.

Apply dry shake materials for colored wear-resistant finish at rate of not less than 60 lbs. per 100 sq. ft., unless greater amount is recommended by material manufacturer.

Immediately following first floating operation, uniformly distribute approximately 2/3 of required weight of dry shake material over concrete surface, and embed by means of power floating. Follow floating operation with second shake application, uniformly distributing remainder of dry shake material at right angles to first application, and embed by power floating.

After completion of broadcasting and floating, apply trowel finish as herein specified. Cure slab surface with curing compound recommended by dry shake hardener manufacturer, waiting up to time period as required by the manufacturer (depending on humidity and drying) before application. Do not use moisture-cover or moisture curing methods.

3.7 CONCRETE FINISH MEASUREMENT AND TOLERANCES

A. Definitions:

1. Flatness (FF) - A measure of a concrete surfaces curvature or deviation from a planar surface. Concrete surfaces that are not flat are wavy or bumpy.

2. Levelness (FL) - A measure of a concrete surfaces tilt or inclination from a horizontal plane. Concrete surfaces that are not level are sloped or tilted.

A. Finished slab flatness (FF) and levelness (FL) values are to comply with the following minimum requirements:

1. Slab on Grade with Trowel Finish:

Specified overall value	FF 25 / FL 20
Minimum local value	FF 17 / FL 15

2. Unshored Metal Deck and Beam Floor Construction:

Specified overall value	FF 20
Minimum local value	FF 15

3. "Specified overall value" (SOV) is based on the composite of all measured values in a placement derived in accordance with ASTM E1155.

4. "Minimum local value" (MLV) describes the flatness or levelness below which repair or replacement is required. MLV is based on the results of an individual placement and applies to a minimum local area. Minimum local area boundaries may not cross a construction joint or expansion joint. A minimum local area will be bounded by construction and/or control joints, or by column lines and/or half-column lines, whichever is smaller.

B. Measurement Standard: All floors should be measured for flatness and levelness according to ASTM E 1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the F-Number System".

1. Contractor not experienced in using FF and FL criteria is encouraged to retain the services of a floor consultant to assist with recommendations concerning adjustments to slab thicknesses, finishing techniques, and procedures on measurements of the finish as it progresses in order to achieve the specific flatness and levelness numbers.

C. Time Period for Measurement and Reporting: Measurement of the finished concrete surface profile for any test section shall be made when requested by the Owner's Representative at his option. All measurements shall be made by the Owner's Testing Laboratory or designated party within 72 hours after completion of finishing operations. The Contractor shall be notified immediately after the measurements of any section are complete and a written report of the floor measurement results shall be submitted within 72 hours after finishing operations are complete. The Contractor shall take immediate action to correct any work that is outside specified tolerances as outlined later in this section.

D. Measuring Equipment: The concrete surface profile shall be measured using equipment manufactured for the purpose such as a laser level or any Type II apparatus (i.e. profileograph, or dipstick) specified in ASTM E1155.

L. Remedial Measures for Slab Finish Construction Not Meeting Specified Tolerances:

1. Application of Remedial Measures.
Remedial measures specified herein are required whenever either or both of the following occur:

a. The composite overall values of FF or FL of the entire floor installation measure less than specified values.

b. Any individual test section measures less than the specified absolute minimum FF or FL value.

2. Modification of Existing Surface:

a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work can be repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately undertake the approved repair method.

b. The Contractor shall submit for review and approval a detailed work plan of the proposed repair showing areas to be repaired, method of repair and time to effect the repair.

c. Repair method(s), at the sole discretion of the Architect/Engineer or Owner's Representative, may include grinding (floor stoning), planing, retopping with self leveling grout or polymer concrete, or any combination of the above.

d. The Architect/Engineer or Owner's Representative maintains the right to require a test repair section using the approved method of repair for review and approval to demonstrate a satisfactory end product. If, in the opinion of the Architect/Engineer or Owner's Representative, the repair is not satisfactory an alternate method of repair shall be submitted or the defective area shall be replaced.

e. The judgment of the Architect/Engineer or Owner's Representative on the appropriateness of a repair method and its ability to achieve the desired end product shall be final.

f. All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3. Removal and Replacement:

a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately commence to remove and replace the defective work.

b. Replacement section boundaries shall be made to coincide with the test section boundaries as previously defined.

c. Sections requiring replacement shall be removed by sawcutting along the section boundary lines to provide a neat clean joint between new replacement floor and existing floor.

d. The new section shall be reinforced the same as the removed section and doweled into the existing floor as required by the Engineer. No existing removed reinforcing steel may be used. All reinforcing steel shall be new steel.

e. Replacement sections may be retested for compliance at the discretion of the Architect/Engineer or Owner's Representative.

f. The judgment of the Architect/Engineer or Owner's Representative on the need for replacement shall be final.

g. All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3.8 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete.

2. Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be 7 days for all concrete except high early strength concrete, which shall be cured for 3 days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods, are tested with the average compressive strength equal to 70% of the specified 28 day strength. Curing may also be terminated when the temperature of the concrete is maintained at least 50°F for the same length of time that laboratory cured cylinders, representative of the concrete in place, require to achieve 85% of the 28 day compressive strength.

3. Curing shall be in accordance with ACI 308 procedures. Avoid rapid drying at the end of the curing period.

B. Curing Methods: Perform curing of all concrete horizontal and vertical surfaces (including columns, shear walls and basement walls) by one of the methods specified or by combinations thereof, as herein specified. The Contractor shall choose a curing method that is compatible with the requirements for subsequent material usage on the concrete surface.

1. Provide moisture curing by one of the following methods:

a. Keep concrete surface continuously wet by covering with water.

b. Continuous water-fog spray.

c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Provide curing/hardener or liquid membrane forming curing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; and to exterior slabs, walks and curbs, as follows:

Apply specified compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Do not allow to puddle. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue down carpet), painting and other coatings and finish materials, unless otherwise acceptable to the Architect.

Use only clear curing compounds for exposed interior slabs and all exterior concrete.

C. Curing Formed Surfaces: Where wooden forms are used, cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping and other flat surfaces by application of appropriate curing compound.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.9 HOT WEATHER CONCRETING

A. Definition:

1. Conditions warranting hot weather concreting practices are defined as any combination of high air temperature, low relative humidity and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise result in abnormal properties.

2. The maximum acceptable concrete temperature at the truck discharge point shall be 95°F.

B. Specification: Hot weather concreting practices required to limit the concrete temperature at the truck discharge point to 95°F or lower shall be followed according to ACI 305 "Hot Weather Concreting."

C. Records: Under hot weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature at truck discharge and general weather conditions.

D. Hot Weather Concreting Requirements: The following items, all or in part as required, should be followed to limit the concrete temperature to 95°F or lower:

1. Design the concrete mixes specifically for hot weather conditions replacing some cement with fly ash or other pozzolan and using a water reducing retarding admixture (ASTM C 494 Type D).
2. Use the largest size and amount of coarse aggregate compatible with the job.
3. Use sunshades and/or windbreaks.
4. Delay construction of indoor slabs-on-grade until the walls and roof are constructed.
5. Cool and shade aggregate stockpiles.
6. Use ice as part of the mixing water or cool the water with liquid nitrogen.

7. Limit the number of revolutions at mixing speed to 125 maximum.
8. Paint mixers and storage bins or silos white to minimize heat absorption.
9. Reduce time between mixing and placing as much as possible.
10. Do not add water to ready-mixed concrete at the job site unless it is part of the amount required initially for the specified water-cement ratio and the specified slump.
11. Schedule concrete placement for early morning, late afternoon, or night.
12. Have all forms, equipment and workers ready to receive and handle concrete.
13. Maintain one standby vibrator for every three vibrators used.
14. Keep all equipment cool by spraying with water including chutes, conveyors, pump lines, tremies, reinforcement and buggies.
15. Dampen the subgrade and side forms with cool water.

16. Protect slab concrete at all stages against undue evaporation by applying a fog spray or mist above the surface or applying a monomolecular film. Where high temperatures and/or placing conditions dictate, use water-reducing retarding admixture (Type D) in lieu of the water-reducing admixture (Type A) as directed by the Owner's Testing Laboratory.
17. Provide continuous curing, preferably with water, during the first 24 hours using wet burlap, cotton mats, continuous spray mist, or by applying a curing compound meeting ASTM C 309. Continue curing for 3 days minimum.
18. Spray exteriors of forms to keep them cool.
19. As soon as possible, loosen forms and run water down the inside. When forms are removed, provide a wet cover to newly exposed surfaces.

3.10 COLD WEATHER CONCRETING

A. Definition:

1. Concrete shall not be placed on any day when the outside air temperature is 40°F or less and falling unless cold weather concreting practices are followed as specified below.

2. Cold weather concreting practices should be followed whenever the mean daily temperature drops below 40°F for more than three successive days.

3. The temperature of concrete mixed and delivered to the job site shall conform to the following requirements:

Air Temperature	Min. Concrete Temperature
Above 30°F	60°F
0°F to 30°F	65°F
Below 0°F	70°F

4. The minimum temperature of concrete during placement and curing shall be 55°F.

5. The maximum concrete temperature heated by artificial means at point of placement shall not exceed 90°F.

B. Specification: Cold weather concreting practices required to limit the concrete temperatures as specified above shall be followed according to ACI 306R-78 "Cold Weather Concreting".

C. Records: Under cold weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature as placed and general weather conditions.

D. Cold Weather Concreting Requirements: The following items, all or in part as required, should be followed to assure acceptable concrete in cold weather conditions:

1. Design the concrete mix suitable for cold weather. Use air entrainment and obtain high early strength by using a higher cement content, a high early strength cement (Type III), or an accelerator (ASTM C 494 Type C and E).
2. Protect the concrete during curing period using insulating blankets, insulated forms, enclosures and/or heaters.
3. Concrete cured in heated enclosures shall have heaters vented to prevent exposure of concrete and workmen to noxious gases.
4. Frozen subgrade shall be thawed prior to concrete placement and snow and ice shall be removed from forms.
5. Concrete shall be protected and cured at 55°F for three days minimum if normal concrete (Type I cement) is used and for two days minimum if high early strength concrete (concrete with Type III cement, 100 pounds cement added per cubic yard concrete, or an accelerator added).
6. Concrete not loaded during construction shall be protected a minimum of 3 days for normal concrete and 2 days for high early strength concrete to obtain safe form stripping strength. Concrete fully loaded during construction shall be protected for whatever time period is required to obtain the required strength as determined by nondestructive strength tests (Windsor probe, Swiss Hammer Test) on the in-place concrete.
7. Heat the mixing water and then blend hot and cold water to obtain concrete no more than 10°F above the required temperature.
8. Heat the aggregates by circulating steam in pipes placed in the storage bins for air temperatures consistently below 32°F. When either water or aggregate is heated to over 140°F combine them in the mixer first to obtain a maximum temperature of the mixture not to exceed 140°F in order to prevent flash set of the concrete.
9. Uniformly thaw aggregates far in advance of batching to prevent moisture variations in the stockpile.
10. Cover warmed stockpiles with tarps to retain heat.
11. Place air entraining admixture in the batch after the water temperature has been reduced by mixing with cooler solid materials.
12. Use wind screens to protect concrete from rapid cooling.
13. Place vertical pump lines inside the building, if possible, for concrete being pumped.
14. Maintain artificial heat as low as possible to reduce temperature stresses during cooling.
15. Avoid water curing of concrete except for parking garage structures. Apply the required curing compound to unformed surfaces as soon as possible to prevent drying of concrete from heated enclosures.
16. Delay form stripping as long as possible to help prevent drying from heated enclosures and to reduce damage to formed surfaces caused by premature stripping.
17. Provide triple thickness of insulating materials at corners and edges vulnerable to freezing.
18. Wrap protruding reinforcing bars with insulation to avoid heat drain from the warm concrete.
19. Gradually reduce the heat at the end of the heating period to reduce likelihood of thermal shock.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with inplace construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and 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 to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions unless otherwise indicated.

E. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp and finish concrete surfaces as scheduled.

3.12 CONCRETE SURFACE REPAIRS

A. Definition - Defective Areas:

1. Formed Surfaces: Concrete surfaces requiring repairs shall include all honeycombs, rock pockets and voids exceeding 1/4" in any dimension, holes left by tie rods or bolts, cracks in excess of 0.01" and any other defects that affect the durability or structural integrity of the concrete.

2. Unformed Surfaces: Concrete surfaces requiring repair shall include all surface defects such as crazing, cracks in excess of 0.01" wide or cracks which penetrate to reinforcement or through the member, popouts, spalling and honeycombs.

B. Classification:

1. Structural Concrete Repair: Major defective areas in concrete members that are load carrying (such as shear walls, beams, joists and slabs), are highly stressed, and are vital to the structural integrity of the structure shall require structural repairs. Structural concrete repairs shall be made using a two part epoxy bonder and/or epoxy mortar. Location of structural concrete repairs shall be determined by the Engineer.

2. Cosmetic Concrete Repair: Defective areas in concrete members that are non-load carrying and minor defective areas in load carrying concrete members shall require cosmetic concrete repair. Cosmetic concrete repairs may be made using a non-epoxy non-shrink patching mortar and bonding agent. The location of cosmetic concrete repair required shall be determined by the Engineer. Cosmetic concrete repair in exposed-to-view surfaces will require Architect's approval prior to patching operation.

3. Slab Repairs: High areas in concrete slabs shall be repaired by grinding after concrete has cured at least 14 days. Low areas shall be filled using self-leveling mortars. Repair of slab spalls and other surface defects shall be made using epoxy products as specified above and as determined by the Engineer.

3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION

See Testing Laboratory Services section of these Specifications 01400 for concrete materials and cast-in-place concrete inspection and test requirements.

END OF SECTION 03300

SECTION 03365
CONCRETE SEALER

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete.

1.03 SUBMITTALS

A. Comply with Section 01300 – Administrative Requirements.

B. Product Data: Submit manufacturer's product data, including surface preparation and application instructions.

C. Installer's Project References: Submit list of successfully completed projects, including project name and location, name of architect, and type and quantity of concrete floor stain applied.

D. Maintenance Instructions: Submit manufacturer's maintenance and cleaning instructions.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Concrete floor stain materials shall be products of a single manufacturer.

B. Installer's Qualifications:
   1. Successful experience in application of similar concrete floor stains.
   2. Employ persons trained for application of concrete floor stains.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying manufacturer, product name, and concrete floor stain color.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready for use.
   1. Concrete Floor Sealer: Keep away from ignition sources. Do not allow to freeze.

C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not apply concrete floor stain when air or surface temperature is below 40 degrees F.

B. Concrete Floor Sealer: Do not apply when air or surface temperature is below 55 degrees F.

C. Exterior Surfaces: Do not apply materials in wet weather.

1.07 SEQUENCING

A. Prepare surface and apply concrete floor stain after interior finish work is completed and before baseboards are installed.

PART 2 PRODUCTS

2.01 MANUFACTURER

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2.03 CONCRETE FLOOR SEALER

A. Concrete Floor Sealer: Kemiko Stone Tone Sealer.
   1. Acrylic water-based urethane clear sealer.
   2. Solids Content: 30 percent.
   3. Non-yellowing.
   4. Resistant to blush.
   5. Satin finish.
   6. VOC compliant.
   7. Quick drying.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive concrete floor stain. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

A. Protection:
   1. Protect walls and surrounding surfaces not to receive concrete floor stain.
   2. Do not allow stain to come in contact with wood or metal surfaces.

B. Prepare concrete surface in accordance with manufacturer's instructions.

C. Ensure concrete is a minimum of 28 days old.

D. Ensure concrete surface is clean, dry, structurally sound, and free from dirt, dust, oil, grease, solvents, paint, wax, asphalt, concrete curing compounds, sealing compounds, surface hardeners, bond breakers, adhesive residue, and other surface contaminants.

E. Do not acid wash or use heavy alkali cleaners.

3.03 APPLICATION

F. Concrete Floor Sealer: Apply concrete floor sealer over concrete floor stain in accordance with manufacturer's instructions.

G. Keep material containers closed when not in use to avoid contamination.

3.04 PROTECTION

A. Protect stained concrete floor from damage during construction.

B. Protect concrete surfaces from foot traffic for a minimum of 24 hours.

C. Avoid washing concrete surfaces for a minimum of 48 hours.

END OF SECTION

SECTION 03370

CONCRETE POLISHED FLOOR STAIN AND SEALER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete floor stain.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete.

1.03 SUBMITTALS

A. Comply with Section 01300 – Administrative Requirements.

B. Product Data: Submit manufacturer's product data, including surface preparation and application instructions.

C. Color Samples: Submit manufacturer's standard color chart.

D. Installer's Project References: Submit list of successfully completed projects, including project name and location, name of architect, and type and quantity of concrete floor stain applied.

E. Maintenance Instructions: Submit manufacturer's maintenance and cleaning instructions.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Concrete floor stain materials shall be products of a single manufacturer.

B. Installer's Qualifications:
   1. Successful experience in application of similar concrete floor stains.
   2. Employ persons trained for application of concrete floor stains.

C. Preinstallation Meeting: Convene a preinstallation meeting before start of application of concrete floor stain. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and applicator. Review surface preparation, application, protection, and coordination with other work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying manufacturer, product name, and concrete floor stain color.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready for use.
   1. Concrete Floor Sealer: Keep away from ignition sources. Do not allow to freeze.

C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not apply concrete floor stain when air or surface temperature is below 40 degrees F.

B. Concrete Floor Sealer: Do not apply when air or surface temperature is below 55 degrees F.

C. Exterior Surfaces: Do not apply materials in wet weather.

1.07 SEQUENCING

A. Prepare surface and apply concrete floor stain after interior finish work is completed and before baseboards are installed.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Drawings and specifications are based on manufacturer's literature from Ameripolish or H&C unless otherwise indicated. Substitutions are permitted. Other manufacturers to comply with the minimum levels of material and detailing indicated on the drawings and in conformance with provisions of Section 01600 – Product Requirements.

B. Acceptable Manufacturer: Ameripolish or H&C

C. Substitutions: Permitted under provisions of Section 01600.

2.02 CONCRETE FLOOR STAIN

A. Concrete Floor Stain: Ameripolish Acetone or H&C (Sherwin Williams).
   1. Color: Selected from manufacturers standard range of colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive concrete floor stain. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

A. Protection:
   1. Protect walls and surrounding surfaces not to receive concrete floor stain.
   2. Do not allow stain to come in contact with wood or metal surfaces.

B. Prepare concrete surface in accordance with manufacturer's instructions.

C. Ensure concrete is a minimum of 28 days old.

D. Ensure concrete surface is clean, dry, structurally sound, and free from dirt, dust, oil, grease, solvents, paint, wax, asphalt, concrete curing compounds, sealing compounds, surface hardeners, bond breakers, adhesive residue, and other surface contaminants.

E. Do not acid wash or use heavy alkali cleaners.

3.03 APPLICATION

A. Apply polished concrete floor stain in accordance with manufacturer's instructions at locations indicated on the drawings.

B. Control depth of color by adjusting volume of stain applied to floor.

C. Grind to a Class A finish – Cement Fines (Also called light sand/Cream Finish) - Class A is defined as 85 – 95% Cement Fines and 5 – 15% Fine Aggregate. The cement fines finish typically exposes only the sand particles in the concrete floor. This finish is considered a “creamy looking” surface and is the most popular choice for Architectural Ground & Polished floors.

D. Stain with one of the products noted above. Final product to look similar to image above.

E. Install Densifier after stain.

F. Polish to a Level 2 Satin (Honed) finish with image clarity value of 10-39% - A level 2 honed polish is obtained by stopping at the 400-grit resin bond, producing a low-sheen finish. When you look directly down at the finished floor and at a distance of roughly 100 feet, you can start to see a slight overhead reflection. This grit level produces a low-luster matte finish.

G. Keep material containers closed when not in use to avoid contamination.

3.04 PROTECTION

A. Protect stained concrete floor from damage during construction.

B. Protect concrete surfaces from foot traffic for a minimum of 24 hours.

C. Avoid washing concrete surfaces for a minimum of 48 hours.

END OF SECTION

SECTION 04065

MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.02 RELATED SECTIONS

A. Section 04720 - Cast Stone.

B. Section 04810 - Unit Masonry Assemblies: Installation of mortar and grout.

C. Section 04851 - Cut Stone Veneer.

1.03 REFERENCES

A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements For Masonry Structures; American Concrete Institute International; 2002.

B. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International; 2002.

C. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2003.

D. ASTM C 150 - Standard Specification for Portland Cement; 2002a.

E. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2004.

F. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2003b.

G. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 2003.

H. ASTM C 476 - Standard Specification for Grout for Masonry; 2002.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C 270 is to be used. Also include required environmental conditions and admixture limitations.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 MATERIALS`

A. Portland Cement: ASTM C 150, Type I - Normal; white.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Aggregate: ASTM C 144.

D. Grout Aggregate: ASTM C 404.

E. Pigments for Colored Mortar: Iron or chromium oxides with demonstrated stability and colorfastness.
   1. Colors: As required to match existing mortar.

F. Water: Clean and potable.

G. Bonding Agent: Latex type.

2.02 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C 270, Property Specification.
   1. Masonry below grade and in contact with earth: Type S.
   2. Exterior, loadbearing masonry: Type N.
   3. Exterior, non-loadbearing masonry: Type N.
   4. Interior, loadbearing masonry: Type N.
   5. Interior, non-loadbearing masonry: Type O.
   6. Pointing mortar: Type N with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

F. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.04 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; mix in accordance with ASTM C 476.
   1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; mix in accordance with ASTM C 476.
   1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.05 GROUT MIXING

A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C 476 for fine and coarse grout.

PART 3 EXECUTION

3.01 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.02 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.03 GROUTING

A. Perform all grouting by means of low-lift technique. Do not employ high-lift grouting.

B. Low-Lift Grouting:
   1. Limit height of pours to 12 inches.
   2. Limit height of masonry to 16 inches above each pour.
   3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
   4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

END OF SECTION

SECTION 04720

CAST STONE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural cast stone.

B. Units required are:
   1. Exterior wall units.
   2. Interior units.

1.02 RELATED SECTIONS

A. Section 04065 - Mortar and Masonry Grout: Mortar for setting cast stone.

B. Section 04810 - Unit Masonry Assemblies: Installation of cast stone in conjunction with masonry.

C. Section 07900 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.

D. Section 04851 - Cut Stone Veneer.

1.03 REFERENCES

A. ACI 318 - Building Code Requirements for Reinforced Concrete; 2002.

B. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

C. ASTM A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2002.

D. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2004.

E. ASTM C 33 - Standard Specification for Concrete Aggregates; 2003.

F. ASTM C 150 - Standard Specification for Portland Cement; 2002a.

G. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2003b.

H. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2004.

I. ASTM C 642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 1997.

J. ASTM C 1364 - Standard Specification for Architectural Cast Stone; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

C. Product Data: Test results of cast stone components made previously by the manufacturer.

D. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.

E. Mortar Color Selection Samples.

F. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.

G. Full-Size Samples: Units required for mock-up.

H. Source Quality Control Test Reports.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm with a minimum of 5 years of experience in producing cast stone of the types required for project and:
   1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
   2. Products previously produced by plant and exposed to weather that exhibit satisfactory appearance.

B. Mock-Up: Provide full size cast stone components for installation in mock-up of exterior wall.
   1. Approved mock-up will become standard for appearance and workmanship.
   2. Mock-up may not remain as part of the completed work.
   3. Remove mock-up not incorporated into the work and dispose of debris.

C. Source Quality Control: Test compressive strength and absorption of specimens selected at random from plant production.
   1. Test in accordance with ASTM C 642.
   2. Select specimens at rate of 3 per 500 cubic feet, with a minimum of 3 per production week.
   3. Submit reports of tests by independent testing agency, showing compliance with requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

B. Number each piece individually to match shop drawings and schedule.

C. Store cast stone components and installation materials in accordance with manufacturer's instructions.

D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.

E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.

F. Store mortar materials where contamination can be avoided.

G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.01 ARCHITECTURAL CAST STONE

A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C 1364.
   1. Compressive Strength: As specified in ASTM C 1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
   2. Freeze-Thaw Resistance: Demonstrated by field experience.

3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.

4. Color: Selected by Architect from manufacturer's full range.
5. Remove cement film from exposed surfaces before packaging for shipment.

B. Shapes: Provide shapes indicated on drawings.
1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
2. Unless otherwise indicated on drawings, provide:
a. Wash or slope of 1:12 on exterior horizontal surfaces.
b. Drips on projecting components, wherever possible.
c. Raised fillets at back of sills and at ends to be built in.

C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.

2.02 MATERIALS

A. Portland Cement: ASTM C 150.
1. For Units: Type I or II, white.
2. For Mortar: Specified in Section 04065.

B. Coarse Aggregate: ASTM C 33, except for gradation; granite, quartz, or limestone.

C. Fine Aggregate: ASTM C 33, except for gradation; natural or manufactured sands.

D. Admixtures: ASTM C 494/C 494M.

E. Water: Potable.

F. Reinforcing Bars: ASTM A 615/A 615M deformed bars, galvanized or epoxy coated.

G. Steel Welded Wire Reinforcement: ASTM A 185, galvanized or epoxy coated.

H. Embedded Anchors, Dowels, and Inserts: ASTM A 123/A 123M hot-dip galvanized steel, of type and size as required for conditions.

I. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A 123M, of shapes and sizes as required for conditions.

J. Mortar: Specified in Section 04065.

K. Sealant: As specified in Section 07900.

L. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
1. Product: Mortar Net
2. Manufacturer: Mortar Net USA, LTD; www.mortarnet.com

M. Weep/Cavity Vents: Plastic tubing.
1. Acceptable Manufacturer: Hohmann & Barnard, Inc; www.h-b.com
a. Acceptable Product: Weep Hole No. 343.
b. Substitutions: See Section 01600 - Product Requirements.

N. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.

B. Do not begin installation until unacceptable conditions have been corrected.

3.02 INSTALLATION

A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04810.

B. Mechanically anchor cast stone units indicated; set remainder in mortar.

C. Setting:
   1. Drench cast stone components with clear, running water immediately before installation.
   2. Set units in a full bed of mortar unless otherwise indicated.
   3. Fill vertical joints with mortar.
   4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

D. Joints: Make all joints 3/8 inch, except as otherwise detailed.
   1. Rake mortar joints 3/4 inch for pointing. Scrub face of each stone to remove excess mortar before it sets.
   2. Point joints with mortar in layers 3/8 inch thick and tool to Architect approved flush profile.
   3. Leave the following joints open for sealant:
      a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
      b. Joints in projecting units.
      c. Joints between rigidly anchored units, including soffits, panels, and column covers.
      d. Joints below lugged sills and stair treads.
      e. Joints below ledge and relieving angles.
      f. Joints labeled "expansion joint".

E. Sealant Joints: Install sealants as specified in Section 07900.

F. Installation Tolerances:
   1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
   2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
   3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
   4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.03 CLEANING AND PROTECTION

A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
   1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
   2. Repair methods and results subject to Architect 's approval.

B. Clean cast stone components as work progresses; remove mortar fins and smears before tooling joints.

C. Protect from splashing by mortar and other damage.

END OF SECTION

SECTION 04730

THIN-SET STONE VENEER

1.1 PROJECT CONDITIONS

A. Environmental Requirements:

1. Minimum air temperature of 40 degrees F (4 degrees C) prior to, during, and for 48 hours after completion of work; and
2. Cold Weather Requirements: IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

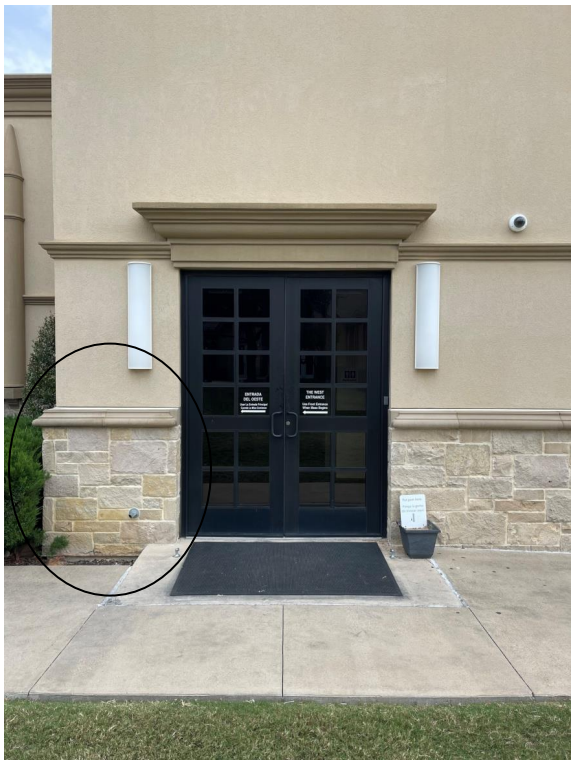
1.2 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect materials in accordance with Section 01600.

1. Store mortar materials on pallets in dry place.
2. Protect materials from rain, moisture, and freezing temperatures.
3. Protect reinforcement and accessories from elements.

PART 2 PRODUCTS

2 **STONE :** TO MATCH EXISTING STONE, COLOR, & PATTERN (INTERIOR & EXTERIOR INSTALLATION)



3 MORTAR COLOR.

EXISTING STONE – MORTAR TO MATCH EXISTING (INTERIOR & EXTERIOR INSTALLATION)

A. Mixing: Use thinset with acrylic additive in accordance with thinset manufacturer's recommendation.
1. Thoroughly mix mortar and grout ingredients in quantities needed for immediate use. Mix grout to ASTM C 270, Type S proportions and mortar to ASTM C 270, Type S requirements.

A. Setting Accessories:

2. Fasteners: Coated 1-1/2 inch nails, staples, or screws of type and for spacing as recommended by simulated stone manufacturer.
3. Cleaner: Nonacid cleaner as recommended by simulated stone manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examination: Examine conditions and proceed with work in accordance with Section 01400.
1. Verify that field conditions are acceptable and are ready to receive work.
2. Verify items provided by other Sections of work are properly sized and located.
3. Verify that built-in items are in proper location and ready for roughing into masonry work.
4. Verify correct product prior to installation.
a. Install metal lath if residual coatings are present on substrate.

B. Protect surrounding area from possible damage during installation work.

C. Initiating installation constitutes Installer's acceptance of existing surfaces and substrate.

3.2 APPLICATION

A. Mortar:
1. Apply bonding agent to masonry or concrete substrates in accordance with manufacturer's recommendations.

D. Stone Veneer :

1. Apply 3/8 to 1/2 inch of mortar covering to back of each stone.
2. Place units with uniform mortar joints to match existing.
3. Install outside corner return units with short and long lengths alternated.

E. Plan work to minimize jobsite cutting. Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking unit corners or edges.

F. Remove excess mortar; do not allow mortar to dry on face of units.
1. Point and tool joints before mortar has set.
2. Clean and finish joints in accordance with architect's and manufacturer's instructions.

G. Control Joints: Size in accordance with Section 07920 for sealant performance, but in no case larger than adjacent mortar joints in exposed stone units.

H. Expansion Joints: Provide where indicated on Drawings or as recommended by system manufacturer.

I. Built-in Work: As work progresses, build in door and window frames, nailing strips, anchor
bolts, plates, and other items specified in various sections.
1. Build in items plumb and level.
2. Bed anchors of metal door and glazed frames in mortar joints. Fill frame voids solid with mortar.
3. Do not build in organic materials subject to deterioration.

3.3 ADJUSTING

A. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, and grounds. Cooperate with other sections of work to provide correct size, shape, and location.
   1. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.4 CLEANING AND SEALING

A. Cleaning: Comply with Section 01740.
   1. Remove excess mortar and smears using brush or steel wool.
   2. Replace defective mortar. Match adjacent work.
   3. Clean soiled surfaces with non-acidic solution, acceptable to the stone manufacturer, which will not harm masonry or adjacent materials.
   4. Leave surfaces thoroughly clean and free of mortar and other soiling.
   5. Use nonmetallic tools in cleaning operations.

B. Sealer: Apply sealer to completed surface in accordance with manufacturer's instructions.

END OF SECTION

SECTION 04810

UNIT MASONRY ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Block.

B. Reinforcement and Anchorage.

C. Flashings.

D. Lintels.

E. Accessories.

1.02 RELATED SECTIONS

A. Section 04065 - Mortar and Masonry Grout.

B. Section 04720 - Cast Stone.

C. Section 04851 - Cut Stone Veneer

D. Section 04900 - Masonry Restoration and Cleaning.

E. Section 05500 - Metal Fabrications: Loose steel lintels.

F. Section 06100 - Rough Carpentry: Nailing strips built into masonry.

G. Section 07115 - Bituminous Dampproofing: Dampproofing parged masonry surfaces.

H. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCES

A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2002.

B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2002.

C. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2002.

D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2003.

E. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2004.

F. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units; 2003.

G. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2003.

H. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2003b.

I. ASTM C 476 - Standard Specification for Grout for Masonry; 2002.

J. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.

1.04 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

1.05 MOCK-UP

A. Mock-up specified in Section 01410 - Approval Mockups.

1.06 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

1.09 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners.
   3. Load-Bearing Units: ASTM C 90, normal weight.
      a. Hollow block.
   4. Non-Loadbearing Units: ASTM C 129.
      a. Hollow block.
      b. Lightweight.

2.02 MORTAR AND GROUT MATERIALS

A. Mortar and grout: As specified in Section 04065.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Hohmann & Barnard, Inc: www.h-b.com.
   3. Masonry Reinforcing Corporation of America: www.wirebond.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420) deformed billet bars; uncoated.

C. Single Wythe Joint Reinforcement: Truss type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

D. Multiple Wythe Joint Reinforcement: Truss type; fabricated with moisture drip; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

E. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
   1. Vertical adjustment: Not less than 2 inches.

F. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.

G. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
   1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

H. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 2 inches.

2.05 FLASHINGS

A. Specified in Section 07650 – Wall Flashing.

2.06 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Dur-O-Wal: www.dur-o-wal.com.
      b. Hohmann & Barnard, Inc: www.h-b.com.
      c. Masonry Reinforcing Corporation of America: www.wirebond.com.
      d. Substitutions: See Section 01600 - Product Requirements.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; maximum lengths available.
   1. Manufacturers:
      a. Dur-O-Wal: www.dur-o-wal.com.

b. Hohmann & Barnard, Inc: www.h-b.com.
c. Masonry Reinforcing Corporation of America: www.wirebond.com.
d. Substitutions: See Section 01600 - Product Requirements.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
1. Product: Mortar Net
2. Manufacturer: Mortar Net USA, LTD; www.mortarnet.com

D. Building Paper: ASTM D 226, Type I ("No.15") asphalt felt.

E. Nailing Strips: Preservative treated softwood, as specified in Section 06100.

F. Weep/Cavity Vents: Louvered plastic tubing.
1. Acceptable Manufacturer: Hohmann & Barnard, Inc; www.h-b.com
a. Acceptable Product: Weep Hole No. 343 Wilko Weep Hole.
b. Substitutions: See Section 01600 - Product Requirements.

G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXES

A. Specified in Section 04065 - Mortar and Masonry Grout.

B. Grout: ASTM C 476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

I. Isolate masonry partitions from vertical structural framing members with a control joint.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.05 WEEP/CAVITY VENTS

A. Install weep/cavity vents in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing.

B. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch greater than panel thickness. Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.

C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.06 CAVITY WALL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor barrier adhesive.

3.07 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.08 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement 8 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below

openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.11 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.12 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend plastic flashings to within 1/4 inch of exterior face of masonry.

C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.13 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
   1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
   2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
   3. Openings over 78 inches: Reinforce openings as detailed.
   4. Do not splice reinforcing bars.
   5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
   6. Place and consolidate grout fill without displacing reinforcing.
   7. Allow masonry lintels to attain specified strength before removing temporary supports.

3.14 GROUTED COMPONENTS

A. Lap splices minimum 24 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

3.15 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

D. Form expansion joint as detailed.

3.16 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

3.17 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.18 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.19 PROTECTION OF FINISHED WORK

A. Without damaging completed work, provide protective boards at exposed external corners which are subject to damage by construction activities.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of structural steel work is shown on drawings including schedules, notes and details which show size and location of members, typical connections, and type of steel required. Furnish all labor, materials, services, equipment and appliances required in conjunction with or related to the furnishing, fabrication, delivery, and erection of all structural steel defined below. Include all supplementary parts, members and connections necessary to complete the structural steel work, regardless of whether all such items are specifically shown or specified on the drawings.

B. Structural steel shall be defined as that work prescribed in Section 2.1 of the AISC Code of Standard Practice and the following items: shelf angles, angle frames for openings in floors and roofs, cooling tower grillage, support frames for elevator machines not otherwise furnished by the elevator manufacturer, steel floor framing supporting elevator equipment, all steel supports for elevator guide rails, steel crane rails and stops, miscellaneous metal deck support and edge angles, shop welded metal studs, all connection material, temporary construction bracing, and all other structural steel shown or specified on the drawings to be part of the work. Labor shall include shop painting as specified, field touch-up painting, and grouting of base plates and bearing plates.

C. Miscellaneous metal fabrications, architecturally exposed structural steel, metal stairs, steel joists, and metal deck are specified elsewhere in these Specifications.

1.3 QUALIFICATIONS

1. Fabricator: The structural steel fabricator shall have not less than 10 years experience in the successful fabrication of structural steel similar to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer.

2. Erector: The structural steel erector shall have not less than 5 years successful experience in the erection of structural steel of a similar nature to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer.

3. Welder: Qualify welding processes and welding operators in accordance with AWS "Structural Welding Code - Steel".

    a. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

    b. If recertification of welders is required, retesting will be Contractor's responsibility.

1.4 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A. Codes and Standards:

Comply with provisions of the following, except as otherwise indicated:

1. All federal (OSHA), state and local laws which govern safety requirements for steel erection and other requirements if more stringent than the codes and standards enumerated below.

2. AISC "Code of Standard Practice for Steel Buildings and Bridges."

3. AISC "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings", including Commentary and supplements thereto as issued.

4. AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

5. AWS D1.1 "Structural Welding Code - Steel".

6. "Steel Structures Painting Manual", Volumes 1 and 2, Steel Structures Painting Council.

7. Industrial Fasteners Institute "Handbook on Bolt, Nut, and Rivet Standards.

B. Design

1. Connections: Design connections under direct supervision of a Professional Engineer registered in the State of Texas, to resist forces shown on structural drawings and as required by building code. Indicate forces, in detail, on shop drawings. Design connections in accordance with requirements shown on drawings. Provide full penetration welds for moment connections to develop full strength of beam. Use design values for high strength bearing type bolts with thread allowed across shear plane.

2. Substitutions:

   a. Submit substitutions of sections or modifications of details, or both, and reasons with shop drawings for approval.
   b. Clearly identify and note substitutions as such.
   c. Coordinate approved substitutions, modifications, and necessary changes in related portions of work by fabricator and accomplish same at no additional cost to Owner.

3. Responsibility for Errors: Fabricator is responsible for errors of detailing, fabrications, and for correct fitting of structural steel members.

4. Templates: Furnished by Fabricator with instructions for setting of anchor bolts and bearing plates.

C. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in the mill, shop, and field by the Owner's testing laboratory. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and

fabrication procedures in compliance with specified requirements. The Contractor shall promptly remove and replace materials or fabricated components which do not comply.

D. Question about Contract Documents: The Contractor shall promptly notify the Architect/Engineer whenever design of members and connections for any portion of the structure are not clearly indicated or when other questions exist about the Contract Documents. Such questions shall be resolved prior to the submission of shop drawings.

E. Testing Laboratory Services: See Testing Laboratory section of the Specifications 01 45 29. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

1.5 SUBMITTALS

A. Shop Drawings:

1. General Requirements: Submit shop drawings including complete details and schedules for fabrication and assembly of structural steel members, and details, schedules, procedures and diagrams showing sequence of erection. Shop drawings not complying with the above requirements will not be reviewed. Structural steel shop drawings shall include the following minimum information:

   a. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Holes, flange cuts, slots and openings shall be made as required by the structural drawings, all of which shall be properly located by means of templates.
   b. Design calculations provided by a registered professional engineer for the connection design of all members not specifically detailed on the structural drawings. Design calculations will be retained for the Engineer’s file, and will not be returned approved.

2. The fabricator alone shall be responsible for all errors of detailing, fabrication, and for the correct fitting of the structural members.

3. All fabricated material and connections shall fit within architectural constraints.

4. Structural steel members for which shop drawings have not been reviewed and approved shall not be fabricated.

4. The Engineer’s review shall cover members sizes, general locations, spacings, and details of design.

5. The omission from the shop drawings of any materials required by the Contract Documents shall not relieve the Contractor of the responsibility of furnishing and installing such materials, even though the shop drawings may have been reviewed and approved.

B. Test Reports: Submit copies of reports of tests conducted on all field-welded connections that are inspected. Include data on type(s) of tests conducted and test results.

C. Certificates and Reports

1. Welders' Certificates: Submit Manufacturer's Certificates, certifying welders employed on the work, verifying AWS qualifications within the previous 6 months.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time so as not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. Do not store materials on structure in a manner that might exceed allowable loads on or cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed by Architect/Engineer.

D. Furnish all fuel, maintenance, and equipment required for hoisting and placement of materials under this contract.

E. Process, pay for and maintain all permits and certificates of on-site inspection required for derricks, cranes and hoisting equipment. No derrick, crane or hoisting equipment shall be operated without a certificate of operation and a certificate of on-site inspection, as required by governing authorities.

1. Wherever the erection equipment is supported by the structure, the Contractor shall be responsible for the retention of a licensed professional engineer to determine the adequacy of the member supporting the erection equipment in relation to the loads imposed thereon. The Contractor shall submit to the Architect/Engineer, for review, the loads which will be imposed by the erection equipment on the building structure. Where the imposed load exceeds the allowable stresses, the Contractor shall be responsible for any additional materials, supports, bracing, connections and similar measures required to support the imposed load of the equipment while in use, subject to review by the Architect/Engineer.

2. In addition to the above, all hoisting equipment shall be installed, operated and maintained in accordance with all applicable regulations of authorities having jurisdiction.

1.7 JOB CONDITIONS

The Contractor shall coordinate the fabrication and erection of all structural steel work with the work of other trades. The contractor shall verify existing conditions prior to beginning work. The contractor shall verify all dimensions shown on the drawings with existing job conditions prior to beginning work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel: All hot rolled steel plates, shapes, sheet piling, and bars shall be new steel conforming to ASTM Specification A6 "Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use".

Structural steel shall comply with the provisions of the following ASTM Specifications as appropriate for the grades and types, and at the locations as specified on the drawings:

1. Wide Flange Structural Shapes: ASTM A 570 Grade 50
2. All other Structural Steel Shapes, Plates, and Bars: ASTM A 36,
3. Cold Formed Steel Tubing: ASTM A 500, Grade B, (46,000 psi yield).
4. Steel Pipe: ASTM A 53, Type E or S, Grade B.
5. HSS Round Shapes: ASTM A 500 Gr. B (42,000 psi yield).
6. HSS Rectangular Shapes: ASTM A500 Gr. B (46,000 psi yield).

B. Structural Bolts and Threaded Fasteners: Structural bolts and threaded fasteners shall comply with the following ASTM Specifications as appropriate for the types and at the locations as specified on the drawings:

1. Anchor bolts & Erection bolts: ASTM A307 Grade A, "Carbon Steel Externally Threaded Standard Fasteners".

2. High Strength Bolts for Connections: ASTM A325 Type 1, "High-Strength Bolts for Structural Steel Joints".

3. Bolts and Nuts, High Strength Bolts: Bolts and nuts for all high strength bolts shall be heavy hex head conforming to ANSI Standards B18.2.1 and B18.2.2 respectively. Nuts shall conform to ASTM A563, "Standard Specification for Carbon and Alloy Steel Nuts".

4. Washers: All washers shall be circular, flat and smooth and shall conform to the requirements of Type A washers in ANSI Standard B23.1. Washers for high strength bolts shall be hardened and conform to ASTM F436, Specification for Hardened Steel Washers. Beveled washers for American Standard Beams and channels shall be square or rectangular, shall taper in thickness (16 2/3% slope) with an average thickness of 5/16". When an outer face of a bolted part has a slope greater than 1:20 with respect to a plane normal to the bolt axis, a beveled washer shall be used.

5. Bolt Lubrication: All bolts shall be well lubricated at time of installation. Dry, rusty bolts will not be allowed. Bolts or nuts shall be wax dipped by the bolt supplier or "Johnson's Stick Wax 140" shall be used with all bolts in the shop or field.

6. New Bolts: All bolts shall be new and shall not be reused.

C. Electrodes for Welding: Comply with AWS D1.1, "Structural Welding Code - Steel". Electrodes for various welding processes shall be as specified below:

1. SMAW: E70XX low hydrogen
2. SAW: F7X-EXXX
3. GMAW: ER70S-X
4. FCAW: E7XT-X
5. Weathering Steel Electrodes shall conform to Table 4.1.4 of the AWS D1.1 Manual.

Electrodes shall be compatible with parent metal joined.

D. Structural Steel Primer Paint: Primer paint shall be one of the following types with the indicated surface preparation:

1. SSPC-Paint 1, 100% red lead and linseed oil, TT-P-86 Type I, surface prepared according to SSPC-SP-2 (Hand Tool Cleaning). All materials shall be lead and chromate free.

2. SSPC-Paint 2, red lead-iron oxide and oil-alkyd, surface prepared according to SSPC-SP-2 (Hand Tool Cleaning). All materials shall be lead and chromate free.

3. TT-P-86, Type II, red lead-iron oxide and oil-alkyd, surface prepared according to SSPC-SP-3 (Power Tool Cleaning). All materials shall be lead and chromate free.

4. TT-P-86, Type III, 100% red lead and alkyd varnish, surface prepared according to SSPC-SP-6 (Commercial Blast Cleaning) or SSPC-SP-8 (Pickling).

5. Alkyd Zinc Chromate Metal Primer 0239 Gray as manufactured by Devoe Napko (SSPL-SP6 Commercial Blast Cleaning).

6. Alkyd Fast Dry Primer 298 as manufactured by Porter Paints (SSPL-SP6 Commercial Blast Cleaning).

7. Modified Alkyd Rust Inhibitive Primer 4-56 as manufactured by Tnemec Company, Inc. (SSPL-SP6 Commercial Blast Cleaning).

Refer to Architect's drawings and specifications for final paint finish requirements of structural steel. Primer paint shall be compatible with final paint requirements.

2.2 FABRICATION

A. Shop Fabrication and Assembly:

1. Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specification and as indicated on approved final shop drawings. Fabricator shall coordinate joint fit-up procedures with erector. Provide camber in structural members where indicated. The General Contractor shall coordinate provision of all erection bolts, lifting lugs or other devices required for erection with the fabricator and the erector.

2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

3. Clearly mark the grade of steel on each piece, distinguishable in the field from floor surfaces, for purpose of field inspection and confirmation of grade of steel.

B. Dimensional Tolerances: Dimensional tolerances of fabricated structural steel shall conform to Section 6.4 of the AISC Code of Standard Practice.

C. Splices in Structural Steel: Splicing of structural steel members in the shop or the field is prohibited without prior approval of the Engineer. Any member having a splice not shown and detailed on approved shop drawings will be rejected.

D. Cutting: Manual oxygen cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is not within 1/8 inch of the finished dimension and final removal is completed by means such as chipping or grinding to

produce a smooth surface quality free of notches or jagged edges. All corners shall be smooth and rounded to a minimum 1/2" radius.

2.3 WELDING

A. Code: All shop and field welding shall conform to all requirements in the "Structural Welding Code - Steel", ANSI/AWS D1.1, as published by the American Welding Society (AWS).

B. Welder Certification: All shop and field welders shall be certified according to AWS procedures for the welding process and welding position used. Submit certification certificates to the Architect for record purposes.

C. Minimum Size and Strength:

1. Fillet Welds: Minimum size of fillet welds shall be as specified in Table 1.17.2A in the AISC Manual of Steel Construction.

2. Minimum Strength of Welded Connections: Unless noted otherwise on the drawings, all shop and field welds shall develop the full tensile strength of the member or element joined. All members with moment connections, noted on the drawings with "MC", shall be welded to develop the full flexural capacity of the member, unless noted otherwise on the drawings.

D. Filler Metal Requirements: Weld metal shall be as specified in AISC Manual of Steel Construction Table 1.5.3.

E. Welding Procedures:

1. Welds not specified shall, if possible, be continuous fillet welds developing the minimum strength, as specified above, using not less than the minimum fillet welds as specified by AISC.

2.4 BOLTING

A. Minimum Bolt Diameter: Minimum bolt diameter shall be 3/4 inch.

B. Connection Type: Unless noted otherwise on the drawings or in the General Notes, all bolted connections shall be bearing type connections using standard holes (hole diameter nominally 1/16 inch in excess of nominal bolt diameter) with threads included in the shear planes. Do not flame cut holes or enlarge by burning.

C. Simple Beams: Simple shear connections shall be capable of end rotations of unrestrained beams as specified in Section 1.15.4 of the AISC Specification.

D. Allowable Working Stresses: The allowable working stresses of bolts shall be as specified in the AISC Specification Table 1.5.2.1 and Tables 2 and 3 of the high strength bolting specification previously cited.

E. Washers: Washers under the bolt head and/or nut shall be used as required by the bolt specification previously cited.

F. New Bolts: All bolts shall be new and shall not be reused.

G. Minimum Strength of Bolted Connections: Unless noted otherwise on the drawings, all shop and field bolted connections shall develop, as applicable, the full tensile or compressive strength of the member. All members with bolted moment connections, noted on the drawings with "MC", shall be bolted to develop the full flexural capacity of the member, unless noted otherwise on the drawings.

H. High strength bolted connections: Install in accordance with AISC "Specifications for Structural Joints using ASTM A 325 Bolts" (RCRBSJ).

I. Base plates: Hole sizes for anchor bolts may be oversized to facilitate erection as follows:
1. Bolts 3/4 inch to 1 inch diameter - 5/16 inch oversize
2. Bolts 1 inch to 2 inch diameter - 1/2 inch oversize
3. Bolts over 2 inch diameter - 1 inch oversize
4. Use oversize or plate washers under nut at all oversized holes in base plates. Washers must be large enough to cover the entire hole. Washer thickness shall be at least one eighth of bolt diameter

2.5 CONNECTIONS

A. Typical connection details are indicated on the drawings.

B. Design Procedure: Exception is taken to the second sentence of Section 4.2.1 of the AISC Code of Standard Practice for Bridges and Buildings, and the following provisions shall be substituted and made a binding part of the project specifications:

1. Connection types to be used are Type 2 "Simple".

C. Type 2 Simple Beam Connections:

1. All typical beam simple connections shall be standard double angle or single angle framed beam connections using bolts as specified.

2. Single plate "shear tab" connections may be used provided there is no axial force in the beam and they are designed strictly according to the procedure outlined in "Engineering for Steel Construction" as published by AISC and the paper appearing in the 3rd Quarter, 1984 Engineering Journal "Single Plate Framing Connections with Grade 50 Steel and Composite Construction" as published by AISC.

3. Simple Beam Design Capacity: Unless a larger reaction is shown otherwise on the plans, minimum design forces shall be as follows:

a. Non Composite Beams: Support a reaction R equal to 60% the total uniform load capacity from the table of Uniform Load Constants in the AISC Manual Part 2 for given shape, span, and grade of steel.

D. Struts and Braces:

1. Connections for all struts, hangers, and braces shall have connections designed to develop the full allowable tensile strength of the member.

2.6 SURFACE PREPARATION AND PAINTING

A. Specification: Surface preparation, paint, and painting practices shall conform to the "Steel Structures Painting Manual", Volumes 1 and 2, as published by the Steel Structures Painting Council (SSPC).

B. Scope: Shop paint all steel.

C. Surface Preparation and Primer Paint - Shop Painted Steel: All structural steel specified to be shop primed shall have paint applied in strict accordance with manufacturers instructions using prescribed surface preparation but not less than specified. Paint shall be applied immediately after surface preparation at a rate to provide a uniform dry film thickness of not less than 1.5 mils. Painting methods shall be used which result in full coverage of joints, corners, edges, and all exposed surfaces. Two coats shall be applied to surfaces which are inaccessible after assembly or erection. The color of the second coat shall be changed to distinguish it from the first coat.

Coordinate shop primer paint requirements with architectural drawings and specifications.

PART 3 - ERECTION

3.1 ERECTION

A. Inspection: Erector shall examine areas and conditions under which structural steel work is to be installed and notify the Contractor and the Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Erection Tolerances: Erection tolerances of anchor bolts, embedded items, and all structural steel shall conform to the AISC Code of Standard Practice.

C. Field Assembly of Structural Steel:

1. As erection of the steel progresses, the work shall be fastened securely to take care of all dead load, wind and erection stresses. Particular care shall be exercised to ensure straightness and tautness of bracing immediately upon raising a steel column.

2. Provide temporary planking and working platforms as necessary to effectively complete work.

3. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure within specified AISC tolerances. The Contractor shall coordinate with Erector and Fabricator regarding possible discrepancies in member lengths between temperature at time of fabrication and temperatures during erection, and shall make necessary adjustments to ensure plumbness within AISC tolerances at 60°F. Compensate for cumulative welding draw, construction loadings, sequential applications of dead loads, or any other predictable conditions that could cause distortions to exceed tolerance limitations.

4. On exposed welded construction, remove erection bolts, fill holes with plug welds or filler and grind smooth at exposed surfaces.

5. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces receiving field welds.

6. Comply with all bolting and welding requirements of Part 2 of this specification section.

7. Remove and replace existing finish materials as required to accomplish all work. The contractor shall comply with all fire codes when performing welding of steel or metal studs.

D. Field Modifications to Structural Steel: Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and structural fitting of parts shall be reported immediately to the Architect/Engineer, and approval of the method of correction shall be obtained. Approved corrections shall be made at no additional cost to the Owner. Do not use cutting torches, reamers, or other devices in the field for unauthorized correction of fabrication errors.

E. Miscellaneous Framing: Provide supplemental structural steel support framing for metal deck where normal deck bearing is interrupted by column flange plates or other framing members and other floor openings whether shown or not on either the architectural, mechanical, or structural drawings.

F. Removal of Erection Aids and Devices: The erector shall remove all erection aids and devices that interfere with architectural finish or MEP requirements.

G. Touch-Up Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas that have been shop painted. Apply paint to exposed areas using same material and surface preparation as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

2. All field welded galvanized connections shall have welds protected with "Z.R.C. Cold Galvanizing Compound" as manufactured by Z.R.C. Products Company.

3. Steel Plates Embedded in Concrete:

a. Studs shall be welded using automatically timed stud welding equipment to develop the full capacity of the stud.

b. Plates must be unpainted and free of heavy rust, mill scale, dirt, sand or other foreign material which will interfere with the welding operation. Shop prime all plates and studs after welding unless plates are exposed to the outside in which case the assembly shall be hot dip galvanized after welding.

H. Clean Up: Clean up all debris caused by the Work of this Section, keeping the premises neat and clean at all times. Replace and repair to like new condition, all damaged areas of the interior and exterior of the building.

3.2 FIELD QUALITY CONTROL

A. See Testing Laboratory section of the Specifications for required structural steel testing.

END OF SECTION 05120

SECTION 05210

STEEL JOISTS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and Drawings are applicable to this Section.

B. Section Includes:
1. Open web steel joists, with bridging, attached bearing plates, angles, and anchors.
2. Loose bearing plates for site placement.
3. Framed floor and roof openings greater than 18 inches.

1.2 QUALITY ASSURANCE

A. Conform to SJI (Steel Joist Institute) Standard Specifications, Load Tables, Weight Tables, and Code of Standard Practice.

B. Provide laboratory inspection of field procedures, personnel, erection, and welding for conformance with Specifications. Refer to Section 01400.

1.3 QUALIFICATIONS

A. Manufacturer: Member of S.J.I. and engaged in design and manufacture of similar units for a period of not less than 5 years.

B. Installer: Minimum 2 years experience in similar sized projects.

C. Welders: Certified using AWS testing procedures.

D. Welders Certificates: Submit manufacturers' certificates that welders have met AWS verification within previous 12 months.

1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 01300.

B. Indicate standard designations, configuration, sizes, spacing, and locations of joists, joist coding, bridging, connections, attachments, and cambers.

C. Mill Test Reports: Submit certified mill test reports evidencing conformity with ASTM and AISC Specifications.

D. Prepare shop drawings under seal of a Professional Structural Engineer registered in State of Texas. Submit design calculations for members with cantilevered or concentrated loads.

E. Submit welders certifications in accordance with the requirements of Section 01400.

1.5 COORDINATION

A. Coordinate installation with structural steel erection. Do not proceed until structure is ready to receive joists.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in accordance with the requirements of Section 01600.

B. Store materials to permit easy access for inspection and identification. Keep joists stored off the ground using adequate blocking.

C. Do not store joists on structure in a manner that might cause distortion or damage to members or supporting structure.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Open Web Joist Members: Grade to suit manufacturer's design; sizes and types as shown and detailed, and in accordance with Steel Joist Institute Standards.

B. Anchor Bolts, Nuts and Washers: ASTM A307.

C. Erection Bolts: ASTM A307 and ASTM A325, in locations noted or shown.

D. Welding Materials: AWS D1.1; type required for materials being welded.

E. Joist Accessories: ASTM A36 quality for bridging, sidewall anchors, joist leg extensions, and wall connectors as required.

F. Primer: SSPC 15, Type 1 red oxide.

2.2 FABRICATION

A. Fabricate steel joists in accordance with SJI Standard Specifications and Code of Standard Practice including headers and other supplementary framing with minimum recommended camber. Splices in principal tension members are prohibited except that joists over 40' long may have one cord member spliced at 1/4 from each end with ultimate strength of weld equal to twice the design strength required by standard load tables.

B. Provide bottom and top joist chord extensions indicated and as required to support ceilings, soffits and fascias. Design as cantilevered beams with reactions carried back to first panel point.

C. Drill holes in top chords necessary for attachment of wood nailers. Do not make or enlarge holes by burning.

D. Design: Where the applicable loading or span configuration is other than uniformly loaded simple span condition, as covered by the Standard Load Tables adopted by the Steel Joist Institute, the joist manufacturer shall design the joist for the specific condition shown on the

drawings, and all temporary construction loading. Deflection of cantilever joists shall be limited to 1/500 of the cantilever length.

2.3 FINISH

A. Remove rust, mill scale, grease, oil and dirt, and shop prime with one coat of primer to 2 mils dry thickness.

B. Shop prime joists. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.

2.4 SOURCE QUALITY CONTROL

A. Testing of components will be performed under provisions of Section 01450.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine areas and conditions under which structural steel work is to be installed, and notify Architect of conditions detrimental to the timely completion of the work.

B. Check elevations of concrete and masonry bearing surfaces before erection begins.

C. Beginning of erection means erector accepts existing conditions.

3.2 ERECTION

A. Erect steel joists in accordance with SJI Standard Specifications. Set joists to lines, levels, and spacing as indicated.

B. Bear joists on supports in accordance with SJI.

C. Do not make or enlarge holes by burning.

D. During erection, provide temporary bracing for induced loads and stresses.

E. Where "open web" joists are 40 feet or longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.

F. Coordinate placement of anchorages in concrete and masonry construction for securing bearing plates.

G. Field weld joist seat to placed bearing plates after alignment and positioning are complete. Execute welding in accordance with AWS standards by welders who have been previously qualified for positions and base metals encountered.

H. Bolt joists to supporting steel framework in accordance with SJI Specifications for type joists used, as indicated on drawings.

I. Do not permit erection of decking until joists and joist girders are braced and bridged.

J. Do not field cut or alter joists and joist girders without approval of Architect/Engineer.

K. After erection, prime welds, abrasions, and surfaces not primed. Use primer consistent with shop coat.

3.3 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01450.

B. Field inspect steel joists and connections to structural steel members.

C. Quality Assurance: Welding performed during manufacture and erection of steel joists shall comply with the requirements of AWS D1.1.

D. Inspect condition of joists after erection, checking method of attachment to structures and details of bridging and accessories.

3.5 CLEAN UP

A. Clean steel as work progresses to remove foreign matter.

END OF SECTION 05210

SECTION 05311

STEEL ROOF DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and Drawings are applicable to this Section.

B. Section Includes:
   1. Steel roof deck and accessories.
   2. Framed openings up to 18 inches.

1.2 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this Section with minimum 3 years documented experience.

B. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural engineer experienced in design of this work and licensed in the State of Texas.

1.3 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01300.

B. Indicate materials, quantities, layout, location of openings and reinforcing, type and location of welds, and details of accessories and metal closure strips. Indicate welds by standard welding symbols adopted by the American Welding Society. Show diaphragm shear support and sidelap fasteners.

C. Product Data: Span tables and material descriptions and recommended installation instructions.

D. Performance Criteria and Tests
   1. Paint Humidity and Blister Resistance Primer coating shall have a #10 rating when subjected to 1000 hours, 5 percent solution salt spray test in accordance with ASTM B 117.

E. Manufacturer's Installation Instructions: Indicate specific installation sequence and special instructions.

1.4 DESIGN CRITERIA

A. Installed deck to withstand net uplift loading of 35 pounds per square foot at eave overhang and 25 pounds per square foot for other roof areas.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01600.

B. Store decking under provisions of Section 01600 on wood sleepers with slope for positive drainage.

C. Cut plastic wrap to encourage ventilation.

1.6 COORDINATION

A. Coordinate installation with structural steel erection. Do not proceed until structure is ready to receive metal decking.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following:
1. Vulcraft.
2. Epic Metals.
3. Wheeling Corrugating Co.

B. Substitutions: Under provisions of Section 01600.

2.2 MATERIALS

A. Sheet Steel: ASTM A 611, Grade C, prime painted.

B. Bearing Angles: ASTM A 36 steel.

C. Welding Materials: AWS D1.1 and D1.3.

D. Metal Closure Strips, Wet Concrete Stops, Cover Plates, and Related Accessories: 22 gage sheet steel; of required profiles and size.

E. Primer: Grey oxide type.

F. Touch-up Primer: Zinc chromate type.

2.3 FABRICATION

A. Metal Decking: Minimum 22 gage sheet steel, 1-1/2 inch high, fluted profile to SDI IR 36 inch sheets; multiple span; lapped joints, continuous over 3 or more spans.

B. Fabricate metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks to accommodate maximum working stress of 20,000 psi and maximum span deflection of L/240.

C. Fabricate roof sump pan of 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, watertight.

2.4 ACCESSORIES

A. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the decking.

B. Fasteners: Galvanized hardened steel, self-tapping

C. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

PART 3 - EXECUTION

3.1 INSPECTION

A. Check supporting members for correct layout and alignment.

B. Verify that surfaces to receive deck are free from debris.

C. Do not proceed with installation until defects are corrected.

D. Beginning of installation indicates acceptance of existing conditions.

3.2 INSTALLATION

A. Erect metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, and Roof Decks. Provide welding in accordance with AWS D1.1 and D1.3.

B. On steel support members provide 3 inch minimum bearing and overlap ends of deck minimum 2 inches. Align and level on supports.

C. On masonry support surfaces provide 4 inch minimum bearing. Align and level on supports.

D. Fasten male/female side lap at midspan with self tapping #10 screws.

E. Fasten deck to steel support members at ends and intermediate supports with 5/8 inch diameter puddle welds at 18 inches o.c. at ends of units, and 18 inches on center at intermediate supports. Provide minimum of 3 welds per support.

F. Reinforce deck openings up to 18 inches in size with 3 by 3 by 1/4 inch steel angles. Span frame over adjacent joists. Place angles perpendicular to flutes; extend minimum two flutes each side of opening and weld to deck.

G. Install 6 inch wide sheet steel cover plates where deck changes direction. Spot weld in place 12 inches oc maximum.

H. Install sheet steel strip closures at roof edge upturned to thickness of slab, to contain wet concrete. Provide closures of sufficient strength to remain in place without distortion.

I. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.

J. Install foam cell closures in locations above walls and partitions or as indicated.

K. Immediately after welding deck in place, touch-up welds, burned areas, and surface coating damage with prime paint.

L. Run deck and insulation under mechanical units so that the only penetration is for ductwork. Shim mechanical unit curbs with steel channels supported directly by joists, to make units level. Refer to drawing details.

3.3 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01400.

B. Qualification of Welders: Qualify the welding process and all welders, and periodically monitor the work in accordance with the requirements of AWS D1.3.

3.4 CLEANING

A. Clean steel as work progresses to remove foreign matter.

END OF SECTION 05311

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Cold-formed framing, usually of 14 to 20 gage, including bracing, fasteners and accessories.

B. Products Installed But Not Furnished Under This Section:
   1. Hot rolled steel shapes; refer to Section 05120.
   2. Insulation inaccessible after framing fabrication; refer to Section 07211.

1.02 SYSTEM REQUIREMENTS

A. Performance Requirements:
   1. Fabricate and assemble system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
   2. Fabricate and assemble system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

B. Interface With Adjacent Systems:
   1. Integrate design and connections with adjacent construction.
   2. Accommodate allowable tolerances and deflections of structural members in installation.

1.03 SUBMITTALS

A. General: Submit in accordance with Section 01300.

B. Product Data:
   1. Submit product data for framing members, accessories, and connection devices.
   2. Describe materials, finish and section properties.

C. Shop Drawings:
   1. Sections and details indicating component locations, connections between components, connections of components to structure.
   2. Connection details indicating size, locations, and spacings of fasteners and welds.
   3. Accessory installation details.

D. Submit following Informational Submittals:
   1. Qualification Data: Manufacturer's, erector's, and welder's qualification data.
   2. Certifications specified in Quality Assurance article.

1.04 QUALITY ASSURANCE

A. Erector Qualifications: Minimum of 5 years documented experience on comparable steel stud framing projects.

B. Welder Qualifications: AWS certified within past 12 months for each type of weld required.

C. Certifications:

1. Submit certificates verifying AWS qualifications for each welder employed on Project.
2. Submit fabricator's certification that products furnished for Project meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01600.

1.06 PROJECT CONDITIONS

A. Field verify measurements. Architect will not review or take responsibility for dimensions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturers:
1. American Studco, Inc, Phoenix, AZ
2. Angeles Metal Systems, Los Angeles, CA
3. Clark Framing Systems, Inc., Cincinnati, OH
4. Consolidated Systems, Inc., Memphis, TN
5. Dale/Incor Industries of Florida.
6. Dale Industries, Inc., Detroit, MI
7. Delta Metal Products, Dallas, TX
8. Dietrich Industries, Inc., Dallas, TX
9. Knorr Steel Framing Systems. Salem, OR.
10. Unimast, Inc., Houston, TX
11. United Construction Supply.
12. Western Metal Lath Co.

2.02 MATERIALS

A. Studs and Joists:
1. C-shape design, roll formed with punched web, 34.9 mm (1-3/8 inch) minimum face flange and manufacturer's standard return lip.
2. Galvanized studs:
   a. 18 gage and thinner: ASTM A446, Grade A.
   b. 16 gage and thicker: ASTM A446, Grade A.

B. Runners:
1. Channel shaped; same width as studs, tight fit; solid web.
2. Galvanized: ASTM A446/A446M, Grade A.

C. Accessories, Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered thickness as indicated on Drawings; same finish as framing members.

D. Structural Steel Shapes: Comply with Section 05120. Size as indicated on Drawings.

E. Fasteners:
1. Self-drilling, self-tapping screws, bolts, nuts and washers: Size, type and spacing determined to suit Project conditions; ASTM A153, hot-dip galvanized, Class C or D as appropriate
2. Anchorage Devices: Power driven or powder actuated as appropriate for material connected.
3. Welding: In conformance with AWS D1.3.

F. Galvanizing Touch-Up Paint: FS TT-P-641, zinc oxide type.

2.03 FABRICATION

A. Fit and assemble in largest practical sections for delivery to site, ready for installation.

B. Fabricate in accordance with requirements of ASTM C955.

C. Cut framing components squarely for attachment to perpendicular members, or as required for angular fit against abutting members. Hold members positively in place until properly fastened.

D. Fabricate studs of sizes and sheet metal thicknesses as required by design indicated on Drawings.

2.04 FINISHES

A. Framing Components: Galvanized, ASTM A525 G90 coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces acting as framing substrates are free from debris.

B. Do not proceed with installation until defects are corrected.

C. Beginning of installation indicates acceptance of existing conditions.

3.02 ERECTION OF MEMBERS

A. Install framing components in accordance with manufacturer's instructions.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

C. Place joists at spacing as indicated on drawings, not more than 2 inches from abutting walls.

D. Connect joists to supports using fastener method.

E. Set ceiling joists parallel and level, with lateral bracing and bridging.

F. Provide joist web stiffeners at reaction points.

G. Touch-up field welds and damaged galvanized surfaces with primer.

3.03 TOLERANCES

A. Maximum variation from true position: 1/4 inch.

B. Maximum variation of any member from plane: 1/8 inch in 4'-0", non-cumulative.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04810 - Unit Masonry Assemblies: Placement of metal fabrications in masonry.

C. Section 05510 - Metal Stairs.

D. Section 05520 - Handrails and Railings.

E. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCES

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2002.

B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2003a.

C. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2002.

D. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

E. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2003.

F. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003.

G. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2004.

H. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2004.

I. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.

J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 1998.

K. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2004.

L. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2000).

M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002.

N. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2000).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.

C. Plates: ASTM A 283.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components or masonry components.

F. Welding Materials: AWS D1.1; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Vertical Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
   2. Rungs: one inch diameter solid round bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

C. Lintels: As detailed; prime paint finish.

2.04 FINISHES - STEEL

A. Prime paint all steel items.
   1. Exceptions: Galvanize items to be embedded in concrete or masonry.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05520

HANDRAILS AND RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Steel pipe handrails, balusters, and fittings.

B. Ornamental handrails.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 04810 - Unit Masonry Assemblies: Placement of anchors in masonry.

C. Section 05510 - Metal Stairs: Handrails other than those specified in this section.

D. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCES

A. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2002.

B. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000.

C. SSPC-Paint 15 - Steel Joist Shop Paint; The Society for Protective Coatings; 1999 (Ed. 2000).

1.04 DESIGN REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E 985 and applicable local code.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Handrails and Railings:
   1. Poma Corp: www.wbuildingproducts.com./poma/rail/html
   2. Sterling Dula Architectural Products: www.sterlingdula.com.
   3. R & B Wagner, Inc: www.rbwagner.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Ornamental Handrails:
   1. Decorative Iron: www.decorativeiron.com.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 STEEL RAILING SYSTEM

A. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

B. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast steel.

C. Mounting: Adjustable Brackets and flanges, with steel inserts for casting in concrete.

Prepare backing plate for mounting in masonry wall construction.

D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

E. Splice Connectors: Steel concealed spigots.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 ORNAMENTAL RAILING SYSTEM

A. Acceptable Products:
   1. Cap Rail: No. MCRW manufactured by Decorative Iron.
   2. Wall Bracket: No. 3A manufactured by Decorative Iron.
   3. Substitutions: See Section 01600 - Product Requirements.

2.04 FABRICATION

A. Fit and shop assemble components in largest practical sizes for delivery to site.

B. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

C. Provide anchors and plates required for connecting railings to structure.

D. Exposed Mechanical Fastenings: Provide flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.

G. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.

H. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

I. Accurately form components to suit specific project conditions and for proper connection to building structure.

J. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Anchor railings securely to structure.

D. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.

E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

F. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05810

EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnish & install expansion joint assemblies for the following:

1. Interior Floor expansion joint covers.
2. Interior Wall expansion joint covers.
3. Interior Ceiling expansion joint covers.
4. Exterior Floor expansion joint covers.
5. Exterior Wall expansion joint covers.
6. Roof expansion joint covers.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete

B. Section 04810 - Unit Masonry Assemblies Section

C. Section 05311 - Steel Floor Deck

D. Section 05312 - Steel Roof Deck

E. Section 05500 - Metal Fabrications

F. Section 07410 - Standing Seam Roof Panels

G. Section 07412 - Metal Soffit Panels

H. Section 07550 - Modified Bituminous Roofing

I. Section 07620 - Sheet Metal Flashing & Trim

J. Section 07650 - Wall Flashing

K. Section 07900 - Joint Sealers

L. Section 09260 - Gypsum Board Assemblies

M. Section 09680 - Carpet

N. Section 09900 - Paints & Coatings

1.03 REFERENCES

A. ASTM B209 - Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.

B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2002.

C. ASTM D 2000 - Standard Classification System for Rubber Products in Automotive Applications.

D. ASTM D 4030 - Standard Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials

E. ASTM D 4070 - Standard Specification for Adhesive Lubricant for Installation of Preformed Elastomeric Bridge Compression Seals in Concrete Structures.

F. ASTM D 4637 - Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane.

G. ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.

1.04 SYSTEM DESCRIPTION

A. Joint covers shall permit unrestrained movement of joint without disengagement of cover.

1. Perpendicular to expansion joint (x-axis joint movement): 2 inches
2. Parallel to expansion joint (y-axis joint movement): 1/2 inch
3. Vertical to expansion joint (z-axis joint movement): 1/16 inch

B. Allowable load on floor joint cover plate shall be 100 psf uniform load and 300 pounds concentrated load with maximum 12,000 psi stress at full open position.

1. Deflection shall be 1/16 inch at neutral position
2. In the absence of load selections the minimum load will apply – 50 psf with 1/8 inch deflection.

C. Centering Bars shall have spheres or pins (based on manufacturer's standard of construction for specific application) which fully engage with the base members' tracks.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, available colors and finish.

C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, anchorage locations.

D. Manufacturer's Installation Instructions: Indicate rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

1.05 QUALITY ASSURANCE

A. Manufacturer : Obtain joint cover assemblies through one source from a single manufacturer.

1. Manufacturer shall be ISO 9001:2000 Certified.
    a. The Manufacturer shall have documented management and control of the processes that influence the quality of its products.
    b. The Manufacturer shall have documented management and control of the processes that influence the quality of its customer service.
2. Manufacturer shall have a minimum of ten (10) years of experience in the fabrication of expansion joint cover assemblies.

B. Installer: Firm with not less than three (3) years of successful experience in the installation of systems similar to those required by this project and acceptable to the manufacturer of the system.

C. Field Measurements: Verify compliance with manufacturer's requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Provide temporary protective cover on ALL metallic finished surfaces.

B. Deliver joint covers to jobsite in new, clean, unopened crates of sufficient size and strength to protect materials during transit.

C. Store components in original containers in a clean, dry location. Store off the ground; protect from freezing, direct sun exposure, weather and construction activities. Store all resin components, at temperatures between 50 degrees F and 80 degrees F.

D. Until used, all components should be left in the manufacturer's original, unopened labeled crates, containers, pallets, reels or bundles.

1.06 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide special tools required for accessing and servicing components.

1.07 WARRANTY

A. Warranty: The specified products are warranted when installed in strict accordance with the manufacturer's technical specifications, details, installation instructions and general procedures as well as good industry practice in effect for normal traffic usage and suitable applications under specific design movements and loading conditions.

1. Warranty Duration: Three (3) years

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Expansion Joint Cover Assemblies:

1. Balco, Inc., PO Box 17249, 2626 S. Sheridan, Wichita, KS 67217; phone: 800-767-0082 or (316) 945-9328; fax: (316) 945-0789 **(basis of design)**
2. Architectural Art Mfg., Inc.
3. Conspec Systems, Inc: www.c-sgroup.com.
4. MM Systems Corp: www.mmsystemscorp.com.
5. InPro Corporation: www.inprocorp.com
6. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. DuraFlex FCWW Series: Extruded aluminum subchannels, extruded elastomeric face seal and an extruded elastomeric back seal sized to accommodate the total range of movement at each joint location without disengagement of the cover.

(1) Allowable movement: As specified for each floor or plane.
(2) Extruded Aluminum Subchannel - Aluminum, ASTM B 221, alloy 6063-T5; Mill Finish.
(1) Elastomeric Face Seal: Santoprene, UV resistant grade.
(2) Elastomeric Face Seal: Silicone, ASTM D 2000, 4GE709M.
(1) Face Seal Finish: Black.
(2) Face Seal Finish: White.
(3) Face Seal Finish: Tan.
(4) Face Seal Finish: Gray.
(5) Face Seal Finish: Color to be selected by Architect from available color

choices.

D. Back Seal: Santoprene, extruded: Black Finish.B. Resilient Filler: Neoprene, exhibiting Shore A hardness of 40 - 50 Durometer.

C. Threaded Fasteners: Aluminum.

D. Backing Paint: Asphaltic type.

2.03 FABRICATION

A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient elastomeric filler strip, designed to permit plus or minus 50 percent joint movement with full recovery, flush mounted.

B. Back paint components in contact with cementitious materials.

C. Galvanize embedded ferrous metal anchors and fastening devices.

D. Shop assemble components and package with anchors and fittings.

E. Provide joint components in single length wherever practical. Minimize site splicing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joint preparation and affected dimensions are acceptable.

3.02 PREPARATION

A. Install anchoring devices in conformance to templates.

3.03 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

3.04 PROTECTION OF FINISHED WORK

A. Do not permit traffic over unprotected floor joint surfaces.

B. Provide strippable coating to protect finish surface.

3.05 SCHEDULES

A. See Construction Drawings for installation locations of specific manufacturer model numbers.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural floor, wall, and roof framing.

B. Floor, wall, and roof sheathing.

C. Preservative treatment of wood.

D. Fire retardant treatment of wood.

E. Miscellaneous framing and sheathing.

F. Telephone and electrical panel boards.

G. Wood nailers and curbs for roofing and items installed on roof.

H. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and miscellaneous items requiring anchor support.

I. Miscellaneous wood nailers and furring strips.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

1.03 REFERENCES

A. AFPA T10 - Wood Frame Construction Manual; American Forest and Paper Association; 2001.

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2003.

C. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2004.

D. ASTM D 2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 1994 (Reapproved 1999).

E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2004.

F. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.

G. AWPA C9 - Plywood -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.

H. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.

I. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2004.

J. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2004.

K. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce); 1995.

L. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 1999.

M. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.

B. Exposed-to-View Rough Carpentry: Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.

C. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

D. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Joist, Rafter, and Small Beam Framing (2 x 6 through 4 x 16):
   1. Machine stress-rated (MSR) as follows:
      a. Fb-single (minimum extreme fiber stress in bending): 1350 psi.
      b. E (minimum modulus of elasticity): 1,300,000 psi.
   2. Species: Southern Pine.

E. Miscellaneous Blocking, Furring, and Nailers:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.02 CONSTRUCTION PANELS

A. Subfloor/Underlayment Combination: APA rated Sturdi-Floor.
   1. Exposure Class: Exterior.
   2. Span Rating: 16 inches.
   3. Thickness: 1-1/8 inch nominal.

B. APA Rated Roof Sheathing: Exterior Exposure Class, and as follows:
   1. Structural I.
   2. Span Rating: 24/0.

C. Plywood Wall Sheathing: PS 1, Grade C-D, Exposure I.

D. Glass Mat Faced Gypsum Sheathing: ASTM C 1177/C 1177M, water-resistant core, square long edges, 1/2 inch thick.
   1. Acceptable Product: Dens Glas Gold; manufactured by Georgia Pacific.

E. Miscellaneous Panels:
   1. Concealed Plywood: PS 1, C-C Plugged, exterior grade.
   2. Exposed Plywood: PS 1, A-D, interior grade.
   3. Electrical Component Mounting: APA rated sheathing, fire retardant treated.

2.03 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Toggle bolt type for anchorage to hollow masonry.

B. Building Paper: No. 30 asphalt felt.

C. Joint tape: 2" wide 10 x 10 glass mesh tape.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

B. Fire Retardant Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc.: www.wolmanizedwood.com.
      b. Hoover Treated Wood Products, Inc.: www.frtw.com.
      c. Osmose, Inc.: www.osmose.com.
   2. Exterior Type: AWPA Use Category UCFB, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D 2898.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Do not use treated wood in direct contact with the ground.
   3. Interior Type A: AWPA Use Category UCFA, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat rough carpentry items as indicated .
      c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc.: www.wolmanizedwood.com.
      b. Chemical Specialties, Inc.: www.treatedwood.com.
      c. Osmose, Inc.: www.osmose.com.
      d. Substitutions: See Section 01600 - Product Requirements.

D. Preservative Pressure Treatment of Lumber Above Grade: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
   1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.
   3. Treat lumber in contact with masonry or concrete.
   4. Treat lumber less than 18 inches above grade.
   5. Preservative Pressure Treatment of Plywood Above Grade: AWPA Use Category UC2 and UC3B, Commodity Specification F (Treatment C9) using waterborne preservative to 0.25 lb/cu ft retention.
      a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
      b. Treat plywood in contact with roofing, flashing, or waterproofing.
      c. Treat plywood in contact with masonry or concrete.
      d. Treat plywood in other locations as indicated.

E. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA Use Category UC4A, Commodity Specification A (Treatment C2) using waterborne preservative to 0.4 lb/cu ft retention.
   1. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
   2. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

PART 3 EXECUTION

3.01 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

F. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

G. Frame openings with two or more studs at each jamb; support headers on cripple studs.

H. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.02 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

A. Coordinate installation of wood decking.

B. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

C. Coordinate curb installation with installation of decking and support of deck openings.

3.03 INSTALLATION OF CONSTRUCTION PANELS

A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.

B. Roof Sheathing: Secure panels perpendicular to framing members, with ends staggered and sheet ends over firm bearing.
   1. Use sheathing clips between roof framing members.
   2. Provide solid edge blocking between sheets.
   3. Nail panels to framing; staples are not permitted.

C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples as recommended by the sheathing manufacturer. Apply with manufacturer recommended face toward the exterior.
   1. Apply joint tape prior to installation of building paper.
   2. Apply building paper over face of sheathing.

3.04 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.05 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Wood door frames, glazed frames.

C. Wood casings and moldings.

D. Hardware and attachment accessories.

1.02 RELATED SECTIONS

A. Section 08211 - Flush Wood Doors.

B. Section 08212 - Stile and Rail Wood Doors.

C. Section 08800 - Glazing

D. Section 09900 - Paints and Coatings: Painting and finishing of finish carpentry items.

1.03 REFERENCES

A. AHA A135.4 - Basic Hardboard; American Hardboard Association; 1995.

B. ANSI A208.1 - American National Standard for Particleboard; 1999.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2004.

D. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2003.

E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.

F. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2000.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide data on fire retardant treatment materials and application instructions.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.

D. Samples: Submit two samples of finish plywood, 12x12 inch in size illustrating wood grain and specified finish.

E. Samples: Submit two samples of wood trim 18 inch long.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Premium grade.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire retardant requirements.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Protect work from moisture damage.

1.08 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 LUMBER MATERIALS

A. Hardwood Lumber
   1. Lumber for transparent finish: Natural Birch species, rotary sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
   2. Lumber for painted finish: Poplar species, maximum moisture content of 6 percent; of quality suitable for paint finish.

2.02 SHEET MATERIALS

A. Medium Density Fiberboard (MDF): ANSI A208.2; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces, thickness as indicated on drawings.

2.03 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate: NEMA LD 3, HGS; Architect selected color, texture and finish.

B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.

2.04 ADHESIVE

A. Adhesive: Type recommended by laminate manufacturer to suit application.

2.05 FASTENERS

A. Fasteners: Of size and type to suit application.

2.06 ACCESSORIES

A. Lumber for Shimming, Blocking, and Grounding: Softwood lumber of pine species.

B. Glass: Type specified in Section 08800.

C. Primer: Alkyd primer sealer type.

D. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.

C. Cap exposed plastic laminate finish edges with material of same finish and pattern.

D. Shop prepare and identify components for book match grain matching during site erection.

E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.

G. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Set and secure materials and components in place, plumb and level.

B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09900.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06410

PLASTIC LAMINATE FACED CABINETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Custom fabricated, plastic laminate faced cabinet units.

B. Countertops.

C. Cabinet hardware.

1.02 REFERENCES

A. AHA A135.4 - Basic Hardboard; American Hardboard Association; 1995.

B. ANSI A208.1 - American National Standard for Particleboard; 1999.

C. AWI P-200 - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute; 1997, Seventh Edition, Version 1.0.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit two samples of drawer pulls and hinges, illustrating hardware finish.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom quality.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Protect units from moisture damage.

1.06 ENVIRONMENTAL REQUIREMENTS

A. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

PART 2 PRODUCTS

2.01 WOOD MATERIALS

A. Softwood Lumber: Graded in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom; average moisture content of 6 percent; pine species.

B. Hardwood Lumber: Graded in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom; average moisture content of 6 percent; Birch species quarter sawn.

2.02 PANEL MATERIALS

A. Hardwood Plywood and Face Veneers: HPVA HP-1 and as required to meet AWI Quality Standards.

B. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms and other components indicated on drawings.

2.03 LAMINATE MATERIALS

A. Manufacturers:
   1. Formica Corporation: www.formica.com.
   2. Nevamar, International Paper: www.nevamar.com.
   3. Wilsonart International, Inc: www.wilsonart.com.
   4. Substitutions: Permitted under provisions of Section 01600.

B. Plastic Laminate: In accordance with AWI Quality Standards Illustrated, 0.048 inch General Purpose quality, colors as selected by Architect.

C. Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate.

2.04 ACCESSORIES

A. Adhesive: Type recommended by laminate manufacturer to suit application.

B. Fasteners: Size and type to suit application.

C. Concealed Joint Fasteners: Threaded steel.

2.05 HARDWARE

A. Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at 1 inch centers; satin finish.
   1. Acceptable Product: Knape & Vogt; Pilaster 255 and Shelf Rest 256.

B. Shelf Brackets: Formed steel brackets, formed for attachment with lugs; satin finish.

C. Drawer and Door Pulls: Brushed stainless steel, “U” shaped pull, 4 inch centers.

D. Drawer Slides: Galvanized steel construction, ball bearings separating tracks, full extension type.
   1. Drawers 6 inch and less: Provide 50 lb. class slides.
   2. Drawers 6 inch and more: Provide 100 lb. class slides.

E. Hinges: Concealed ‘European style, round, inletted, steel. Nickel plated.

2.07 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fit shelves, doors, and exposed edges with 3/8 inch matching hardwood edging. Use one piece for full length only.

C. Cap exposed plastic laminate finish edges with material of same finish and pattern.

D. Door and Drawer Fronts: 3/4 inch thick; flush overlay style.

E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter

butt joints minimum 2 feet from sink cut-outs.

G. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

H. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.

I. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure casework in place; rigid, plumb, and level.

B. Use cabinet attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07115

BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Bituminous dampproofing.

1.02 REFERENCES

A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 1994 (reapproved 2000).

B. ASTM D 449 - Standard Specification for Asphalt Used in Dampproofing and Waterproofing; 2003.

C. ASTM D 2822 - Standard Specification for Asphalt Roof Cement; 1991 (Reapproved 1997).

D. ASTM D 3747 - Standard Specification for Emulsified Asphalt Adhesive for Adhering Roof Insulation; 1979 (Reapproved 2000).

E. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2000.

F. NRCA ML104 - The NRCA Roofing and Waterproofing; National Roofing Contractors Association; Fifth Edition.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide properties of primer, bitumen, and mastics.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Karnak Chemical Corp: www.karnakcorp.com.
   2. Mar-Flex Systems, Inc: www.mar-flex.com.
   3. W.R. Meadows, Inc: www.wrmeadows.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 HOT ASPHALTIC MATERIALS

A. Bitumen: ASTM D 449, Type I, asphalt.

B. Primer: ASTM D 41, compatible with substrate.

C. Sealing Mastic: Asphalt roof cement, ASTM D 4586, Type I.

2.03 COLD ASPHALTIC MATERIALS

A. Bitumen: Asphalt emulsion, ASTM D 3747.

B. Asphalt Primer: ASTM D 41, compatible with substrate.

C. Sealing Mastic: Asphalt roof cement, ASTM D 2822, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.

C. Verify items which penetrate surfaces to receive dampproofing are securely installed.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive dampproofing.

B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.

C. Do not apply dampproofing to surfaces unacceptable to manufacturer.

D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

E. Apply attached flashings prior to application of dampproofing. Apply dampproofing over flashings.

3.03 APPLICATION

A. Prime surfaces in accordance with manufacturer's instructions.

B. Apply bitumen at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.

C. Apply bitumen in one coat, continuous and uniform.

D. Seal items projecting through dampproofing surface with mastic. Seal watertight.

END OF SECTION

SECTION 07212

BATT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermal batt insulation in exterior wall and ceiling construction.

1.02 RELATED SECTIONS

A. Section 05400 – Cold Formed Metal Framing: Support for insulation.

1.03 REFERENCES

A. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2001.

B. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 BATT INSULATION MATERIALS

A. Type 1 Batt Insulation for general use in thermal applications: ASTM C 665; preformed glass fiber batt; friction fit, conforming to the following:
   1. Provide insulation made without formaldehyde.
   2. Thermal Resistance: As indicated on drawings.
   3. Thickness: As indicated on drawings.
   4. Facing: Faced on one side with aluminum foil.
   5. Surface Burning Characteristics: Flame spread index of 25 or less; smoke developed index of 50 or less, when tested in accordance with ASTM E 84.
   6. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Owens Corning Corp: www.owenscorning.com.
   7. Substitutions: See Section 01600 - Product Requirements.

A. Type 2 Batt Insulation for use in acoustic applications: ASTM C 665; preformed glass fiber batt; friction fit, conforming to the following:
   1. Provide insulation made without formaldehyde.
   2. Thickness: As indicated on drawings.
   3. Facing: Black vinyl face.
   4. Surface Burning Characteristics: Flame spread index of 25 or less; smoke developed index of 50 or less, when tested in accordance with ASTM E 84.
   5. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Owens Corning Corp: www.owenscorning.com.
   6. Substitutions: See Section 01600 - Product Requirements.

2.02 ACCESSORIES

A. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inch wide.

B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.02 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install Type 1 in exterior wall and ceiling spaces without gaps or voids. Do not compress insulation.

C. Install Type 2 in locations shown on drawings without gaps or voids. Do not compress insulation.

D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

E. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.03 PROTECTION OF FINISHED WORK

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07213 - NAILABLE BASE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation over a sloping structural wood deck.

1.02 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance criteria, and limitation of materials.
B. Manufacturer's Installation Instructions: Indicate special environmental conditions required for installation, or special installation techniques.

PART 2 PRODUCTS

2.01 MANUFACTURERS – INSULATION MATERIALS

Hunter Panels
15 Franklin Street
Portland, Maine 04101

Cornell Corp.
P.O. Box 338
Cornell, WI 54732

Rmax.
13524 Welch Road
Dallas, TX. 75244-5291

2.02 INSULATION MATERIALS

A. Ventilated nailable base insulation (to be installed below composition shingle roofing system.:
   a. Board Size: 48" x 96"
   b. Board Thickness: Thickness as necessary to provide R-25 insulation value

PART 3 INSTALLATION INSTRUCTIONS

A. If specified, install a vapor retarder on the supporting roof deck.

B. Install wood nailers at the eave and rake edge of the roof. Check the supporting roof deck to make sure it is smooth and even, with no bumps or depressions.
C. Lay panels with the wood side up and the long side parallel to the ridge. Stagger end joints in succeeding panel rows.
D. Nail or screw through the panel into the supporting deck. Do not over-torque the screws and compress the insulation too much.
E. Check the insulation top surface for uneven edges before covering. Grind off any uneven edges with an electric sander/grinder.

FASTENERS

A. Use 15 nails or screws per 4’ x 8’ panel. Use additional nails or screws at the eave and ridge. (See manufacturers fastening pattern)
B. Wood Deck – Nails should be ring shank nails at least 1” longer than the insulation thickness. On plywood, use screws that protrude through the deck by at least 1/4”.
C. Steel Deck – Use self-drilling self-tapping roof insulation screws without washers. They should penetrate the steel deck a minimum of ½”.

End of Section - 07213

SECTION 07214

BOARD INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation to be used for acoustic application.

1.02 REFERENCES

A. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2000a.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2004.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 BOARD INSULATION MATERIALS

A. Glass Fiber Board Insulation: Rigid glass fiber, ASTM C 612; top surface coated with 28 lb/square asphalt and Kraft paper, insulation with the following characteristics:
   1. Surface coating color: Black
   2. Board Size: 48 x 48 inch.
   3. Board Thickness: 1 inches.
   4. Board Edges: Square.
   5. Maximum Density: 8.0 lb/cu ft.
   6. Surface Burning Characteristics: Flame spread index of 25 or less; smoke developed index of 50 or less; when tested in accordance with ASTM E 84.
   7. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Owens Corning Corp: www.owenscorning.com.
   8. Substitutions: See Section 01600 - Product Requirements.

2.02 ACCESSORIES

A. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT CAVITY WALLS

A. Secure impale fasteners to substrate at a frequency as follows:
   1. Six per board.

B. Provide adhesive installation when impale fasteners are impractical.

C. Install boards to fit snugly together.

D. Install in running bond pattern.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 PROTECTION OF FINISHED WORK

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07215

RIGID FOAM INSULATION

PART 1 – GENERAL

1.1 SUMMARY

A. Provide a thermal, water and air resistance barrier wall system for exterior cold-formed metal wall assemblies. Work includes:
   1. Provide continuous exterior wall insulation.
   2. [Provide interior spray polyurethane foam.]

B. Related Sections:
   1. Section 05 40 00 Cold-Formed Metal Framing: Non Load-bearing, metal exterior wall framing assemblies.
   2. Section 09 21 16 Gypsum Board Assemblies: Interior gypsum board wall finish.

1.2 REFERENCES

A. Reference standards:
   1. ASTM International (ASTM):
      a. ASTM C203: Test Methods for Breaking Load and Flexural Properties of Block-type Thermal Insulation.
      b. ASTM C209: Test Method for Cellulosic Fiber Insulating Board.
      c. ASTM C518: Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
      d. ASTM C1029: Specification for Spray-Applied rigid Cellular Polyurethane thermal Insulation.
      e. ASTM C1289: Specification for Faced Rigid Cellular Polyisocyanurate thermal Insulation Board.
      f. ASTM D1621: Test Method for Compressive Properties of Rigid Cellular Plastics.
      g. ASTM D1622: Test Method for Apparent Density of Rigid Cellular Plastics.
      h. ASTM D2126: Test Method for Response of Rigid Cellular Plastics to thermal and Humid Aging.
      i. ASTM E84: Test Method for Surface Burning Characteristics of Building Materials.
      j. ASTM E96/E96M: Test Method for Water Vapor Transmission of Materials.
      k. ASTM E331: Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
      l. ASTM E2357: Test Method for Determining Air leakage of Air Barrier Assemblies.
      m. ASTM E283: Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors under Specific Pressure Differences Across the Specimen.

2. Factory Mutual (FM):
   a. FM 4880: Class 1 Fire Rating of Insulated Wall or Wall and Roof /Ceiling Panels Interior Finish Materials (Room Corner Fire Test).
3. Underwriters Laboratories Inc. (UL):
   a. UL 723: Surface Burning characteristics of Building Materials.
4. National Fire Protection Association (NFPA):
   a. NFPA 285 [2006]: Standard Method of Test for the evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test apparatus.
   b. NFPA 259 (2008) Standard Test Method for Potential Heat of Burning Materials.

1.3 SYSTEM DESCRIPTION

A. Furnish and install an exterior wall system that effectively controls thermal, air, vapor and water performance and provides continuity of the building envelope enclosure. The system shall include the following:
   1. Insulated sheathing secure to the exterior of the metal wall framing assembly.
   2. Joint, penetration and gap sealing material for sealing component joints, penetrations through the wall system and gaps between the building envelope enclosure components and wall opening frames.
   3. [Spray polyurethane foam applied to the interior wall cavity]

B. Performance Characteristics:
   1. Thermal performance:
      a. Exterior insulation: ASTM C518, Stabilized R-value of 6.5 at one inch of thickness with a maximum six month exposure capability to outdoor elements [and 15 year thermal warranty].
      b. [Interior spray polyurethane foam: ASTM C518, 140degreeF/90day Aged R-value (measured at 75degreeF mean Temp.), for product with a minimum 45 degree F ambient and substrate application temperature is R6.4/inch and 140 degree F/90day Aged r-value (measured at 75 degree F Mean Temp.), for product with a minimum 30 degree F ambient and substrate application temperature is R6.0/inch.
         1) Core density: ASTM D1622, Minimum 2.0 pcf.
         2) Acceptable adhesion to substrate based on specific minimum application temperature and proper substrate conditions.]
   2. Air barrier performance: When tested in accordance with ASTM E2357, at a test pressure of not less than 6.24 psf, air infiltration shall not exceed 0.04 cfm per square foot (0.2L/*m2) of fixed wall area. Testing should be conducted at positive and negative sustained wind loading of 12.5psf (600Pa) for one-hour duration in each direction, pressure cycling of the wall at 2000 cycles in both the positive and negative direction, ending with wind gust loading at 25psf.
   3. Water penetration: when tested in accordance with ASTM E331, no uncontrolled water penetration shall occur at a minimum differential pressure of 6.24 psf for minimum test duration of 2hrs.
   4. Mold resistance: Wall system components shall provide non-food source for fungal growth.

C. Code Compliance: Wall system and component materials shall comply with the following requirements:
   1. Exterior Insulation:
      a. Class A (<and/or= 25 Flame spread Index and <450 Smoke Developed Index) classified at Max. thickness per UL 723 criteria or ASTM E84 criteria.
      b. Fire Performance Evaluation as a component of an NFPA 285 approved wall assembly per the requirements of the International Building Code.
   2. Spray Polyurethane foam:
      a. Class A (<and/or= 25 Flame Spread Index and < 450 smoke Developed Index) Classified at Max. thickness per UL 723 criteria or ASTM E84 criteria.
      b. Fire Performance Evaluation as a component of an NFPA 285 approved wall assembly per the requirements of the International Building Code.]
   3. System complies with ASTM E2357: Test Method for determining Air Leakage of Air Barrier Assemblies.
   4. System complies with NFPA 285: Standard method of Testing for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible components using the Intermediate Scale, Multi-Story Test Apparatus.

D. All joints, penetrations and gaps of the wall system shall be made water and air resistive.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each wall system component product required.
B. Reports:
   1. Submit summarized documentation, from ICC-ES or Manufacturer of material(s), verifying qualities of wall system components meet or exceed specified requirements.
      a. Include summarized results of ASTM E2357 air barrier system testing and ASTM E331 water penetration tests.
      b. [Submit Field Inspection and Test Reports for Interior Spray Foam in accordance with Field Quality control requirements per manufacturer's installers certification program.]
C. Samples: Submit following material samples.
   1. Insulation panel, 8" square.
   2. Insulation fasteners/washers and joint flashing , one each.
D. Submit Material Safety Data sheets (MSDS) for wall system components.
E. Spray Foam Contractor MUST submit at the time of BID a written certification from the wall system manufacturer.
   1. At bid submission, provide the following evidence to the Architect:
      a. Wall System Manufacturer Installer Certification.
         1) Acceptable Certification Program.

i. STYROFOAM-CM Certification Program.
ii. FROTH PAK Ultra Certification Program]

1.5 QUALITY ASSURANCE

A. Spray Polyurethane Foam Installation: Spray polyurethane foam installer shall be certified by wall system manufacturer at the time of bid. The spray foam installer shall be the certified individual that submitted certification at time of bid.

B. Installer Qualifications:

1. The air barrier Installer shall be, during the award period as well as for the duration of the installation, officially recognized as a Certified Installer by the wall system Manufacturer (Certified Installer). The Certified Installer shall carry liability insurance and bonding.
2. Each worker who is installing air barriers must be a, or accompanied by a, Certified Installer.
3. Each Certified Installer can supervise a maximum of five workers. The Certified Installer shall be thoroughly trained and experienced in the installation of air barrier of the types being applied. Certified Installers shall perform or directly supervise all air/vapor barrier work on the project.
4. Certified Installers shall have their wall system Manufacturer Certification in their possession and available on the project site, for inspection upon request.

C. Pre-installation Meeting: Prior to commencement of application of wall system, review and document methods and procedures related to installation, including the following:

1. Participants: Authorized representatives of the Contractor, [Construction Manager,] [Owner,] Architect, [Engineer,] Applicator, [Independent Inspector] and [Manufacturer].
2. Review metal wall framing assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
3. Review insulated sheathing, flashing and [spray polyurethane foam] methods and procedures related to application including manufacturer's installation guidelines.
4. Review construction schedule and confirm availability of products, applicator personnel, equipment and facilities.
5. Review governing regulatory requirements, and requirements for insurance and certificates as applicable.
6. Review field quality control procedures.

1.6 DELIEVERY, STORAGE AND HANDLING

A. Deliver wall system materials in Manufacturer's unopened containers or bundles, fully identified by name, brand, type and grade. Exercise care to avoid damage during unloading, storing and installation.

B. Store, protect and handle wall system materials in accordance with the Manufacturer's recommendations to prevent damage, contamination and deterioration. Keep materials free of dirt and other foreign matter.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Install wall system work only when weather conditions are in compliance with Manufacturer's specific environmental requirements and condition will permit work to be performed in accordance with Manufacturer's recommendations and warranty requirements.
   1. [Spray polyurethane foam:
      a. Do not proceed with installation of spray polyurethane foam until sheathing substrate construction is complete and openings and penetrating items have been installed and sealed.
      b. Do not proceed with installation of spray polyurethane foam until substrate temperatures accepting the spray polyurethane are above the manufacturer's recommended minimum surface temperatures.
      c. Verify that substrate surfaces to receive spray polyurethane foam are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious material that would impair bond.
      d. Do not apply spray polyurethane after the 6 months expiry date printed on the label of each container.
      e. Ventilate area to receive spray polyurethane foam by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.
      f. Provide protection for workers as recommended by spray polyurethane foam manufacturer.
      g. Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
      h. Dispose of waste foam daily in location designated by Architect [Engineer] and empty drums in accordance with foam manufacturer's instructions.]

1.8 WARRANTY

A. Submit the following warranties: Follow all Manufacture's requirements for acquiring warranty.
   1. Exterior insulation warranty: Six month exposure and 10year thermal warranty.
   2. Liquid sprayed flashing: Six month exposure and 10 year water resistance warranty
   3. Flashing Tape: Six month exposure
   4. Spray Polyurethane Foam: Limited Warranty

PART 2- PRODUCTS

2.1 INSULATION

A. Continuous Exterior Insulation: Glass-fiber-reinforced enhanced polyisocyanurate foam core sheathing faced with nominal 4 mil embossed blue acrylic-coated aluminum on one side and 1.25 mil embossed aluminum on the

other side, complying with ASTM C1289 and meeting the following physical properties:

1. ASTM C1289 type 1, class 2.
2. Compressive Strength (ASTM D1621): 25 psi, minimum.
3. Flexural Strength (ASTM C203): Minimum 55 psi .
4. Water Absorption (ASTM C209): Minimum 0.1 percent by volume.
5. Water Vapor Permeance (ASTM E96): <0.03 perms.
6. Maximum Use Temperature: 250 degrees F.
7. Class A (<and/or= 25 Flame spread Index and <450 Smoke Developed Index) classified at Max. thickness per UL 723 criteria or ASTM E84 criteria.
8. Acceptable Products: The Dow Chemical Company “THERMAX™ ci Exterior Insulation.”
    a. Panel Size: 4’-0” wide x 8’-0” [12’-0”] long, square edge, shiplap (shiplap on thickness of 1.55: and greater) panels.
    b. Thickness and Stabilized R-Value**: 7.5 min.**

2.2 ACCESSORIES

A. Fasteners: Provide insulated sheathing manufacturer’s recommended polymer or other corrosion protective coated steel screw fasteners for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness.

1. Acceptable Products:
    a. Rodenhouse, Inc. 2 inch diameter “THERMAL-GRIP ci Prong washers” plastic washers which can be installed using either bulk Grip-Deck self-drilling screws or collated Grip-Deck screws. [Use the Grip-Lok auto-feed fastening system for high speed application (recommended for wall assemblies up to 2 inches in thickness).] Contact Rodenhouse Inc. for more information at 616-454-3100.
    b. Rodenhouse, Inc. “Plasti-Grip PMF” fasteners. Recommended for block, concrete, or masonry substrates. Contact Rodenhouse, Inc. for more information at 616-454-3100.
    c. Or approved equal

B. Liquid spray flashing: Provide insulation manufacturer’s recommended board joint commercial liquid spray flashing and sealant for sealing joints, seams, window openings, door openings, counter-flashing and penetrations through the insulation layer.

1. Acceptable Products:
    a. The Dow Chemical Company “LIQUIDARMOR™- CM” spray flashing and sealant.
        1) Meets ASTM 2357 standard test method for determining air leakage of air barrier assemblies, as part of an approved assembly with continuous foam insulation.
        2) Meets ASTM 331 water penetration of existing windows by uniform static air pressure differences, as part of an approved assembly with continuous foam insulation.

3) Meets ASTM D412 tensile strength- 340 psi.
4) Meets ASTM E96 water transmission- 4 perms at typical application thickness.
5) Density- 11.4 pounds/gallons as liquid.
6) Application temperature: 35 degrees F to 120 degrees F.
7) 3" ± 1" coverage required at board joints.
8) UV resistance: 180 days.
9) Recommended thickness of spray sealant: 50 ± 5 wet mils around screws, veneer anchors and wall penetrations
10) Passes ASTM D1970/AAMA714 requirements for nail sealing ability.

C. Flashing Tape: Provide insulation manufacturer's recommended tape for counter-flashing and penetrations through the insulation layer.
1. Acceptable Products:
a. The Dow Chemical Company "WEATHERMATE™" Straight Flashing 4 inch, 6 inch, 9 inch and 18 inch at straight openings at heads, jambs and sills.
1) Meets ASTM 711for self adhering flashing.
2) Meets ASTM D5034 standard test method for breaking strength an elongation of textile fabrics.
3) Meets ASTM D3330 standard test method for peel adhesion for pressure sensitive tape.
4) Meets ASTM D1970 standard test method for self adhering polymer modified bituminous sheet materials used as steep roofing underlayment for ice dam protection.
5) Meets ASTM G154 standard practice for operating fluorescent ultraviolet lamp apparatus for exposure of nonmetallic materials.
6) Water vapor transmission less than 1 perm
7) Application temperature: 30 degrees F to 120 degrees F.
8) UV resistance: 120 days.

D. Penetration Filler: Provide insulated sheathing manufacturer's recommended polyurethane foam for sealing penetrations of insulated sheathing.
1. Acceptable Products:
a. The Dow Chemical Company "GREAT STUFF PRO™ Gaps & Cracks" single-component polyurethane low-pressure foam sealant.
1) Meets ASTM E84 standard test method for surface burning characteristics of building materials.
2) Meets Modified ASTM E814 standard test method for fire block.
3) Complies with Underwriters laboratories, Inc. Classification, as a sealant fire block.
4) Polyurethane based foam is minimal expanding, single component foam.
5) Cures quickly and has a moisture resistant skin.
6) Allows for movement/shifting within a structure.
7) Fills and seals gaps up to 3".
8) Flexural strength, ASTM C203, parallel to rise, psi, minimum: 8.8
9) Compressive strength, ASTM D1621m parallel to rise, psi: 9.3
10) Tensile strength, ASTM D1623, parallel to rise, psi: 14.4

b. The Dow Chemical Company “GREAT STUFF PRO™ Window & door” single-component polyurethane low-pressure foam sealant.
   1) Meets ASTM E2112 standard practice for installation of exterior windows, door and skylights.
   2) Meets ASTM E84 standard test method for surface burning characteristics of building materials.
   3) Meets ASTM E283 standard test method for determining rate of air leakage through exterior windows, curtain walls and doors under specified pressure difference across the specimen, as part of an approved assembly with continuous foam insulation.
   4) Meets E331 standard test method for water penetration of exterior windows, skylights, doors and curtain walls by uniform static air pressure difference, as part of an approved assembly with continuous foam insulation.
   5) Application temperature: 40 degrees F to 100 degrees F at relative humidity of > 20%..
   6) Meets sealant component air barrier requirements for ABAA Specifications.
   7) Classified per UL 723 as under UL File R13655.
   8) Under ICC-ES ESR-1961 evaluated as an insulating sealant.
   9) Flexural strength, ASTM C203 parallel to rise, psi, min.: 5.2
   10) Compressive strength, ASTM D1621, parallel to rise, psi: 2.8
   11) Tensile strength, ASTM D1623, parallel to rise, psi: 5.7
   12) Flame spread/Smoke developed, ASTM E84: 10/20.

E. Gap Air Infiltration Filler: Two Component, Quick Cure Polyurethane Foam:
   1. Acceptable Products:
      a. The Dow Chemical Company FROTH-PAK™ Ultra Foam Insulation two component, quick-cure polyurethane foam.
         1) NFPA 286 approval for Exposed use to the interior of the building without the need for a 15-min thermal barrier at max 6” height, 2” thick and indefinite width.
         2) ASTM E-84 Class A rating- flame spread of 25 or less.
         3) Maximum temperature exposure: 240 degrees F.
         4) Complies with NFPA 286- can be left exposed in non-fire-resistant-rated roof/wall junctures, maximum 6” high and 2” deep with unlimited width.
         5) Flame spread/smoke developed, ASTM E84/UL 723.
         6) Thermal resistance per inch, ASTM C519: 6.0 per inch.
         7) Water Permeance, ASTM E96: 6.4 perms for 1 inch, 3.2 perms for 2” thick material.
         8) Water absorption, ASTM D2942, % by volume: 3.2
         9) Compressive strength, ASTM D1621, lb/sq. in.: 17.2

F. Steel stud veneer attachment: Provide steel stud framed wall attachment through the rigid foam sheathing to the substrate to structural steel stud. Verify anchor size and installation pattern with manufacturer.
   1. <u>Masonry</u>
      a. Acceptable Products:
         1) Heckmann Building Products Pos-I-Tie masonry veneer anchoring system with THERMAL-GRIP brick-tie washers (washers from Rodenhouse Inc. but also available through Heckmann Building Products). Must use Pos-I-Tie anchors with

barrel length equal to sheathing thickness so that compressive loads are transferred directly to the metal wall framing. EPDM gasket and THERMAL-GRIP brick-tie washers must be used with Pos-I-Tie. For enhanced thermal performance use THERMAL-CLIP accessory from Heckmann Building Products to reduce thermal-bridging. Wire ties are available to accommodate specified air gaps and masonry. Contact Heckmann Building Products at 800-621-4140 or Rodenhouse, Inc. at 616-454-3100 for more information.

2) Hohmann & Barnard 2-Seal with THERMAL Wing Nut
3) Hohmann & Barnard 2-Seal with 1.5" diameter washer

2. 3 Coat Stucco and Adhered Stone Veneer
   a. An additional weather resistive barrier must be installed over the insulation prior to the attachment of the metal lath. Any commercial wrap product can be used.
   b. Corrosion resistant metal lath to be attached back to the steel studs using any fastener which is acceptable to the Masonry institute.
   c. Fastener schedule to be determined using the FSC Tech Matters "Guide to Attaching Exterior Wall Coverings Through Foam Sheathing to Wood or Steel Wall Framing"
3. ACM and Metal Panel
   a. Any surface mounted Firing system can be used provided it has been engineered to be installed on foamed plastic insulation.
   b. Erect panels level and plumb, in proper alignment in relation to substructure framing and established lines
   c. Panels shall be erected in accordance with approved shop drawings
   d. Panel anchorage shall be structurally sound and per engineering recommendations.
   e. Fastener schedule to be determined using the FSC Tech Matters "Guide to Attaching Exterior Wall Coverings Through Foam Sheathing to Wood or Steel Wall Framing"
4. Terracotta
   a. Any surface mounted Firing system can be used provided it has been engineered to be installed on foamed plastic insulation.
   b. Panels shall be erected in accordance with approved shop drawings
   c. Panel anchorage shall be structurally sound and per engineering recommendations.
   d. Fastener schedule to be determined using the FSC Tech Matters "Guide to Attaching Exterior Wall Coverings Through Foam Sheathing to Wood or Steel Wall Framing"
5. Cement Board Siding
   a. Any surface mounted Firing system can be used provided it has been engineered to be installed on foamed plastic insulation.
   b. Fastener schedule to be determined using the FSC Tech Matters "Guide to Attaching Exterior Wall Coverings Through Foam Sheathing to Wood or Steel Wall Framing"

G. Flexible polyethylene foam gasket strip to reduce air infiltration between a concrete foundation and sill plate.

1. Acceptable Products: the Dow chemical Company “STYROFOAM™ Sill Seal Foam Gasket.

2.3 WALL ASSEMBLY PERFORMANCE SPECIFICATIONS SECTION

A. Wall assembly must meet the following performance criteria:
   1. ASTM 331 Standard test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air pressure Differences.
   2. ASTM E330 Standard test Method for Structural Performance of Exterior Windows, Skylights, Doors and Curtain Walls.
   3. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
   4. ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Windows, Curtain Walls, and Door Under Specified Pressure Differences Across the Specimen.
   5. NFPA 285 Standard method of Test for Evaluation of Flammability characteristics of Foam plastic Rigid Insulation.
   6. NFPA 259 Standard test Method for Potential Heat of Building Materials.
      a. FM 4880: Class 1 Fire Rating of Insulated Wall or Wall and Roof /Ceiling Panels Interior Finish Materials (Room Corner Fire Test).
   7. UL 723 Surface burning characteristics of building materials – product must be a Class A.
   8. Compliance to Continuous Insulation in ASHRAE 90.1-2007 energy Standard for buildings except Low Rise Residential.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and installation conditions for compliance with requirements for installation conditions affecting performance of the work.
   1. Verify that metal wall studs, opening framing, bridging, bracing and other framing support members and anchorage have been installed within wall system alignment tolerances and requirements.
   2. Verify that substrate surfaces to receive spray polyurethane foam are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious material that would impair bond.
   3. Verify that items required to penetrate the wall system are place and penetration gaps and cracks are properly sealed before installation of spray polyurethane foam.
   4. Do not proceed with wall system installation until unsatisfactory conditions have been corrected.

3.2 INSULATION INSTALLATION

A. Install insulation in accordance with manufacturer's recommendations: Fasten to exterior face of exterior metal stud wall framing using sheathing manufacturer's recommended type and length screw fasteners with washers. Abut panels tightly together and around openings and penetrations.
   1. Install sheathing panels horizontally with blue aluminum facing to exterior. Use maximum lengths to minimize number of joints. Locate edge joints parallel to and on framing. Center end joints over supports and stagger in each course. Provide additional framing wherever panel joints do not bear against framing plate or sill members.
   2. Fasten panels to each support with fasteners spaced 12 inches on center at perimeter of the wall and 16 inches on center in panel field. Set back perimeter fasteners 3/8" from edges and ends of panel units. Drive fasteners to bear tight and flush with surface of insulation. Do not overdrive fastener causing damage to the insulation board facer. Perimeter fasteners can be detailed to bridge the gap of abutting board joints due to the 2" diameter of the washer used to fasten the board to the studs. Maximum of two board joints may be bridged per fastener.
   3. Install flashing at end and edge joints in accordance with sheathing manufacturer's joint sealing recommendations.
   4. Install flashing behind wall tie and mechanical fastening assemblies for rain screen claddings according to manufacturer's recommendations.
   5. Seal sheathing joints and penetrations of sheathing in accordance with sheathing manufacturer's joint and penetration sealing recommendations.
   6. After base flashing, which may include a termination bar running horizontally along the top edge of the flashing, is installed on exterior of insulated sheathing, install LIQUIDARMOR-CM or WEATHERMATE™ Flashing 6 inch or 9 inch" to the exterior sheathing and lapped over the top edge of the base. If a termination bar is utilized a flat strap must be included in framing at termination bar height to allow proper fastening of the termination bar.

3.3 [SPRAY POLYURETHANE FOAM INSTALLATION]

A. Preparation
   1. Mask and cover adjacent areas to protect from overspray.
   2. Apply primers for special conditions as recommended by manufacturer.
   3. Cover wide joints with transition sheet membrane as specified in Section 07 27 50.
   4. Clean work area prior to application of sprayed insulation.
   5. Verify substrate temperature meets manufacturer's requirements for specific formulations used.
   6. Ensure that all stud cavity fire-stopping is installed prior to application of spray foam.

B. Application: Spray apply polyurethane foam in accordance with ASTM C1029 and manufacturer's installation guidelines; complying with preparation methods outlined in 3.3.A.
   1. Apply spray polyurethane foam by picture framing around the interior studs at the insulated sheathing- steel stud interface and one pass across all board joints and penetrations.
   2. Finish applying spray polyurethane foam with one pass not exceeding 1.5 inches in thickness. Two passes are acceptable to reach maximum thickness of 1.5 inch.

3. If more than one layer is being applied, allow the layer applied first o cool to the max. substrate temperature or less recommended for the STYROFOAM™ Spray Polyurethane foam CM Series or FROTH PAK™ Ultra.
4. Avoid formation of sub-layer air pockets.
5. Apply spray polyurethane foam in overlapping layers, in a manner to obtain a smooth, uniform surface. Total thickness as indicated.
6. Maintain [3 inch] [75 mm] clearance around chimneys, heating vents, steam pipes, recessed lighting fixtures and other heat sources.
7. Do not apply spray polyurethane foam to inside of exit openings or electrical junction boxes.
8. Maintain a continuous layer of spray foam from floor to floor to roof to complete air barrier.
9. Site Tolerances: Maximum Variation in Applied thickness – minus [1/4 inch] [6 mm], plus [5/8 inch] [10 mm].

C. Field Quality control. Submit spray polyurethane foam field inspection and test reports for the following:
   1. The Certified Installer shall complete the Daily Work Record and record all information required including the results of the testing. The Daily work Record shall be kept on site for routine inspection. Copies of the daily Work Record shall be forwarded to the manufacturer, owner or owner's representative upon request.
   2. The costs incurred for daily testing and inspection by the Certified Installer and the completion of the Daily work Record shall be done by the Accredited Contractor.
   3. If required by the owner, arrange for site inspections by a qualified third party inspector. The frequency and cost of inspections shall be included in the bid at the owner's request. If the site inspection reveals any defects, the Accredited Contractor shall immediately rectify all such defects at his cost.
   4. The Certified Installer's daily work record shall verify conformance with the Thermal and Air Barrier Wall System Manufacturer's instructions, the standard ULC S705.2-02 Installation standard and this section of the project specification.
      a) Follow Manufacturer guidelines for proper temperature settings regarding spray equipment as stated on Manufacturer product information sheets.
      b) Follow Manufacturer guidelines for proper spray polyurethane foam formulation based on substrate and ambient temperatures product will be applied to.
      c) Test completed application daily for core density and cohesion/adhesion to substrate. Record results daily in test reports.
      d) After product has properly cured, conduct tests to verify adhesion between the spray polyurethane foam and the substrate.
      e) Conduct adhesion tests on all corners and building angles, at wall-to-slab junctions, and at wall-to-roof junctions.
      f) Perform one adhesion test for every wall less than [100 feet] [30 meters] in length. Perform two testes for every wall greater than [100 feet] [30 meters] and less than [200 feet] [60 meters in length, with an additional test conducted for every additional [100 feet] [30 meters], or part thereof, in wall length.

g) Transition membranes shall be pull tested in accordance with the Certified Installer training program requirements before installing the spray polyurethane air barrier material.]

3.4 LIQUIDARMOR™- CM FLASHING AND SEALANT INSTALLATION

A. LIQUIDARMOR™- CM is not a hazardous chemical, and does not pose a respiratory hazard when used according to instructions. It is recommended that when applying the spray to do so in a well ventilated area to ensure optimal product curing.
   1. Surface and ambient temperatures should be 35 degrees F and rising and below 120 degrees F during the application.
   2. Do not apply product on surfaces with standing water or frost.
   3. LIQUIDARMOR™ -CM tolerates rain shortly after the curing process has begun (typically 1 to 4 hours), avoid installing on days with a high probability of significant rainfall.
   4. Seal any gaps greater than ¼" with GREAT STUFF PRO Window and Door Insulating Foam Sealant or compatible sealant according to manufacturer's recommendations, prior to applying LIQUIDARMOR™- CM. If facer on insulation board is damaged note the affected area so that additional spray can be applied appropriately. Damaged insulation can also be replaced or WEATHERMATE Straight Flashing Tape can be used to tape down facer flaws.
   5. Flash board joints, penetrations and other fenestration openings as required with a minimum50 wet mils (+/-5). Spray can be applied on one or two passes depending on site conditions.
   6. Apply 3 inches (+/-1") over the board joints. Make sure that a minimum of 1" of spray covers each side of the joint. Fasteners and washers along the board joints should also be completely covered with LIQUIDARMOR™- CM. Brick anchors can be installed after the application of LIQUIDARMOR™- CM.
   7. For rough openings apply LIQUIDARMOR™- CM a minimum of 3 inches onto the sheathing face, completely covering the sheathing board edge. In turn extend spray a minimum of 3 inches back onto the rough opening substrate. It is recommended to cover a distance back onto the rough opening equal to what is covered by traditional flashing materials
   8. For penetrations through the rigid insulation or substrate apply LIQUIDARMOR™- CM a minimum of 2 inches onto the sheathing face and a minimum of 2 inches onto the penetration substrate or primary flashing substrate..
   9. Use wet mil thickness gauge to ensure proper installation thickness. A paint brush can be used to even out product application thickness. If product is consistently below minimum thickness spray another pass to achieve proper thickness requirements.
   10. LIQUIDARMOR™- CM typically cures to touch within 1 to 4 hours after application. Depending on humidity, temperature, sun exposure and wind direction this time can be longer. Application will dry to an approximate 30 mil thickness when completely cured.

PART 4- PRODUCT DATA SHEET 1 – Cleaning

1.1 Remove overspray from non-prescribed surfaces without causing damage to surfaces.

1.2 Remove protective covers from adjacent surfaces.

END OF SECTION 07 42 65

END OF SECTION

SECTION 07216

THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. TPO Mechanically fastened membrane roofing system.

B. Cover board

C. Roof insulation.

D. Vapor retarder.

E. Substrate board.

1.2 RELATED SECTIONS

A. Division 05 Section "Steel Decking" for furnishing acoustical deck rib insulation.

B. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, cants, curbs, and blocking[and for wood-based, structural-use roof deck panels].

C. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.

D. Division 07 Section "Manufactured Roof Expansion Joints."

E. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:

1. ASTM D 1079 “Terminology Relating to Roofing and Waterproofing.”
2. Glossary of NRCA's "The NRCA Roofing and Waterproofing Manual."
3. Roof Consultants Institute “Glossary of Roofing Terms.”

B. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

1.4 DESIGN CRITERIA

A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

D. FMG Listing: Roofing membrane, base flashings, and component materials shall comply with requirements in FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG's “RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1. Fire/Windstorm Classification: Class 1A-75
2. Hail Resistance: MH

1.5 SUBMITTALS

A. Product Data: Manufacturer’s data sheets for each product to be provided.

B. Detail Drawings: Provide roofing system plans, elevations, sections, details, and details of attachment to other Work, including:

1. Base flashings, cants, and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening patterns.

C. Verification Samples: Provide for each product specified.

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" and “Guarantees” Article.

1. Provide evidence of meeting performance requirements and intent to guarantee.

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.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's guarantee.

B. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

C. Test Reports:

1. Roof drain and leader test or submit plumber’s verification.
2. Core cut (if requested).
3. Roof deck fastener pullout test.

D. Moisture Survey:

1. Submit prior to installation, results of a non-destructive moisture test of roof system completed by approved third party. Utilize one of the approved methods:

a. Infrared Thermography
b. Nuclear Backscatter

E. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system must be labeled by the single source roofing manufacturer issuing the guarantee.

F. Fire-Test-Response Characteristics: Provide 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.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

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.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. 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.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 GUARANTEE

A. Provide manufacturer's system guarantee equal to Johns Manville's Peak Advantage No Dollar Limit Roofing System Guarantee.

1. Single-Source special guarantee includes roofing plies, base flashings, liquid applied flashing, roofing membrane accessories and other single-source components of roofing system marketed by the manufacturer.
2. Guarantee Period: 15 years from date of Substantial Completion.
3. Accidental Puncture Rider: Guarantee shall provide coverage for accidental puncture for up to 16 mainhours per year for the life of the guarantee.

B. Installer’s Guarantee: Submit roofing Installer's guarantee, including all components of roofing system for the following guarantee period:

1. Guarantee Period: Five Years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC POLYOLEFIN ROOFING (TPO) MEMBRANE

A. Fabric-Reinforced Thermoplastic Polyolefin (TPO) Sheet: ASTM D 6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Basis of Design: JM TPO [or architect pre approved equal]

1. Thickness: 60 mils (1.14 mm), nominal.
2. Accelerated Weathering: Minimum of 24,000 hours without cracking or crazing as tested using ASTM G155.
3. Tensile Strength: Minimum of 300 lbf as tested using ASTM D751
4. Tearing Strength: Minimum of 85 lbs as tested using ASTM D751

2.2 AUXILIARY ROOFING 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 sheet flashing of same material, type, reinforcement, thickness, and color as sheet membrane.

C. Sheet Flashing: Manufacturer's unreinforced sheet flashing of same material as sheet membrane..

D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors.

E. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, prepunched.

F. Fasteners: Factory-coated steel fasteners and metal or plastic 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.

2.3 AUXILIARY ROOFING SYSTEM COMPONENTS

A. Expansion Joints: Provide factory fabricated weatherproof, exterior covers for expansion joint openings consisting of flexible rubber membrane, supported by a closed cell foam to form flexible bellows, with two metal flanges, adhesively and mechanically combined to the bellows by a bifurcation process. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee.

B. Coping System: Manufacturer’s factory fabricated coping consisting of a base piece and a snap-on cap. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee.

2.4 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads sourced from membrane roofing system manufacturer.

2.5 COVER BOARD

A. High-Density Polyisocyanurate: High-density polyisocyanurate technology bonded in-line to mineral-surfaced, fiber glass reinforced facers with greater than 125 lbs of compressive strength (1/4” Johns Manville Invinsa)

2.6 ROOF INSULATION

A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Choose performance standard or prescriptive thickness.

1. Provide insulation package with R Value of 25 or greater – (2) layers.

2.7 TAPERED INSULATION

A. Tapered Insulation: ASTM C 1289, provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48).

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer.

D. Urethane Adhesive: Manufacturer’s two component urethane adhesive formulated to adhere insulation to substrate.

E. Wood Nailer Strips: Comply with requirements in Division 06 Section **"**Miscellaneous Rough Carpentry**."**

F. EXECUTION

2.9 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements 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.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

2.10 PREPARATION

A. Clean and remover from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.

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. Proceed with installation only after unsatisfactory conditions have been corrected.

2.11 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints 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 like material.

E. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

G. Preliminarily Fastened Insulation for Mechanically Fastened Systems: Install insulation with fasteners at rate required by roofing system manufacturer or applicable authority, which ever is more stringent.

2.12 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Where roof slope exceeds 1/2 inch per 12 inches (1:24, contact the membrane manufacturer for installation instructions regarding installation direction and backnailing

D. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

E. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

2.13 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

A. Start installation of roofing membrane in presence of roofing system manufacturer's technical representative.

B. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

D. Always install membrane laps perpendicular to the steel deck flutes. “Picture Frame” installation method is not permitted.

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 and repair seam sample areas.

    a. Remove and repair any unsatisfactory sections before proceeding with Work.

3. Repair tears, voids, and lapped seams in roofing membrane that do 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. Proceed with installation only after unsatisfactory conditions have been corrected.

2.14 FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Flash penetrations and field-formed inside and outside corners with sheet flashing.

C. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

D. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

2.15 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Adhere with compatible adhesive or heat weld walkway products to substrate according to roofing system manufacturer's written instructions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

2.16 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's Registered Roof Observer (RRO) to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

2.17 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07240

EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Class PM and PB composite wall and soffit cladding of rigid insulation and applied coating. Provide designated system where indicated on drawings.

1.02 RELATED SECTIONS

A. Section 05400 - Cold Formed Metal Framing: Sheathing on metal studs.

B. Section 06100 - Rough Carpentry: Sheathing.

C. Section 07620 - Sheet Metal Flashing and Trim: Perimeter flashings.

D. Section 07900 - Joint Sealers: Perimeter and penetration sealants.

1.03 REFERENCES

A. ASTM C 150 - Standard Specification for Portland Cement; 2002a.

B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 1997.

C. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2003b.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2004.

E. EIMA (PM) - Guideline Specification For Exterior Insulation and Finish Systems, Class PM; EIFS Industry Members Association; 1984, Revised 1999.

F. EIMA (PB) - Guideline Specification For Exterior Insulation and Finish Systems, Class PB; EIFS Industry Members Association; 1984, Revised 1997.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.

C. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.

D. Manufacturers list of approved sealants and sealant manufacturers.

E. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.

F. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.

G. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.05 QUALITY ASSURANCE

A. EIFS Manufacturer Qualifications: Provide all EIFS products other than insulation from the same manufacturer with qualifications as follows:
   1. Member in good standing of EIMA (EIFS Industry Members Association).
   2. Manufacturer of EIFS products for not less than 5 years.

3. Manufacturing facilities ISO 9002 certified.

B. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

C. Installer Qualifications: Company specializing in EIFS work and approved by the EIFS manufacturer.

1.06 MOCK-UP

A. Specified in Section 01410 - Approval Mock-Ups. Construct mock-up of typical EIFS application on specified substrate, size as indicated on drawings, and including flashings, joints, and edge conditions.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Protect adhesives and finish materials from freezing and temperatures in excess of 90 degrees F.
   1. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
   2. Protect insulation materials from exposure to sunlight.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

B. Do not install finish or sealants when ambient temperature is below 40 degrees F.

C. Do not leave installed insulation board exposed to sunlight.

1.09 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

C. Provide separate warranty from installer covering labor for repairs or replacement for a period of not less than 5 years.

D. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Dryvit: www.dryvit.com.
   2. TEIFS: www.teifs.com.
   3. Sto Corp; Product: www.stocorp.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 CLASS PM SYSTEM

A. Exterior Insulation and Finish System: Cementitious base coating, minimum 1/4 inch thick, reinforcing mesh, and synthetic finish coating, over mechanically-fastened extruded polystyrene board insulation; complying with performance requirements of EIMA Class PM system.

B. Base Coat: Acrylic or polymer-modified, fiber reinforced Portland cement coating.

C. Finish Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
   1. Texture:.
   2. Color: As selected from manufacturer's range of standard colors.

D. Portland Cement: ASTM C 150, Type I or II.

E. Insulation Board: Extruded polystyrene board with natural skin surfaces; ASTM C 578, Type IV; with the following characteristics:
   1. Board Size: 48 x 96 inch.
   2. Board Size Tolerance: 1/16 inch from square and dimension.
   3. Board Thickness: As indicated on drawings.
   4. Thickness Tolerance: 1/32 inch maximum.
   5. Board Edges: Square.
   6. Thermal Conductivity (k factor) at 25 degrees F: 0.18 as determined by ASTM C 177.
   7. Compressive Resistance: 25 psi.
   8. Board Density: 1.6 lb/cu ft.
   9. Water Absorption, maximum: 0.3 percent, volume.
   10. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/400, when tested in accordance with ASTM E 84.

F. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating; weight, strength, and number of layers as required to meet EIMA Class PM specifications.

2.03 CLASS PB SYSTEM

A. Exterior Insulation and Finish System: Synthetic base and finish coatings with fiberglass reinforcing mesh, over adhesive-attached expanded polystyrene board insulation; complying with performance requirements of EIMA Class PB system.
   1. Impact Resistance: Construct system to provide impact resistance when tested per EIMA 101.86:
      a. High: 90-150 in-lb, for areas with general access to public.

B. Base Coat: Fiber-reinforced, acrylic or polymer-based product that is compatible with insulation board and reinforcing mesh.

C. Finish Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
   1. Texture: Medium.
   2. Color: As selected from manufacturer's range of standard colors.

D. Molded Polystyrene Board Insulation: Expanded polystyrene board; ASTM C 578, Type I; with the following characteristics:
   1. Board Size: 24 by 48 inches.
   2. Board Size Tolerance: +/-1/16 inch from square and dimension.
   3. Board Edges: Square.
   4. Board Density: 1.6 lb/cu ft.
   5. Compressive Resistance: 25 psi.
   6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/400, when tested in accordance with ASTM E 84.

E. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.

2.04 ACCESSORIES

A. Insulation Fasteners: Fastener and plate system appropriate for substrate and as recommended by EIFS manufacturer.

B. Flashing: As specified in Section 07650 - Wall Flashing.

C. Flashing Tape: Self-adhering rubberized asphalt tape with polyethylene backing for maintenance of continuous weather barrier at substrate transitions and intersections with other materials.

D. Trim: EIFS manufacturer's standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track.

E. Sealant Materials: As recommended by EIFS manufacturer.

F. Waterproofing: Manufacturer’s standard waterproofing material.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate is sound and free of oil, loose materials, or protrusions that could interfere with EIFS installation and is of a type that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are thoroughly dry.

B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.02 PREPARATION

A. Apply primer to substrate as recommended by EIFS manufacturer for project conditions.

3.03 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions and requirements and recommendations of EIMA Guideline Specification For Exterior Insulation and Finish Systems, Class PM.

B. Accessories: Install starter track, back-wrap mesh or edge-wrap mesh at system terminations and other accessories as recommended by EIFS manufacturer, assuring that track is level and securely fastened.

3.04 INSTALLATION - INSULATION

A. Install insulation in accordance with manufacturer's instructions.

B. On wall surfaces, install boards horizontally.

C. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.

D. Rasp irregularities off installed insulation board.

E. Mechanical Fastening: Space fasteners as recommended by EIFS manufacturer.

3.05 INSTALLATION - CLASS PM SYSTEM

A. Joints: Install control and expansion joints at spacings indicated on the drawings. Do not exceed 150 sq ft for areas defined by the placement of control joints.

B. Trim: Install trim as required. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

C. Reinforcing Mesh: Install in strict accordance with manufacturer's instructions, using mechanical fasteners at spacing recommended.
   1. Lap reinforcing mesh edges and ends 2 inches minimum.

D. Base Coat: Install to minimum thickness specified, following manufacturer's instructions. Leave base coat in condition suitable to receive finish coat.

E. Finish Coat: Apply finish coat after base coat has dried not less than 24 hours and finish to a uniform texture and color.
   1. Thickness: As recommended by manufacturer.

F. Apply sealant at finish perimeter and at control and expansion joints as detailed and in accordance with Section 07900.

3.06 INSTALLATION - CLASS PB SYSTEM

A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at all terminations of the EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.
   1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.

B. Install trim as indicated. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

C. Install expansion joints at floorlines as recommended by EIFS manufacturer.

D. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.

E. Apply sealant at finish perimeter and expansion joints in accordance with Section 07900.

3.07 CLEANING AND PROTECTION

A. Do not permit finish surface to become soiled or damaged.

B. Remove excess and waste EIFS materials from project site.

C. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

END OF SECTION

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SECTION 07270

FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid-applied, vapor-permeable membrane air barriers.

1.2 RELATED REQUIREMENTS

1. Division 01 Section "Sustainable Design Requirements" for additional requirements, including [LEED] documentation requirements.
2. Section 04 20 00 "Unit Masonry" for [air barrier substrates and] compatibility with flashing components.
3. Section 04 21 13 "Brick Masonry" for compatibility with flashing components.
4. Section 06 16 00 "Sheathing" for air barrier substrates[and joint treatments].
5. Division 07 roofing Sections for roof assembly air barriers and interface coordination.
6. Division 08 exterior openings sections for framing for [aluminum-framed entrances and storefronts] [aluminum windows] [glazed aluminum curtain walls] [louvers and vents] receiving air barrier transition assembly specified in this Section.

1.3 REFERENCES

A. References, General: Versions of the [following] [cited] standards current as of the date of issue of the project apply to the Work of this Section.

B. ASTM International (ASTM):

1. ASTM A 240/A 240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
3. ASTM C 1193 - Guide for Use of Joint Sealants
4. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials
7. ASTM E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
8. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors
9. ASTM E 1186 - Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems

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10. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials
11. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

C. National Fire Protection Association (NFPA): www.nfpa.org:

1. NFPA 285 - Standard Fire Test Method For Evaluation Of Fire Propagation Characteristics Of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

D. U. S. Environmental Protection Agency (EPA): www.epa.gov:

1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings

E. US Green Building Council (USGBC): www.usgbc.org:

1. Leadership in Energy and Environmental Design (LEED) Green Building Rating System

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.
1. Review manufacturer's instructions for air barrier application meeting Project requirements for substrates specified, including three-dimensional video model demonstrating proper application of components at wall openings.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of air barrier product specified, including:

1. Technical data indicating compliance with requirements.
2. Substrate preparation instructions and recommendations.

B. Shop Drawings: Show locations for air barrier. Show details for each type of substrate, joints, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.

1. Show location of transition and accessory materials providing connectivity through out the assemblies.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer[, and Air Barrier Inspector].

1. Certification of manufacturer's approval of Installer.

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B. Manufacturer's Product Compatibility Certificate: Certify compatibility of air barrier products with adjacent materials.

C. Low-Emitting Product Certificate: For air barrier products specified to meet volatile organic emissions standards, submit Greenguard Children and Schools Certification or comparable certification acceptable to Architect.

D. Fire Propagation Characteristics Certificate: From a qualified testing agency, documentation that air barrier system as a component of a wall assembly has been tested and passed NFPA 285. Include system classification number of testing agency on shop drawings.

E. Product Test Reports: Test data for air barrier products and air barrier assembly, by qualified testing agency, indicating proposed membrane air barrier meets performance requirements, when requested by Architect.

F. Warranty: Sample of unexecuted manufacturer and installer special warranties.

G. Field quality control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm with minimum [three] years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of [three] years experience installing similar work, able to communicate verbally with Contractor[, Architect,] and employees.

B. Air Barrier Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified air barrier system, qualified to perform observation and inspection specified in Field Quality Control Article, to determine Installer’s compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Inspector shall be one of the following:

1. An authorized full-time technical employee of the manufacturer.
2. A independent party certified as an air barrier inspector by the ABAA or other certifying organization acceptable to Architect, retained by the Contractor.

1.8 DELIVERY, STORAGE AND HANDLING

A. Accept materials on site in manufacturer's unopened original packaging.

B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by air barrier manufacturer.

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1.9 ENVIRONMENTAL REQUIREMENTS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.10 SCHEDULING

A. Coordinate installation of membrane air barrier with completion of roofing and other work requiring interface with air barrier.

B. Schedule work so air barrier applications may be inspected prior to concealment.

C. Ensure air barrier materials are cured before covering with other materials.

1.11 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which air barrier manufacturer agrees to furnish and install air barrier material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Access for Repair: Owner shall provide unimpeded access to the Project and the air barrier system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding materials upon completion of repair.
2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
3. Warranty Period: [] years date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of air barrier materials from the following:

1. Movement of the structure caused by structural settlement or stresses on the air barrier exceeding manufacturer's written specifications for elongation.
2. Mechanical damage caused by outside agents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: Provide air barrier products manufactured by **Tremco, Inc., Commercial Sealants and Waterproofing Division, An RPM Company**, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com, [or comparable products of other manufacturer

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approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements].

2.2 MATERIALS, GENERAL

A. Source Limitations: Obtain air-barrier materials from single source from single manufacturer.

B. VOC Content: 250 g/L maximum per 40 CFR 59, Subpart D (EPA Method 24) and complying with requirements of authorities having jurisdiction.

C. Low-Emitting Products: Provide sealants and sealant primers complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Compatibility: Provide membrane air barrier materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by membrane air barrier manufacturer based on testing and field experience.

2.3 PERFORMANCE REQUIREMENTS

A. General: Membrane air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air barriers shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 2357.

C. Fire Propagation Characteristics: Provide air barrier system qualified as a component of a comparable wall assembly that has been tested and passed NFPA 285.

2.4 MEMBRANE AIR BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, UV-resistant, synthetic membrane, formulated for application in a range of 48 - 70 mils (wet), 25 - 35 mils (dry)

1. Basis of Design Product: **Tremco, Inc., ExoAir 230**.
2. Air Permeance, ASTM E 2178: 0.004 cfm/sq. ft of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference, maximum.
3. Vapor Permeance, ASTM E 96/E96M: Minimum 12 perms (690 ng/Pa x s x sq. m).

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4. Elongation, Ultimate, ASTM D 412, Die C: 600 percent, minimum.
5. Combustion Characteristics: Class A, flame spread, not greater than 25; smoke developed, not greater than 450, per ASTM E 84.
6. UV Resistance, QUV-B: Over 160 cycles of UV and water spray with no observable deterioration.
7. VOC Content: Less than 50 g/L.

2.5 ACCESSORY MATERIALS

A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete air barrier assembly meeting performance requirements, and compatible with air barrier membrane material and adjacent materials.

B. Primer: Liquid primer meeting VOC limitations, recommended for substrate by membrane air barrier manufacturer, when installing modified bituminous self-adhered membranes.

1. Basis of Design Product: **Tremco, Inc., ExoAir Primer**

C. Transitions:
1. Counterflashing Strip: Modified bituminous, 40 mils (1.0 mm) thick self-adhering composite sheet consisting of 32 mils (0.8 mm) of SBS rubberized asphalt laminated to an 8 mils (0.2 mm) high-density, cross-laminated polyethylene film, for counterflashing of metal flashings and for substrate transitions and for termination of air barrier to bituminous roof membranes and to air barrier terminations at openings.
   a. Basis of Design Product: Tremco, Inc., ExoAir TWF Thru-Wall Flashing.
2. High Temperature Flashing Strip and Underlayment: Butyl, 24 mil thick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F (115 deg C).

   a. Basis of Design Product: **Tremco, Inc., ExoAir 110AT**.
3. Flashing Strip: Butyl, 22 mil thick self-adhering composite sheet consisting of 16 mils of butyl laminated to 6 mil polypropylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F (115 deg C)
4. Opening Transition Assembly: Cured low-modulus silicone extrusion, with reinforcing ribs, sized to fit opening widths, [with aluminum race for insertion into aluminum framing extrusions,] with the following characteristics:
   a. Basis of Design Product: Tremco, Inc., Proglaze ETA Engineered Transition Assembly. Tear Strength: 110 lb/in (19.3 kN/m)
5. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening

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widths, with manufacturer's recommended silicone sealant for bonding extrusions to substrates.

a. Basis of Design Product: Tremco, Inc.; Spectrem SimpleSeal.

D. Reinforcing Fabric: High strength mesh fabric consisting of open-weave glass fiber saturated with synthetic resins formulated for high moisture resistance, for reinforcing of liquid applications; not less than 2.5 oz/sq. yd (85 g/sq. m).

1. Basis of Design Product: **Tremco, Inc., Tremco 2011.**

E. Liquid Joint Sealants:

1. ASTM C 920, single-component polyurethane, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories.
   a. Basis of Design Product: **Tremco, Inc., Dymonic 100**.
2. ASTM C 920, single-component, neutral-curing silicone, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories post installation of the membrane.
   a. Basis of Design Product: **Tremco, Inc., Spectrem 1**.

F. Sprayed Polyurethane Foam Sealant: Sprayed Polyurethane Foam Sealant: Foamed-in-place, 1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m) density, with flame-spread index of 25 or less per ASTM E 162, for filling of gaps at openings and penetrations.

1. Basis of Design; Tremco Inc., Flexible Low Expanding Foam (LEF)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Surface Condition: Before applying air barrier materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.

1. Verify concrete and masonry surfaces are visibly dry, have cured for time period recommended by membrane air barrier manufacturer, and are free from release agents, curing agents, and other contaminates.

2. Test for capillary moisture by method recommended in writing by air barrier manufacturer..
3. Verify masonry joints are filled with mortar and struck flush.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INTERFACE WITH OTHER WORK

A. Commencement of Work: Commence work once air barrier substrates are adequately protected from weather and will remain protected during remainder of construction.

B. Sequencing of Work: Coordinate sequencing of air barrier work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air barrier system installation. Coordinate installation of EXOAIR® 230 with the roofing trade to ensure compatibility and continuity with the roofing system.

C. Subsequent Work: Coordinate air barrier work with work of other sections installed subsequent to air barrier to ensure complete inspection of installed air barrier and sealing of air barrier penetrations necessitated by subsequent work.

3.3 PREPARATION

A. Clean, prepare, and treat substrate in accordance with air barrier manufacturer's written instructions.

1. Mask adjacent finished surfaces.
2. Remove contaminants and film-forming coatings from substrates.
3. Remove projections and excess materials and fill voids with substrate patching material.
4. Prepare and treat joints and cracks in substrate per ASTM C 1193 and membrane air barrier manufacturer's written instructions.

3.4 APPLICATION OF ACCESSORY MATERIALS

A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions. Install transition materials and other accessories to form connect and seal membrane air barrier material to adjacent components of building air barrier system, including, but not limited to, roofing system air barrier, exterior fenestration systems, door framing, and other openings.

B. Primer: Apply primer to substrates when recommended by air barrier manufacturer at required rate for those substrates that will be receiving a modified bituminous self-adhered membrane. Reprime areas not covered within 24 hours.

C. Assembly Transitions: Connect and seal exterior wall air barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

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1. Opening Transitions: Fill gaps at perimeter of openings with foam sealant and apply approved transition or accessory material
2. Penetrations: Fill gaps at perimeter of penetrations with foam sealant and level with approved sealant. or seal transition strips around penetrating objects and terminate with approved sealant.
3. Joints: Bridge and cover isolation joints, expansion joints, and discontinuous joints between separate assemblies utilizing approved transition or accessory materials.
4. Changes in Plane: Apply approved sealant beads at corners and edges to form smooth transition.
5. Substrate Gaps: Cover gaps with stainless steel sheet mechanically attached to substrate and providing continuous support for air barrier.

D. Flashings: Seal top of through-wall flashings to membrane air barrier with a continuous bead of approved sealant recommended by air barrier manufacturer.

E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air barrier manufacturer’s recommendations and extend repair beyond repaired areas to maintain continuity.

3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

A. General: Apply fluid air-barrier material to form a seal with transition materials and accessories to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.

B. Membrane Air Barrier: Apply fluid air barrier material in full contact with substrate to produce a continuous seal according to membrane air barrier manufacturers written instructions.

1. Vapor-Permeable Membrane Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, -in a range of 25 – 35 mils (1.0-mm) dry film thickness depending on substrate, applied in one or more equal coats, roller- or spray- applied.

C. Connect and seal exterior wall air-barrier membrane continuously to subsequently-installed roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, wall openings, and other construction used in exterior wall openings, using approved transitions and accessory materials.

D. Wall Openings: Apply approved sealant to adhere silicone extrusion to perimeter of windows, curtain walls, storefronts, doors, and louvers. Apply [opening transition assembly] [preformed silicone sealant extrusion] according to air barrier transition manufacturer’s written instructions.

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E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air barrier manufacturer's recommendations and extend repair beyond repaired areas to maintain continuity.

F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.

B. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

3.7 CLEANING AND PROTECTING

A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.

B. Protect membrane air barrier from damage from subsequent work. Protect membrane materials from exposure to UV light for period in excess of that acceptable to membrane air barrier manufacturer; replace overexposed materials and retest.

END OF SECTION

PART 4 -

END OF SECTION

SECTION 07311 - ASPHALT SHINGLE ROOFING SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Granule surfaced asphalt shingle roofing.

B. Moisture shedding underlayment, eave, valley and ridge protection.

C. Associated metal flashing.

1.02 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Plywood Roof Sheathing.

B. Section 07620 - Sheet Metal Flashing and Trim.

1.03 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 1996.

B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 1995.

C. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 1997.

D. ASTM D 3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules; 1990 (Reapproved 1994).

E. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method); 1997.

F. ASTM D 3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules; 1997a.

G. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 1993.

H. ASTM D 4869 - Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing; 1988 (Reapproved 1993).

I. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings; 1996.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria, and product limitations.

C. Certificate of Compliance: Provide certificate of compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:
   1. Fire Resistance: ASTM E 108 and UL 790 Class A.
   2. Wind Resistance: UL 997 and ASTM D 3161 Type I.

1.05 QUALITY ASSURANCE

A. Maintain one copy of manufacturer's application instructions on project site.

B. Verify that manufacturer's label contains reference to specified ASTM standards.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Take special care when applying eave protection membrane and shingles when ambient and wind chill temperatures are below 45 degrees F. Tack eave protection membrane in place if it does not adhere immediately to the deck.

1.07 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer's Warranty: Furnish shingle manufacturer's 30 year material replacement warranty.

1.08 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide 200 sq ft of extra shingles of each color specified.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Owens Corning Weathered Wood laminated shingle to match existing.

2.02 MATERIALS

A. The use of a particular manufacturer's name and product designation is to establish a standard of quality only, and is not intended to preclude the use of acceptable alternates.

B. Shingles: ; ASTM D 3018 Type I; self-sealing; UL Certification of ASTM D 3462, UL 997 Wind Resistance, and UL Class A Fire Resistance.
   1. Glass fiber mat base; ceramically colored/UV resistant mineral surface granules across entire face of shingle.

C. Eave Protection Membrane: Equivalent to CertainTeed "WinterGuard"; ASTM D 1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having high traction surface, internal reinforcement, and "split" back plastic release film.
   1. Provide material with warranty equal in duration to that of shingles being applied.

D. Underlayment: Sharkskin Comp, manufactured by Kirch Building Products LLC. or approved

equal.

E. Metal Flashing: ASTM B 209 (ASTM B 209M); 0.025 inch thick aluminum, mill finish.

F. Bituminous Paint: Acid and alkali resistant type; black color.

2.03 ACCESSORIES

A. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum, or chromated steel.
   1. Minimum 3/8 inch head diameter.
   2. Minimum 11 or 12 gage shank diameter; shank to be of sufficient length to penetrate through roof sheathing or 3/4 inch into solid wood, plywood, or non-veneer wood decking.

B. Plastic Cement: ASTM D 4586, asphalt roof cement.

C. Ridge Vents: Ridgemaster by Mid-America Building Products Corp. , or Roll Vent , Continuous Ridge Vent by Tamko, or approved substitute.

2.04 FLASHING FABRICATION

A. Form flashing to profiles indicated on drawings, and to protect roofing materials from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing site conditions under provisions of Section 01700.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

C. Verify roof openings are correctly framed prior to installing work of this section.

D. Verify deck surfaces are dry and free of ridges, warps, or voids.

3.02 ROOF DECK PREPARATION

A. Follow shingle manufacturer's recommendations for acceptable roof deck materials.

B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.03 INSTALLATION - EAVE ICE DAM PROTECTION

A. Place eave edge and gable edge metal flashing tight with fascia boards. Weather lap joints 2 inches. Secure flange with nails spaced 8 inches on center.

B. Apply eave protection membrane in accordance with manufacturer's instructions.

C. Extend eave protection membrane minimum 24 inches up slope beyond interior face of exterior wall.

3.04 INSTALLATION - PROTECTIVE UNDERLAYMENT

A. Roof Slope Between 2:12 and 4:12: Apply one layer of eave protection membrane over entire roof area, with ends and edges weather lapped minimum 6 inches. Stagger end laps each consecutive layer. Nail in place.

B. Roof Slope 4:12 or Greater: Install one layer of underlayment over area not covered by eave protection membrane, perpendicular to slope of roof.

C. Lap underlayment minimum 4 inches over eave protection.

D. Weather lap and seal watertight with plastic cement items projecting through or mounted on roof. Do not allow solvent based cements to contact eave protection membrane.

3.05 INSTALLATION - VALLEY PROTECTION

A. For "closed-cut", "woven", and "open" valleys, first place one ply of eave protection membrane, minimum 36 inches wide, centered over valleys. Lap joints minimum 6 inches. Follow instructions of shingle and membrane manufacturer.

3.06 INSTALLATION - METAL FLASHING

A. Weather lap joints minimum 2 inches.

B. Seal work projecting through or mounted on roofing with plastic cement and make weathertight.

3.06 INSTALLATION - RIDGE VENTS

A. Cut 1" wide slot into ventilated portion of sheathing under ridge vents, extend to 6" of ends of vents.

B. Apply shingle over vent: fasten with three inch nails. Extend shingle to pilasters at each end for continuous vent look.

3.07 INSTALLATION - ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions for product type and application specified.

3.08 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01400.

3.09 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01700.

B. Do not permit traffic over finished roof surface.

END OF SECTION - 07311

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.

B. Reglets and accessories.

C. Precast concrete splash pads.

D. Prefabricated, pre-finished copings.

1.02 RELATED SECTIONS

A. Section 07315 - Slate Shingles: Slate shingle system.

B. Section 07411 - Preformed Metal Roof Panels

C. Section 07710 - Manufactured Roof Specialties: Preformed flashings.

D. Section 07900 - Joint Sealers.

E. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCES

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2002.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2003.

C. ASTM B 32 - Standard Specification for Solder Metal; 2003.

D. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.

E. ASTM D 4479 - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2000.

F. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2000.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation.

Slope metal sheets to ensure drainage.

B. Prevent contact with materials which may cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch thick base metal.

B. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.

2.02 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Underlayment: ASTM D 226, organic roofing felt, Type I ("No. 15").

C. Primer: Zinc chromate type.

D. Protective Backing Paint: Asphaltic mastic, ASTM D 4479 Type I.

E. Sealant: Type specified in Section 07900.

F. Plastic Cement: ASTM D 4586, Type I.

G. Solder: ASTM B 32; Sn50 (50/50) type.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.04 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters: Profile as indicated.

B. Downspouts: Profile as indicated.

C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 5 years in accordance with SMACNA Architectural Sheet Metal Manual.

D. Accessories: Profiled to suit gutters and downspouts.
   1. Downspout Supports: Brackets.

E. Seal metal joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Conform to drawing details:

B. Secure flashings in place using concealed fasteners.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

F. Secure gutters and downspouts in place using concealed fasteners.

G. Slope gutters 1/4 inch per foot minimum.

H. Set splash pads under downspouts.

3.04 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07650

WALL FLASHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Section provides for flexible rubberized asphalt, self-sealing through-wall flashing and wall flashing accessories.

1.02 RELATED DOCUMENTS

A. Section 04720 – Cast Stone.

B. Section 04810 – Unit Masonry Assemblies.

C. Section 04851 –Stone Veneer.

1.02 REFERENCES

A. American Society for Testing and Materials
   1. ASTM E96 – Test Methods for Water Vapor Transmission of Materials
   2. ASTM D570 – Test Method for Water Absorption of Plastics
   3. ASTM E154 – Test Method for Water Vapor Retarders used in contact with Earth Under Concrete Slabs, on Walls or as Ground Cover
   4. ASTM D1004 – Test Method for Initial Tear Resistance of Plastic Film and Sheeting
   5. ASTM D1938 – Test Method for Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method
   6. ASTM D1876 – Test Method for Peel Resistance of Adhesives
   7. ASTM D1970 – Standard Specifications for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
   8. D412 – Test Methods for Vulcanized Rubber & Thermoplastic Rubbers and Thermoplastic Elastomers – Tension

1.03 SUBMITTALS

A. Product Data and Shop Drawings: Data Sheets, details and installation procedures.

B. Test Reports: Indicating compliance with the performance requirements of this section.

C. Samples of flashing.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer’s recommendations for storage and handling of each product.

1.06 WARRANTY

A. Standard Product Warranty:
   1. Submit manufacturer’s warranty that flashing and accessories are free of defects at time of delivery, and are manufactured to meet manufacturer’s published physical properties and material specifications.
   2. Installer to warrant that flashing and accessories have been installed in accordance with manufacturer’s recommendations.

B. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Drawings and specifications are based on manufacturer's literature from W.R. Grace Building Products unless otherwise indicated. Other manufacturers to comply with the minimum levels of material and detailing indicated on the drawings and in conformance with provisions of Section 01600 – Product Requirements.

B. Flashing Description: 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mils) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

C. Performance Requirements:
   1. Water Vapor Transmission: ASTM E96, Method B – 2.9 ng/m2sPa (0.05 perms) maximum
   2. Water Absorption: ASTM D570 – Max. 0.1% by weight
   3. Puncture Resistance: ASTM E154 – 356 N (80 lbs)
   4. Tear Resistance:
      a. Initiation – ASTM D1004 – min. 58 N (13.0 lbs) M.D.
      b. Propagation – ASTM D1938 – min. 40 N (9.0 lbs) M.D.
   5. Lap Adhesion at -4ºC (25ºF): ASTM D1876 – 880 N/M (5.0 lbs/in.) of width
   6. Low Temperature Flexibility – ASTM D1970 – Unaffected to -43ºC (-45ºF)
   7. Tensile Strength: ASTM D412, Die C Modified – Min. 5.5 MPa (800 psi)
   8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C – Min. 200%

C. Product: Perm-A-Barrier® Wall Flashing manufactured by Grace Construction Products.
   1. Substitutions permitted under provisions of Section 01600.

D. Wall Flashing Accessories:
   1. Surface Conditioner:
      a. Description: Water-based latex liquid for substrate preparation.
         (1.) Flash Point: No flash to boiling point
         (2.) Solvent Type: Water
         (3.) VOC Content: Not to exceed 125 g/L
         (4.) Application Temperature: -4ºC (25ºF) and above
         (5.) Freeze/Thaw Stability: 5 cycles min.
         (6.) Freezing point (as packaged): -10ºC (14ºF)
      b. Product: Perm-A-Barrier Surface Conditioner manufactured by Grace Construction Products.
   2. Termination Mastic:
      a. Description: Rubberized asphalt-based mastic with 200 g/L max. VOC Content.
      b. Product: Bituthene® Mastic manufactured by Grace Construction Products.
   3. Optional Primer:
      a. Description: Water-based latex primer
         (1.) Specially designed for glass mat surfaced exterior gypsum boards
         (2.) VOC Content: Not to exceed 10 g/L
      b. Product: Perm-A-Barrier WB Primer by Grace Construction Products.
   4. Optional Primer:
      a. Description: Water-based latex primer with 110 g/L max. VOC content.
      b. Product: Bituthene Primer WP-3000 by Grace Construction Products.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions, with installer present, for compliance with requirements for installation, tolerances and other specific conditions affecting performance of flashing. Remove all deleterious materials from surfaces to be flashed.

3.02 INSTALLATION

A. General: Install flashing to dry surfaces at air and surface temperatures of -4ºC (25ºF) and above in accordance with manufacturer's recommendations at locations indicated on Construction Documents.

B. Flexible Wall Flashing:
   1. Precut pieces of flashing to easily handled lengths for each location.
   2. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.
   3. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
   4. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a steel hand roller.
   5. Trim bottom edge 13 mm (1⁄2 in.) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.
   6. At heads, sills and all flashing terminations turn up ends a minimum of 50 mm (2 in.) and make careful folds to form an end dam, with the seams sealed.
   7. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
   8. Do not expose flashing membrane to sunlight for more than thirty days prior to enclosure.

C. Accessories:
   1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture, apply surface conditioner by spray, brush, or roller at the rate recommended by manufacturer, prior to flashing installation. Allow surface conditioner to dry completely before flashing application.
   2. Apply a bead or trowel coat of mastic along flashing top edge, seams, cuts, and penetrations.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

1.02 RELATED SECTIONS

A. Section 07840 - Firestopping: Firestopping sealants.

B. Section 08800 - Glazing: Glazing sealants and accessories.

C. Section 09300 - Tile: Sealant used as tile grout.

1.03 REFERENCES

A. ASTM C 834 - Standard Specification for Latex Sealants; 2000.

B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 2002.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2002.

D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.

E. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2000.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics.

C. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.06 MOCK-UP

A. Mock-ups specified in Section 01410.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve

airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Silicone Sealants:
   1. Bostik Findley: www.bostikfindley-us.com.
   2. GE Plastics: www.geplastics.com.
   3. Pecora Corporation: www.pecora.com.
   4. Degussa Building Systems/Sonneborn: www.chemrex.com.
   5. Substitutions: See Section 01600 - Product Requirements.

B. Polyurethane Sealants:
   1. Bostik Findley: www.bostikfindley-us.com.
   2. Pecora Corporation: www.pecora.com.
   3. Degussa Building Systems/Sonneborn: www.chemrex.com.
   4. Substitutions: See Section 01600 - Product Requirements.

C. Butyl Sealants:
   1. Bostik Findley: www.bostikfindley-us.com.
   2. Pecora Corporation: www.pecora.com.
   3. Substitutions: See Section 01600 - Product Requirements.

D. Acrylic Emulsion Latex Sealants:
   1. Bostik Findley: www.bostikfindley-us.com.
   2. Pecora Corporation: www.pecora.com.
   3. Degussa Building Systems/Sonneborn: www.chemrex.com.
   4. Substitutions: See Section 01600 - Product Requirements.

E. Preformed Compressible Foam Sealers:
   1. Emseal Joint Systems, Ltd: www.emseal.com.
   2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
   3. Dayton Superior Chemical Division (Polytite): www.daytonsuperiorchemical.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 SEALANTS

A. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

B. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
   1. Color: Selected by Architect.
   2. Size as required to provide weathertight seal when installed.
   3. Provide product recommended by manufacturer for traffic-bearing use.
   4. Applications: Use for:
      a. Exterior wall expansion joints.

C. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.
      b. Concealed sealant bead in siding overlaps.

D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

E. Bathtub/Tile Sealant: White silicone; ASTM C 920, Uses I, M and A; single component, mildew resistant.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bath countertops and wall surfaces.

F. Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure and between bottom stud track and floor.

G. Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, I, M and A; single component.
   1. Color: Gray.
   2. Applications: Use for:
      a. Joints in sidewalks and vehicular paving.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C 1193.

C. Perform acoustical sealant application work in accordance with ASTM C 919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

I. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Steel frames for wood doors.

C. Fire-rated steel doors and frames.

D. Thermally insulated steel doors.

E. Steel glazing frames.

F. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED SECTIONS

A. Section 08710 - Door Hardware.

B. Section 08800 - Glazing: Glass for doors and borrowed lites.

C. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 1998.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2002a.

E. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; current edition (ANSI/DHI A115 Series).

F. NAAMM HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 1999.

G. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 1992.

H. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2000.

I. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.

J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 2003.

K. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.

L. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Ceco Door Products: www.cecodoor.com.
   2. Republic Builders Products: www.republicdoor.com.
   3. Steelcraft: www.steelcraft.com.
   4. Substitutions: See Section 01600 – Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   4. Door Texture: Smooth faces.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   6. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   7. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:
   1. Grade: NAAMM HMMA 861, physical performance Level A.
   2. Core: Polystyrene foam.
   3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: NAAMM HMMA 860, physical performance Level A.
   2. Core: Polystyrene foam.
   3. Thickness: 1-3/4 inches.

C. Interior Doors, Fire-Rated:
   1. Grade: NAAMM HMMA 861, physical performance Level A.
   2. Fire Rating: As indicated on Door and Frame Schedule, with temperature rise ratings as required by code, tested in accordance with NFPA 252.
      a. Provide units listed and labeled by UL.
      b. Attach fire rating label to each fire rated unit.
   3. Smoke and Draft Control Doors: In addition to required fire rating, comply with air leakage requirements of UBC Std 7-2, Part II; with "S" label; if necessary, provide additional gasketing or edge sealing.
   4. Core: Mineral fiberboard.

D. Panels: Same construction, performance, and finish as doors.

2.04 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. Frames for Wood Doors: Comply with frame requirements specified in NAAMM HMMA 861
   2. Finish: Same as for door.
   3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
   4. Frames in Masonry Walls: Size to suit masonry coursing with head member 2 inches high to fill opening without cutting masonry units.
   5. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
   2. Weatherstripping: Separate, see Section 08710.

C. Interior Door Frames, Non-Fire-Rated: Fully welded type.
   1. Terminated Stops: Provide at all interior doors; closed end stop terminated 6 inches above floor at 45 degree angle.

D. Interior Door Frames, Fire-Rated: Fully welded type.
   1. Fire Rating: Same as door, labeled.

E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Glazing: As specified in Section 08800, factory installed.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

D. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

E. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction. Provide minimum 3 anchors per jamb.

D. Grout frames in masonry and concrete construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Coordinate installation of hardware.

F. Coordinate installation of glazing.

3.04 ERECTION TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08211

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration with applied moldings; fire rated and non-rated.

1.02 RELATED SECTIONS

A. Section 08110 - Steel Doors and Frames.

B. Section 08710 - Door Hardware.

C. Section 08800 - Glazing.

D. Section 09900 - Paints and Coatings: Site finishing of doors.

1.03 REFERENCES

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2003.

B. ICC (IBC) - International Building Code; 2003.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

D. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.

E. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 – Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria.

D. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

C. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

A. See Section 01780 – Closeout Submittals for additional warranty requirements.

B. Provide warranty for the following term:
   1. Interior Doors: Life of installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Veneer Doors:
   1. Eggers Industries: www.eggersindustries.com.
   2. Haley Brothers: www.haleybros.com.
   3. Marshfield DoorSystems, Inc: www.marshfielddoors.com. (formerly Weyerhaeuser Door Division)
   4. Substitutions: See Section 01600 – Product Requirements.

2.02 DOORS AND PANELS

A. All Doors: See drawings for locations and additional requirements.
   1. Quality Standard: AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300, Custom Grade.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with International Building Code ("positive pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
   3. Smoke and Draft Control Doors: Tested to ratings indicated on drawings in accordance with International Building Code; UL labeled if required by applicable code; provide gasketing as specified by listing.
   4. Wood Veneer Facing
      a. Transparent finish doors: Red Oak veneer, slip matched and factory finished. Stain color selected by Architect. Meet specified requirements for Custom Grade.
      b. Painted wood doors: Birch veneer, rotary cut. Meet specified requirements for Custom Grade.
   5. Facing Adhesive: Type I – waterproof.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type SLC, staved lumber core, plies and faces as indicated above.

B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above.

2.04 ACCESSORIES

A. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.

B. Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.

C. Astragals for Fire Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Provide solid blocks at lock edge for hardware reinforcement.
   1. Provide solid blocking for other throughbolted hardware.

C. Fit door edge trim to edge of stiles after applying veneer facing.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings.

F. Cut and configure exterior door edge to receive recessed weatherstripping devices.

G. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).
   1. Trim fire door height at bottom edge only, in accordance with fire rating requirements.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

3.03 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inches surface area.

B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inches surface area.

C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inches surface area.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE - See Drawings

END OF SECTION

SECTION 08212

STILE AND RAIL WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood doors, stile and rail design.

B. Panels of wood and glass.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: Wood door frames.

B. Section 08110 - Steel Doors and Frames.

C. Section 08710 - Door Hardware.

D. Section 08800 - Glazing.

E. Section 09900 - Paints and Coatings: Site finishing doors.

1.03 REFERENCES

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate stile and rail core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.

D. Samples: Submit two samples of door veneer, 12 x 12 inch in size illustrating wood grain, stain color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI/AWMAC Quality Standards Illustrated, Section 1400, Premium grade.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Package, deliver and store doors in accordance with AWI/AWMAC Quality Standards Illustrated, Section 1300.

B. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals for additional warranty requirements.

B. Provide warranty to the following term:
   1. Interior Doors: Life of installation years.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stile and Rail Wood Doors:
   1. Algoma Hardwoods: www.algomahardwoods.com
   2. Eggers Industries: www.eggersindustries.com.
   3. Enjo Architectural Millwork: www.enjo.com.
   4. The Maiman Company: www.maiman.com.
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 DOOR TYPES

A. Interior Doors: 1-3/4 inches thick unless otherwise indicated; solid lumber construction; mortised and tenoned joints.

2.03 DOOR AND PANEL FACING

A. Interior Doors: Wood red oak wood doors, provide smooth wood grain finish.

B. Adhesive: Type I - waterproof.

2.04 ACCESSORIES

A. Molding: Wood, of same species as door facing, indicated shape, mitered corners; prepared for countersink style tamper proof screws.

2.05 FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards requirements.

B. Vertical Exposed Edge of Stiles: Of same species as veneer facing.

C. Bond edge banding to cores.

D. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

E. Factory fit doors for frame opening dimensions identified on shop drawings.

2.06 FINISH

A. Factory Stained, stain color to be selected by Architect from standard stain finishes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and AWI Quality Standards requirements.

B. Trim door width by cutting equally on both jamb edges.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

D. Machine cut for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

F. Coordinate installation of glazing.

3.03 INSTALLATION TOLERANCES

A. Conform to AWI requirements for fit, clearance, and joinery tolerances.

B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inch surface area.

C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inch surface area.

D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inch surface area.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08310

ACCESS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire rated and non-rated access door and frame units

B. Wall and ceiling locations

1.02 RELATED SECTIONS

A. Section 03300 – Cast-in-Place Concrete: openings in concrete

B. Section 04810 – Unit Masonry System: openings in masonry

C. Section 04851 – Cut Stone Veneer: openings in cut stone

D. Section 09260 – Gypsum Board Assemblies: openings in partitions

E. Section 09511 – Suspended Acoustical Ceilings: openings in ceilings

F. Section 09900 – Paints & Coatings: field paint finish

1.03 REFERENCES

A. UL – Fire Resistance Directory

B. Warnock Hersey – Certification Listings

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 – Administrative Requirements: submittals and review procedures

B. Product Data: provides sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of all access door units

D. Samples: Sudmit two access units, 12x12 inch in size illustrating frame configuration, anchors, & finishes

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 – Administrative Requirements: submittals and review procedures

B. Manufacturer's Installation Instructions: Indicate installation requirements, rough-in dimensions and any special requirements

1.06 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01780 – Closeout Submittals

B. Record actual locations of all access units

1.07 QUALITY ASSURANCE

A. Perform work in accordance with Underwriters Laboratories and Warnock Hersey Design requirements. Maintain one (1) copy on site.

1.08 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated access doors

B. Provide certificate of compliance from authority having jurisdiction indicating approval of fire rated access doors.

1.09 PROJECT CONDITIONS

A. Section 01700: Execution Requirements

B. Coordinate the work with other work requiring access doors

PART 2 PRODUCTS

2.01 MANUFACTURERS – WALL AND CEILING UNITS

A. Karp Associates, Inc.

B. J.L. Industries, Inc.

C. Section 01600 – Product Requirements: product substitutions. Substitutions permitted.

2.02 ACCESS UNITS - WALLS

A. Non-fire Rated Door and Frame Unit: Formed steel
   1. In Cast-in-place Concrete: Model DSC-214M manufactured by Karp
   2. In Masonry: Model DSC-214M manufactured by Karp
   3. In Cut Stone: Model DSC-214M manufactured by Karp
   4. In Gypsum Board: Model DSC-214M manufactured by Karp

B. Fire Rated Door and Frame Unit: Formed steel, finish: 1-1/2 hour B label fire rating
   1. In Cast-in-place Concrete: Model KRP-150FR manufactured by Karp
   2. In Masonry: Model KRP-150FR manufactured by Karp
   3. In Cut Stone: Model KRP-150FR manufactured by Karp
   4. In Gypsum Board: Model KRP-150FR manufactured by Karp

2.03 ACCESS UNITS - CEILINGS

A. Non-fire Rated Door and Frame Unit: Formed steel
   1. In Gypsum Board on Steel Studs: Model DSC-214M manufactured by Karp
   2. In Metal T-bar Suspended Acoustical Tile: Model NZW manufactured by Daiken-Hatch

B. Fire Rated Door and Frame Unit: Formed steel, finish: 1-1/2 hour B label fire rating
   1. In Gypsum Board on Steel Studs: Model KRP-150FR manufactured by Karp
   2. In Metal T-bar Suspended Acoustical Tile: Model NZW manufactured by Daiken-Hatch

2.04 FABRICATION- WALL AND CEILING UNITS

A. Fabricate frames and flanges of 16 gauge steel

B. Fabricate door panels of 20 gauge steel for non-fire rated and 16 gauge steel for fire-rated applications.

C. Weld, fill, and grind joints to ensure flush and square unit.

D. Hardware:
   1. Hinge: 175 degree continuous piano hinge
   2. Lock cylinder: Lock with latch, two (2) keys for each unit.

1.07 FINISHES

A. Base Metal Protection: Prime coat of rust inhibitive electrostatic powder baked grey enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Section 01300 – Administrative Requirements: verification of existing conditions before staring work.

B. Verify that rough openings for door and frame are correctly sized and located.

3.01 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in opening. Secure rigidly in place.

C. Position unit to provide convenient access to concealed work requiring access.

END OF SECTION

SECTION 08320

ROLLING COUNTER DOOR

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions, and Division 1 General Requirements, apply to the work of this Section.

1.02 SUMMARY

A. The work of this Section includes rolling counter doors.

B. Related Sections: Other specification sections which directly relate to the work of this Section include, but are not limited to, the following:
   1. Section 08710 - Finish Hardware; key cylinders for locks.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each type of rolling counter door. Include both published data and any specific data prepared for this project.

B. Shop Drawings: Submit shop drawings for approval prior to fabrication. Include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories. Include relationship with adjacent materials.

1.04 QUALITY ASSURANCE

A. Manufacturer: Rolling counter doors shall be manufactured by a firm with a minimum of five years experience in the fabrication and installation of rolling counter doors. Manufacturers proposed for use, which are not named in these specifications, shall submit evidence of ability to meet performance and fabrication requirements specified, and include a list of five projects of similar design and complexity completed within the past five years.

B. Installer: Installation of rolling counter doors shall be performed by an authorized representative of the manufacturer.

C. Single-Source Responsibility: Provide doors, guides, motors, and related primary components from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

D. Pre-Installation Conference: Schedule and convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Products indicated are manufactured by Overhead Door Corporation and establish a standard of quality for products of this section. Substitutions permitted under provisions of Section 01600.

2.02 COUNTER DOORS

A. Acceptable Product: 652 Series Counter Doors by Overhead Door Corporation.

B. Curtain: Interlocking slats, Type FE-138 fabricated of aluminum. Endlocks shall be attached to alternate slats to maintain curtain alignment and prevent lateral slat movement.

C. Finish: Aluminum with bronze anodized finish.

D. Bottom Bar: Aluminum tubular extrusion with vinyl bottom astragal.

E. Guides: Extruded aluminum shapes with clear anodized finish with continuous silicone-treated woolpile strips.

F. Brackets: Steel to support counterbalance, curtain and hood.

G. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel.

H. Hood: Aluminum . Provide intermediate support brackets as required.

I. Manual Operation: Manual push up.

K. Locking: Slide bolt locks suitable for use with padlock and provide cylinder locks.

L. Wall Mounting Condition: As indicated on drawings.

PART 3 – EXECUTION

3.01 PREPARATION

A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Strictly comply with manufacturer’s installation instructions and recommendations. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.

B. Instruct Owner’s personnel in proper operating procedures and maintenance schedule.

3.03 ADJUSTING AND CLEANING

A. Test rolling counter doors for proper operation and adjust as necessary to provide proper operation without binding or distortion.

B. Touch-up damaged coatings and finishes and repair minor damage. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned.

END OF SECTION

SECTION 08410

ALUMINUM STOREFRONTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section Includes Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.

B. Related Sections:
   1. Section 07900 - Joint Sealants
   2. Section 08700 - Door Hardware
   3. Section 08800 - Glass and Glazing

1.02 SYSTEM DESCRIPTION

A. Storefront System Performance Requirements:
   1. Wind loads: Provide framing system; include anchorage, capable of withstanding wind load design pressures complying with applicable codes
   2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft2 at a static air pressure differential of 6.24 psf.
   3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf as defined in AAMA 501.
   4. Uniform Load: A static air design load of 20 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
   5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
      a. Glass to Exterior – 0.47 (low-e) or 0.61 (clear) BTU/hr/ft2/°F.
      b. Glass to Center – 0.44 (low-e) or 0.61 (clear) BTU/hr/ft2/°F.
      c. Glass to Interior – 0.41 (low-e) or 0.56 (clear) BTU/hr/ft2/°F.
   6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
      a. Glass to Exterior – 70frame and 69glass (low-e) or 69 frame and 58 glass (clear).
      b. Glass to Center – 62 frame and 68glass (low-e) or 63 frame and 56 glass (clear).
      c. Glass to Interior – 56 frame and 67 glass (low-e) or 54 frame and 58 glass (clear).

1.03 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Quality Assurance/Control Submittals:
   1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

1.04 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for entrance system as follows:
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.

C. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
   2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle framing material and components to avoid damage. Protect framing material against damage from elements, construction activities, and other hazards before, during and after framing installation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

B. Acceptable Product:
   1. Aluminum Storefront Systems. Kawneer – basis of design
      a. Aluminum Storefront System
      c. Framing Member Profile: 2" x 4-1/2" nominal dimension and as detailed on the drawings.
      d. Finish/Color: dark bronze anodized aluminum

B. Equivalent products by the following manufacturers are acceptable:
   1. Vistawall Architectural Products.
   2. YKK AP America, Inc.
   3. Old Castle Inc.

2.02 MATERIALS

A. Aluminum (Framing and Components):
   1. Material Standard: ASTM B 221; 6063-T6 alloy and temper
   2. Member Wall Thickness: Each framing member shall provide structural strength to meet specified performance requirements.
   3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.02 COMPONENTS

2.03 ACCESSORIES

A. Fasteners: Where exposed, shall be Stainless Steel.

B. Gaskets: Glazing gaskets shall be extruded EPDM rubber.

C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

D. Thermal Barrier (Trifab® VG 451T):
   1. Kawneer IsoLock® Thermal Break with a 1/4" separation consisting of a two part chemically curing, high density polyurethane which is mechanically and adhesively joined to aluminum storefront sections.
      a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

2.04 RELATED MATERIALS

A. Sealants: Refer to Joint Treatment (Sealants) Section.

B. Glass: Refer to Glass and Glazing Section.

2.05 FABRICATION

A. General:
   1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
   2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
   3. Prepare components to receive anchor devices. Fabricate anchors.
   4. Arrange fasteners and attachments to conceal from view.

2.06 FINISHES

A. Factory Finishing:
   1. Clear Anodized Aluminum

2.07 SOURCE QUALITY CONTROL

A. Source Quality: Provide aluminum framing specified herein from a single source.
   1. Building Enclosure System: When aluminum framing is part of a building enclosure system, including entrances, entrance hardware, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.

B. Fabrication Tolerances: Fabricate aluminum framing in accordance with framing

manufacturer's prescribed tolerances.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.
   1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 INSTALLATION

A. General: Install framing system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
   1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
   2. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.
   3. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
   4. Provide alignment attachments and shims to permanently fasten system to building structure.
   5. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.

B. Related Products Installation Requirements:
   1. Sealants (Perimeter): Refer to Section 7 Joint Treatment (Sealants).
   2. Glass: Refer to Section 8 Glass and Glazing.
      a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

3.03 PROTECTION AND CLEANING

A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum storefront system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

SECTION 08411

ALUMINUM ENTRANCES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Section Includes: Aluminum Entrances, glass and glazing, and door hardware and components.

B. Related Sections:
   1. Section 08410 – Aluminum Storefronts
   2. Section 08700 – Finish Hardware

1.02 SYSTEM DESCRIPTION

A. Entrance Performance Requirements:
   1. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf. A single 3'0" x 7'0" entrance door and frame shall not exceed 0.50 cfm per linear foot of perimeter crack.
   2. Structural: Corner strength shall be tested per Kawneer's dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity Testing procedure and certified test results available upon request.

1.03 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Quality Assurance/Control Submittals:
   1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

1.04 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for entrance system as follows:
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.
   2. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Installer Qualifications: Installer experienced (as determined by contractor) to

perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle entrance doors and components to avoid damage. Protect entrance doors against damage from elements, construction activities, and other hazards before, during and after entrance installation.

PART 2 – PRODUCTS

2.01 MANUFACTURERS (ACCEPTABLE MANUFACTURERS/PRODUCTS)

A. Products and accessories specified are manufactured by the Kawneer Company and establish a standard of quality for products of this section.

B. Equivalent product by the following manufacturers are acceptable:

1. Vistawall Architectural Products.
2. YKK AP America , Inc.
3. Old Castle Inc.

Substitutions permitted under provisions of Section 01600.

2.02 MATERIALS

A. Aluminum (Entrances and Components):
1. Material Standard: ASTM B 221; 6063-T5 alloy and temper
2. The door shall be 2" thick and stile and rail face dimensions of:

Door	Vertical Stile	Top Rail	High Bottom Rail
STANDARD	5"	5"	10-1/4"

3. Glass stops shall be square.
4. All walls of the door members shall be a minimum 0.188" nominal in thickness with 0.050" thick glass stops.
5. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association.

B. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

C. Provide adjustable glass jacks to help center the glass in the door opening.

D. Door Hardware:

1. Hinge: Manufacturers standard, continuous.
2. Closers:
   a. Overhead concealed, single acting, adjustable closing and latching speed and backcheck, non hold open.

   b. Adjustable opening force and delayed closing in accordance with applicable accessibility code.
3. Exit Devices:
   a. UL 305 and ANSI/BHMA A156.3, Grade 1, push pad design.
   b. Single Door: Rim type
   c. Paired doors: Concealed vertical type rod type.
   d. Outside Trim: To be selected from manufacturers full range of selection.
   e. Cylinders: To be determined-standard .
4. Push and Pull sets: To be selected from manufactures full range of selections
5. Thresholds: 4 inches wide x 1/2" high, aluminum, saddle profile.
6. Door stops: Floor mounted, aluminum riser with resilient bumper.

2.03 ACCESSORIES

A. Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.

B. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

C. Standard Entrance Hardware
   1. Weatherstripping:
      a. Meeting stiles on pairs of doors shall be double weathered with one consisting of an adjustable astragal.
      b. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair® weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
   2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners. (Necessary to meet specified performance tests.)
   3. Balance of Hardware specified in Section 08710 – Door Hardware. The finish hardware supplier shall be responsible for furnishing physical hardware to the entrance manufacturer prior to fabrication, and for coordinating hardware delivery requirements with the hardware manufacturer, the general contractor and the entrance manufacturer to insure the building project is not delayed.

2.04 RELATED MATERIALS

A. Sealants: Refer to Joint Treatment (Sealants) Section.

B. Glass: Refer to Glass and Glazing Section.

2.05 FABRICATION

A. Entrance System Fabrication:
   1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
   2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
   3. Prepare components with internal reinforcement for door hardware.
   4. Arrange fasteners and attachments to conceal from view.
   5. Door frame moldings 4-1/2" in depth, which provide structural support for the

door(s), shall be full tubular sections with minimum wall thicknesses – specify or 3/16" – at exposed faces and sides, 5/16" at recessed sidewalls receiving mortised or concealed hardware.

2.06 FINISHES

A. Factory Finishing:
   1. dark bronze anodized aluminum

2.07 SOURCE QUALITY CONTROL

A. Source Quality: Provide aluminum entrances specified herein from a single source.
   1. Building Enclosure System: When aluminum entrances are part of a building enclosure system, including storefront framing, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.

B. Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.
   1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 INSTALLATION

A. General: Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
   1. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
   2. Provide alignment attachments and shims to permanently fasten system to building structure.
   3. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
   4. Set thresholds in bed of mastic and secure.
   5. Adjusting: Adjust operating hardware for smooth operation.

B. Related Products Installation Requirements:
   1. Sealants (Perimeter): Refer to Section 7 Joint Treatment (Sealants).
   2. Glass: Refer to Section 8 Glass and Glazing.
   a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

3.03 PROTECTION AND CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum entrances from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. Remove and replace damaged aluminum entrances at no extra cost.

END OF SECTION

SECTION 08710

HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide all items of finish hardware required to adequately trim, hang, and operate all doors, as is hereinafter specified and listed in the Hardware Schedule.
   1. Provide hardware for doors and frames of unusual profile or shape or other special conditions.
   2. Provide all necessary standard and special fasteners, screws, bolts, expansion shields or anchors to properly secure hardware to its intended door, frame, or other surface.

B. Related Sections include the following:
   1. Steel Doors and Frames:
   2. Interior Aluminum Frames:
   3. Flush Wood Doors:
   4. Aluminum Storefront:
   5. Access Control System:

1.2 REFERENCES

A. The following reference standards and model code documents shall be used in estimating and detailing door hardware, and shall considered as a standard of quality, function, and performance, as applicable:
   1. I.B.C. International Building Code 2009 Edition.
   2. NFPA-80 Fire Doors & Windows (current year adopted).
   3. NFPA-101 Life Safety Code (current year adopted).
   4. NFPA-105 Smoke Control Door Assembly. (current year adopted)
   5. ANSI-117.1 1992 Edition Providing Accessibility and Usability for Physically Handicapped People.
   6. A.D.A.A.G Americans with Disabilities Act Accessibility Guidelines.
   7. T.A.S. Texas Accessibility Standards.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Section 013300.

B. Product Data: Provide a catalog cut sheet, clearly marked and identified, illustrating and describing each product included in the Hardware Schedule.
   1. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Formulate catalog cut sheets into sets and include a set with each copy of the Hardware Schedule submitted.

C. Door Hardware Schedule: 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 Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
   3. Content: Include the following information:
      a. Type, style, function, size, label, hand, and finish of each door hardware item.

b. Complete designations of every item required for each door or opening including name and manufacturer.
c. Fastenings and other pertinent information.
d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule. Use same scheduling sequence and format and use same door numbers and hardware set numbers as in the Contract Documents.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other Work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Wiring Diagrams: For electrified hardware items specified for this Project, Provide complete wiring diagrams along with riser drawings and elevations, showing locations where such material is to be installed. Wiring Diagrams shall be submitted with Hardware Schedule. Verify and coordinate with the electrical systems installer. Integration shall take effect into central system as specified by Owner.
1. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
2. Sequence of Operation: Include description of component functions that occur in the following situations:
a. authorized person wants to enter;
b. authorized person wants to exit;
c. unauthorized person wants to enter;
d. unauthorized person wants to exit.

E. Samples for Verification: If so requested by the Architect, provide a sample of any product or item requested, properly marked and tagged, for the opening for which it is intended.

F. Keying: Provide a keying schedule, listing the levels of keying, (GGMK, GKD, MKD or KA) as well as an explanation of the key system's function, the key symbols used and the numbers of the doors controlled. Provide in conjunction with the Door Index/Keying Schedule (which lists the door number, schedule heading, lock type and individual key symbol and remarks or special instructions) mentioned in above. Project shall be Masterkeyed and/or Grand Masterkeyed and provide two (2) keys per lockset or cylinder.

G. Operation and Maintenance Data: For each type of door hardware to include in maintenance manuals. Provide latest, revised and updated schedule of finish hardware, complete with catalog cuts and keying schedule. In addition, furnish one (1) copy of maintenance and parts manuals for those items for which they are readily available and normally provided.
1. Submit in accordance with provisions of Section 01782.

1.4 QUALITY ASSURANCE

A. Substitutions: Request for substitutions for alternative hardware items will not be accepted on this Project unless specifically indicated. Specification indicates one (1) specified product, listed hereinafter in the Hardware Schedule, and two (2) acceptable alternative manufacturers for that product. If any specified product is listed as a "No Substitution" product, only that specified product shall be provided as indicated.

B. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
1. The hardware supplier shall be engaged regularly in the furnishing, delivery and servicing

of contract builder's hardware and must be experienced and knowledgeable in all phases of estimating, detailing, scheduling, masterkeying, shipping and installation practices.

2. When electro-mechanical or electronic hardware is supplied, a qualified individual with a minimum five- (5) year's experience shall be available for assistance.

D. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

E. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

F. Regulatory Requirements: Comply with provisions of the following:
1. Provide hardware that complies with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," and ANSI A117.1.

G. Fire-Rated Door Assemblies: Provide door hardware for 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.

H. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

I. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." 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.
5. Location of Key Cabinet.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Marking and Packaging: All items of hardware shall be delivered to the site in manufacturer's original cartons or boxes. Each item of hardware shall be marked with the abbreviation set forth on the Shop Drawings to ensure that the product reaches its installation destination without needing specific hardware product number knowledge.

B. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

C. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing 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.

B. 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, as applicable.

1.7 MAINTENANCE

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: If there are any products listed hereinafter that normally require a

maintenance or service contract, provide the Owner and Architect with details and costs of standard maintenance or service contract.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
   1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Hardware Schedule" Article.

B. Product manufacturers listed with an asterisk (*) denote the specified manufacturers listed in the Hardware Schedule. The remaining two (2) listed manufacturers will be acceptable substitutions. If only one manufacturer is listed this shall be considered a “No Substitution” specification as set forth in “Quality Assurance” Article, for that particular item.

2.2 MATERIALS

A. Screws and Fasteners: Provide all screws and fasteners of the proper size and type to properly anchor or attach the item of hardware scheduled. Provide all fasteners with Phillips heads, unless security type screws (spanner-head or torx-head) are hereinafter specified.

B. Hinges: Provide as follows:
   1. On doors to exterior openings and main corridor doors, and other doors of high frequency use, provide a continuous, gear type hinge of appropriate weight.
   2. Where regular ball bearing hinges are listed for other doors, provide one hinge for each 30-inch of door height.
   3. The width of the hinges shall be sufficient to clear all trim that is mounted to the doorframe.
   4. Acceptable Manufacturers:
      a. Ives*
      b. Hager.
      c. Bommer.

C. Continuous Hinges: Continuous hinges shall consist of three (3)-interlocking extrusions in a pin-less assembly applied to the full height of the door. All continuous geared hinges shall be manufactured to template screw locations and be non-handed. All mortise hinges and half mortise hinges shall cover and wrap the door edge completely. Doorframe heads shall be extended for clearance on full or half mortise hinges versus downsizing doors for ease of repair and replacement. All frames shall be properly reinforced per manufacturer's standards.
   1. Standard warranty shall be for the life of opening.
   2. Acceptable Manufacturers:
      a. Ives*
      b. Select.
      c. Pemko.

D. Locks: All locks shall incorporate a seven pin removable core tumbler system and be keyed to a GRANDMASTER SYSTEM as not to breach security of system in place. Keying system must be guaranteed of no duplication of existing change keys, master keys or grandmaster keys located in this Project. All keying shall be coordinated with Owner. Locks shall be Grade 1 mortise and as hereinafter listed in the Hardware Schedule.
   1. Acceptable Manufacturers:
      a. Schlage* (no substitution)
      b. Keying – Schlage FSIC Primus.

E. Lock Trim: Mortise locks are to be furnished with lever handle trim, with levers having a return to within 1/2 inch of the door face, as is hereinafter listed in the Hardware Schedule.

F. Flush Bolts: Manual flush bolts to have 12-inch rods for doors 7’-6”. Doors over 7’-6” high shall

have bolts with top rods of 18 inch or 24 inch to allow ease of access to bolt lever. Furnish dust proof strikes for all bottom bolts.

1. Acceptable Manufacturers:
   a. Ives*
   b. Trimco.
   c. Rockwood.

G. Power Supply: Power supply shall integrate with selected switching for maintained switching with an emergency interface relay wired into the fire alarm system to insure fail secure application. Battery backup shall be included to produce backup power at full load during power failure.

1. Acceptable Manufacturers:
   a. Schlage Commercial Electronics*
   b. (no substitution)

H. Exit Devices: Exit Devices shall be rim, mortise or vertical rod type as called for in the Hardware Schedule. Devices shall be of the touch-pad type as is hereinafter specified in the Hardware Schedule. Exit devices shall be constructed to allow cylinder to be removed and re-keyed without removing the device from the door either by removable core cylinders or construction of exit device. Exit devices shall be constructed to allow the conversion from one function to another simply within lock stile case and selecting proper outside trim as specified hereinafter in the Hardware Schedule. Devices shall be furnished with outside trim lever handles matching locks.

1. Acceptable Manufacturers:
   a. Von Duprin*
   b. (no substitution)

I. Exit Device (QEL): Electric latch retraction, exit devices shall provide remote unlocking ability. A control switch or wiring schematic as specified shall allow an “exit” only or latched door to push-pull operation by a continuous duty solenoid retracting the latch bolt.

1. Acceptable Manufacturers:
   a. Von Duprin*
   b. (no substitution)

J. Card Reader/Controller: Access credential reader shall be capable of reading keypad codes to insure flexibility of control and management.

1. Acceptable Manufacturers:
   a. Related Section*

K. Door Closers: Door closers shall be of cast iron and rectangular design, furnished with a full cover. Provide complete with backcheck, delayed action and hold-open as indicated. Closers shall be mounted out of the line of sight wherever possible (i.e., room side of corridor doors, etc.) with parallel arm mounting on out-swinging doors. Mount closers to jamb or on brackets and/or drop plates, where special conditions require.

1. Acceptable Manufacturers:
   a. LCN*
   b. (no substitution)

L. Push Plates: Push plates are to be .050 brass, bronze or stainless steel with four (4) beveled edges, drilled and countersunk for screws, as is hereinafter specified in the Hardware Schedule.

1. Acceptable Manufacturers:
   a. Ives*
   b. Trimco.
   c. Rockwood.

M. Door Pulls: Door pulls shall be ADA compliant with a 2 1/2 inch projection from back of pull to face of door. All door pulls shall be thru-bolted or back-to-back mounted.

1. Acceptable Manufacturers:
   a. Ives*
   b. Trimco.
   c. Rockwood.

N. Protective Plates: Protective plates shall be mop (6”), kick (10”) or armor (34”) and shall be minimum .050 thick brass, bronze, or stainless steel, with three (3) beveled edges, drilled and countersunk for screws. Plates shall be mounted to avoid louvers and/or glass kits.

1. Acceptable Manufacturers:
   a. Ives*

b. Trimco.
c. Rockwood.

O. Door Stops and Holders: Where a door strikes a wall at approximately 90 degrees, a suitable door stop shall be provided, either a wall bumper or floor stop. Where doors are undercut, provide floor stops with adequate height to properly stop the door. If door would not otherwise strike a wall, an overhead stop shall be provided. In-wall blocking for wall bumpers at stud walls shall be provided in accordance with Section 06105. Provide reinforcing in frame and door for overhead stops.
1. Acceptable Manufacturers:
a. Ives*
b. Trimco.
c. Rockwood.
d. Glynn-Johnson*.

P. Thresholds and Weatherstrip: Weatherstripping to have aluminum housing, specified insert, and elongated mounting holes. Door sweeps shall be surface mounted, of aluminum/stainless steel housing with specified insert. Overhead drip caps to be of aluminum, have a 2 1/2-inch projection and be 4 inches wider than the door opening. Thresholds shall be of saddle type with no more than 1/2 inch rise. Weatherstripping and smoke seals shall be surface-mounted on doorstop and have 1/4" adjustment slots.
1. Acceptable Manufacturers:
a. NGP*
b. Hager.
c. Pemko.

Q. Smoke Gasket: Smoke gasket shall comply with door and frame manufacturers for positive pressure tests for fire and smoke. (UBC 7-2, Parts 1 & 2/UL10C).
1. Acceptable Manufacturers:
a. NGP*
b. Hager.
c. Pemko.

2.3 FINISHES

A. Hardware finishes shall match and be maintained to BHMA symbols, as indicated in the Hardware Schedule. Strict adherence to base metals and finish is required.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2. 4 KEYING

A. Keying of locks and cylinders throughout project shall be scheduled through a key meeting with Architect, Owner, and hardware supplier. Key schedule shall be prepared and submitted to the Owner for approval. Copies of final key schedule with the bitting instructions shall be submitted as part of the Project Record Documents.

2.5 KEY CONTROL

A. Provide key cabinet(s) manufactured by of sufficient capacity to handle all keys, plus 50 percent expansion. Provide key control cross-reference chart and accountability (sign-out) tags.
1. Acceptable Manufacturers:
a. Telkee*
b. Lund.
c. Key Control Systems.

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 SDI 107 or ANSI A250.6, whichever is more stringent.

B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

A. Installation shall be by a qualified installer with a minimum five (5) year's experience in the installation of commercial grade hardware. Manufacturer's instructions shall dictate templating and installation.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
   1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

C. 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 9 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.

D. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.

E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect prior to installation.

F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

A. Perform final inspection with hardware installer and hardware supplier present to ensure correct installation and operation, and check for any damaged or defective items. Observe and inspect that all hardware has been installed to its correct destination in proper working order.

B. Independent Architectural Hardware Consultant: Owner reserves the right to engage a qualified independent Architectural Hardware Consultant to perform a separate independent inspection and to prepare an inspection report.

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.

1. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: 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. At completion of the installation and prior to Substantial Completion, make final adjustments to door closures and other items of hardware. Leave all hardware clean and fully operable. Should any item be found to be defective, it shall be repaired or replaced as directed.

C. Occupancy Adjustment: Approximately three 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 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 Section 01820.

END OF SECTION

SECTION 08800

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass and glazing materials for windows, and doors.

B. Glazing compounds and accessories.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Sealant and back-up material.

B. Section 08410 – Aluminum Storefronts.

C. Section 08411 – Aluminum Entrances

1.03 REFERENCES

A. ASTM C 1036 - Standard Specification for Flat Glass; 1991 (Reapproved 1997).

B. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 1997b.

C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.

D. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2000.

E. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 1997.

F. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

1.04 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
   1. In conjunction with materials described in Section 07900 and 08520.
   2. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
   3. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

B. Select type and thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with applicable code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Thicknesses listed are minimum.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Samples of each glass type indicating color and tint properties.

E. Manufacturer's Certificate: Certify that glass meets or exceeds specified requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide a five (5) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

C. Provide a five (5) year warranty to include coverage for delamination of laminated glass and replacement of same.

D. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 PRODUCTS

2.01 FLAT GLASS MATERIALS

A. Manufacturers:
   1. AFG Industries, Inc: www.afgglass.com.
   2. Guardian Industries Corp: www.guardian.com.
   3. Pilkington Building Products North America: http://buildingproducts.us.pilkington.com.
   4. PPG Industries, Inc: www.ppg.com.
   5. Viracon: www.viracon.com.
   6. Substitutions: Permitted under provisions of Section 01600 - Product Requirements.

B. Glass Tint: Where glass is indicated as tinted, match tint of existing Family Life Center Building.

C. Clear Float Glass: Clear, annealed.
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality q3 glazing select.

D. Safety Glass: Clear; fully tempered with horizontal tempering.
   1. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 1, Quality q3 glazing select.

E. Tinted Glass: Float type, annealed, heat-absorbing and light reducing in tinted color.
   1. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 2 tinted heat-absorbing and light reducing, Quality q3 glazing select.

F. Tinted Safety Glass: Float type, fully tempered, heat-absorbing and light reducing in tinted color.
   1. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 2

tinted heat-absorbing and light reducing, Quality q3 glazing select.

2.02 SEALED INSULATING GLASS MATERIALS

A. Manufacturer:
   1. Viracon.
   2. Substitutions: Permitted under provisions of Section 01600 - Product Requirements.

B. Type 1 Insulated Safety Glass Units and Insulated Glass Units: Double pane with glass to elastomer edge seal
   1. Uses: Exterior vertical glazing. Provide safety glass where indicated on drawings.
   2. Acceptable Product: VE1/2M; manufactured by Viracon.
      a. Substitutions: Permitted under provisions of Section 01600 - Product Requirements.

C. Type 2 Insulated Safety Glass Units: Double pane with glass to elastomer edge seal.
   1. Uses: Skylight glazing.
   2. Acceptable Product: 1-1/8 inch VRE459 Insulated/Laminated; manufactured by Viracon.
      a. Substitutions: Permitted under provisions of Section 01600 - Product Requirements.

D. Type 3 Insulated Safety Glass Units: Double pane with glass to elastomer edge seal.
   1. Uses: Exterior vertical glazing at Sanctuary. (Stained glass)

2.03 GLAZING MATERIALS

A. Manufacturers:
   1. Norton Performance Plastics Corp.
   2. Pecora Corporation: www.pecora.com.
   3. Tremco, Inc: www.tremcosealants.com.
   4 PPG. Inc.
   5. Substitutions: Refer to Section 01600 - Product Requirements.

B. Provide types for applicable setting method specified in GANA Glazing Manual and FGMA Sealant Manual except as specified otherwise. Do not use metal sash putty, nonskinning compounds, nonresilient preformed sealers or impregnated preformed gaskets.

C. Materials Exposed to View and Unpainted: Black.

D. Accessories: As required for complete installation. Include glazing points, clips, shims, angles, beads, gaskets and spacers. Provide primer-sealers and cleaners as recommended by glass and sealant manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.

E. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install glass in accordance with recommendations and procedures in GANA Glazing Manual and FGMA Sealant Manual.

B. Install glass in accordance with storefront frame manufacturer recommendations and instructions.

C. Install glass with lines or waves horizontal.

3.04 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.05 PROTECTION OF FINISHED WORK

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Acoustic insulation.

D. Gypsum wallboard.

E. Joint treatment and accessories.

F. Textured finish system.

1.02 RELATED SECTIONS

A. Section 06100 – Rough Carpentry: Wood blocking for support of wall-mounted equipment.

1.03 REFERENCES

A. AISI SG-971 - Specification for the Design of Cold-Formed Steel Structural Members; 1996, with 2000 Supplement.

B. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 1999.

C. ANSI A118.9 - American National Standard Specifications for Cementitious Backer Units; 1999.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2002a.

E. ASTM C 36/C 36M - Standard Specification for Gypsum Wallboard; 2001.

F. ASTM C 79/C 79M - Standard Specification for Treated Core and Nontreated Core Gypsum Sheathing Board; 2001.

G. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002.

H. ASTM C 514 - Standard Specification for Nails for the Application of Gypsum Board; 2001.

I. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2000.

J. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

K. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2000.

L. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board; 2002.

M. ASTM C 931/C 931M - Standard Specification for Exterior Gypsum Soffit Board; 1998.

N. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2000.

O. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2001.

P. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 1999.

Q. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2002.

R. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.

S. GA-253 - Recommended Specifications for the Application of Gypsum Sheathing; Gypsum Association; 1999.

T. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2000.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Applicator Qualifications: Company specializing in performing gypsum board application and finishing, with minimum five years of documented experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as follows:

PART 2 PRODUCTS

2.01 METAL FRAMING MATERIALS

A. Metal Framing Manufacturers:
   1. Clark Steel Framing Systems: www.clarksteel.com.
   2. Dale/Incor: www.daleincor.com.
   3. Dietrich Metal Framing, Inc: www.dietrichindustries.com.
   4. Marino-Ware: www.marinoware.com.
   5. Substitutions: See Section 01600 - Product Requirements.

B. Metal Framing Connectors and Accessories:
   1. Same manufacturer as framing.

C. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
   1. Studs: C shaped with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

D. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05400.

E. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.

F. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI SG-971 Specification for the Design of Cold-Formed Steel Structural Members.
   2. Material: ASTM A 653/A 653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating.

G. Between stud wall blocking: Type and size appropriate to stud spacing.

2.02 GYPSUM BOARD MATERIALS

A. Manufacturers:
   1. G-P Gypsum Corporation: www.gp.com.
   2. National Gypsum Company: www.nationalgypsum.com.
   3. USG Corporation: www.usg.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Gypsum Wallboard: ASTM C 36/C 36M and ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut.
   1. Interior Type X: Fire resistant, UL or WH rated.
      a. Application: Where required for fire-rated assemblies, unless otherwise indicated.
      b. Thickness: 5/8”
      c. Edges: Tapered.

   2. Impact-Resistant Type: Gypsum wallboard especially formulated for increased impact resistance, with enhanced gypsum core and heavy duty face and fiber reinforced.
      a. Application: High-traffic areas indicated.
      b. Core Type: 5/8”Type X.

   3. Moisture & Mold Resistant: : Gypsum wallboard especially formulated for plumbing wall locations.
      a. Application: All Restrooms and Kitchen
      b. Core Type: 5/8 Type X.

C. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, ASTM C 931/C 931M, or ASTM C 1396/C 1396M, with manufacturer's standard edges.

   1. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum.
   2. Core: As indicated, **Type X where designated on Construction Drawings**
   3. Long Edges: Square.

B.

D. Shaft Wall liner: ASTM C1396; 1" inch thick x 24" wide, maximum practical length, square edges.

2.03 ACCESSORIES

A. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness indicated on drawings.

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board. Provide Bostik Fireban One manufactured by Bostik Findley, or approved equal.

C. Building Paper: Asphalt impregnated building felt conforming to ASTM D 226, Type I.

D. Finishing Accessories: ASTM C 1047, galvanized steel or rolled zinc, unless otherwise indicated.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.
      a. Substitutions permitted under provisions of Section 01600.
   4. Outside Corners: Provide chamfer with chamfer adapter as indicated on drawings and as manufactured by Trimtex.
      a. Substitutions permitted under provisions of Section 01600.

E. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, creased paper tape for joints and corners.
   2. Ready-mixed vinyl-based joint compound.

F. Textured Finish Materials: Latex-based compound; plain.

G. Screws: ASTM C 1002; self-piercing tapping type.

H. Screws: ASTM C 954; steel drill screws for application of gypsum board to loadbearing steel studs.

I. Nails: ASTM C 514.

J. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Comply with ASTM C 754 and manufacturer's instructions.

B. Suspended Ceilings: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.

C. Studs: Space studs as scheduled.
   1. Extend partition framing to structure where indicated. Extend to minimum 8 inches above lay-in ceiling plane where not scheduled to extend to deck.
   2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive

gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 16 inches on center.
1. Orientation: Horizontal.
2. Spacing: As indicated.

F. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.

G. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, toilet accessories, and hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
1. Place one bead continuously on substrate before installation of perimeter framing members.
2. Place continuous bead at perimeter of each layer of gypsum board.
3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.04 GYPSUM BOARD INSTALLATION

A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of listing authority.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
2. Place vertical control joints at above each side at hollow metal doors frame locations.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.06 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish all gypsum board in accordance with ASTM C 840 Level 4.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

3.07 TEXTURE FINISH

A. Apply finish texture coating by means required to match Architect's sample.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09300

TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Cementitious backer board as tile substrate.

D. Stone thresholds.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers.

B. Section 09260 - Gypsum Board Assemblies: Installation of tile backer board.

1.03 REFERENCES

A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 1999.
   1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 1999.
   2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 1999.
   3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar; 1999.
   4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive; 1999.
   5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999.
   6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999.
   7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Mortar and Grout; 1999.
   8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999.
   9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999.
   10. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 1999.
   11. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 1999.
   12. ANSI A118.1 - American National Standard Specifications for Dry-Set Portland Cement Mortar; 1999.
   13. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar; 1999.
   14. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation; 1999.
   15. ANSI A118.9 - American National Standard Specifications for Cementitious Backer Units; 1999.
   16. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 1988.

B. TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of America, Inc.; 2004.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.05 QUALITY ASSURANCE

A. Maintain one copy of TCA Handbook and ANSI A108 Series/A118 Series on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesives in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.08 EXTRA MATERIALS

A. Provide 10 sq. ft of each size, color, and surface finish of tile specified.

PART 2 PRODUCTS

2.01 TILE

A. Terrazzo Floor Tile

Tectura Designs 1-800-388-8728
Field – Wausau, River Run, (standard colors) TBD
Size : 24” x 24”
Pattern: Running Bond
4.Series: Floor & Wall Tile

B. Ceramic Tile: CT-1

1. Manufacturer: DalTile
2. Size: 4 “x12” wall tile

3. Colors: TBD – semi-gloss type
4. Series: Color Wheel Linear
5: . Pattern: Vertical Stacked Bond

2.02 TRIM AND ACCESSORIES

A. Tile Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
   1. Applications: Use in the following locations:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
      c. Floor to Wall Joints: Cove base.
   2. Manufacturer: Same as for tile.

B. Thresholds: Marble, white, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick thick; beveled to meet handicapped access requirements; without holes, cracks, or open seams.
   1. Applications: Provide at the following locations:
      a. At doorways where tile terminates.
      b. At open edges of floor tile where adjacent finish is a different height.

2.03 MORTAR MATERIALS

A. Manufacturers:
   1. W.R. Bonsal Co: www.bonsal.com.
   2. Bostik: www.bostik.com.
   3. Custom Building Products: www.custombuildingproducts.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Mortar Bed Materials: Portland cement, sand, latex additive and water.

C. Mortar Bond Coat Materials:
   1. Dry-Set Portland Cement type: ANSI A118.1.
   2. Latex-Portland Cement type: ANSI A118.4.

2.04 GROUT MATERIALS

A. Manufacturers:
   1. W.R. Bonsal Co: www.bonsal.com.
   2. Bostik: www.bostik.com.
   3. Custom Building Products: www.custombuildingproducts.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Standard Grout: Polymer modified cement grout, sanded or unsanded, as specified in ANSI A118.7.
   1. Color: As selected.

2.05 ACCESSORY MATERIALS

A. Cementitious Backer Board: Specified in Section 09260.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Section 03300 and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within tolerances specified in Section 09260, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of setting materials to sub-floor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge. Cementitious backer board specified in Section 09260.

E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

E. Form internal angles square and external angles bullnosed.

F. Install thresholds where indicated.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Allow tile to set for a minimum of 48 hours prior to grouting.

J. Grout tile joints. Use standard grout unless otherwise indicated.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, dry-set or latex-portland cement bond coat, with standard grout, unless otherwise indicated.
   1. Where waterproofing membrane is indicated, install in accordance with TCA Handbook Method F122, with latex-portland cement grout.

3.05 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCA Handbook Method W244, using membrane at toilet rooms.

B. Over interior concrete and masonry install in accordance with TCA Handbook Method W202, thin-set with dry-set or latex-portland cement bond coat.

3.07 CLEANING

A. Clean tile and grout surfaces.

3.08 PROTECTION OF FINISHED WORK

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09511

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

C. Supplementary acoustical insulation above ceiling.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Acoustical sealant.

1.03 REFERENCES

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2000.

B. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1996.

C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

D. ASTM E 580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 2002.

E. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 1998.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Samples: Provide full size samples of proposed ceiling tiles. Provide 12 inch long sections of ceiling grid and trim.

D. Product Data: Provide data on suspension system components.

1.05 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.07 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

1.08 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide 5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturer: Products indicated in this section are manufactured by Armstrong World Industries and establish a standard of quality for products of this section. Substitutions permitted under provisions of Section 01600.

B. Acoustical Units - General: ASTM E 1264, Class A.

C. Acoustical Ceiling Tile, Type 1: ASTM E 1264 Type III, to the following characteristics:
   1. Size: 24 x 24 inches.
   2. Product: Fine Fissured; manufactured by Armstrong.
   3. Color: White.
   4. Edges: Tegular.

2.02 SUSPENSION SYSTEM(S)

A. Acceptable Product: 15/16 inch Exposed Tee Systems; manufactured by Armstrong World Industries.
   1. Color 1: White.
   .

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Gasket For Perimeter Moldings: Closed cell rubber sponge tape.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09650

RESILIENT FLOORING & BASE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 REFERENCES

A. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2003.

B. ASTM F 1066 - Standard Specification for Vinyl Composition Floor Tile; 1999.

C. ASTM F 1861 - Standard Specification for Resilient Wall Base; 2002.

1.03 DELIVERY, STORAGE, AND PROTECTION

A. Protect roll materials from damage by storing on end.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.05 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide 100 sq ft of flooring, 100 lineal feet of base, of each type and color specified.

PART 2 PRODUCTS

2.01 MATERIALS - SHEET FLOORING

2.02 MATERIALS - TILE FLOORING

A. A. Luxury Vinyl Tile (LVT):

1. Style:Regency Tile
2. Color: from standard colors with Honed Stone Finish
3. Size: 18” x 18”
4. Thickness: 20 mil
5. Pattern: stack
6. Manufacturers: Artistek Floors

2.03 MATERIALS - BASE

A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; **Roppe,Contours**
1. Height: 4 inch.
2. Thickness: 0.125 inch thick.
3. Finish: Satin.

4. Color: Color as selected from manufacturer's standards.
5. Accessories: Premolded external corners and end stops.

2.04 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Moldings and Edge Strips: Same material as flooring.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is cured.

C. Clean substrate.

D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - SHEET FLOORING

A. Install in accordance with manufacturer's instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place, press with heavy roller to attain full adhesion.

D. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.

E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

F. Install flooring in recessed floor access covers. Maintain floor pattern.

3.04 INSTALLATION - TILE FLOORING

A. Install in accordance with manufacturer's instructions.

B. Mix tile from container to ensure shade variations are consistent when tile is placed.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

G. Install flooring in recessed floor access covers. Maintain floor pattern.

3.05 INSTALLATION - BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.07 PROTECTION OF FINISHED WORK

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09680

CARPET

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet, direct-glued.

B. Accessories.

1.02 REFERENCES

A. CRI 104 - Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute; 2002.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate seaming plan, method of joining seams, direction of carpet pile and pattern, location of edge moldings and edge bindings.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing carpet with minimum five years experience.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.

C. Ventilate installation area during installation and for 72 hours after installation.

1.06 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional requirements.

B. Provide 100 sq ft of carpeting of each type, color, and pattern specified.

PART 2 PRODUCTS

2.01 CARPET

A. Acceptable Products:

A. CPT-1 - 2’x 2’carpet tile, Mannington Commercial, Canopy II , Color to be selected by Architect.

2.03 ACCESSORIES

A. Sub-Floor Filler: Type recommended by carpet manufacturer.

B. Tackless Strip: Carpet gripper, of type recommended by carpet manufacturer to suit application, with attachment devices.

C. Moldings and Edge Strips: Rubber, color as selected.

D. Adhesives: Type recommended by carpet manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Section 03300 and are ready to receive carpet.

B. Verify that concrete sub-floor surfaces are ready for carpet installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by carpet manufacturer and adhesive materials manufacturer.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Install carpet in accordance with manufacturer's instructions and CRI 104.

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Lay out carpet and locate seams in accordance with shop drawings:
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
   4. Locate change of color or pattern between rooms under door centerline.
   5. Provide monolithic color, pattern, and texture match within any one area.

D. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

3.05 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Shop-primed items.

B. Division 15 - Mechanical Identification: Painted identification.

C. Division 16 - Electrical Identification: Painted identification.

1.03 REFERENCES

A. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2000.

B. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 1992 (Reapproved 1997).

1.04 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products.

C. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

D. Samples: Provide approval samples 24 inch x 24 inch of required specialty or “faux” finishes for Architect approval.

1.06 MOCK-UPS

A. Provide mockups of all painted or stained surfaces. Mock-up may remain in place following approval of the Architect.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.08 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.09 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.11 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Supply one gallons of each color; store where directed.

C. Label each container with color in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Paints:
   1. Base Manufacturer: Sherwin Williams: www.sherwin-williams.com.
   2. Other Acceptable Manufacturers:
      a. Duron, Inc: www.duron.com.
      b. ICI Paints North America: www.icidecorativepaints.com.
      c. Benjamin Moore & Co: www.benjaminmoore.com.
      d. PPG Architectural Finishes, Inc: www.ppgaf.com.

B. Substitutions: See Section 01600 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
   1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
   2. For good flow and brushing properties.
   3. Capable of drying or curing free of streaks or sags.

B. Specialty Finish Techniques: Coatings indicated on the drawings are to receive specialty or “faux” finishes matching approved submittals.

2.03 PAINT SYSTEMS - EXTERIOR

A. Wood, Transparent, Varnish, Stain:
   1. One coat of stain.
   2. One coat of sealer.
   3. One coat of varnish; satin.

B. Concrete/Masonry, Opaque, Alkyd, 3 Coat:
   1. One coat of block filler.
   2. Eggshell: Two coats of alkyd enamel.

C. Gypsum Board and Plaster, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Eggshell: Two coats of latex.

D. Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
   2. Eggshell: Two coats of alkyd enamel.

E. Galvanized Metals, Alkyd, 3 Coat:
   1. One coat galvanize primer.
   2. Eggshell: Two coats of alkyd enamel.

F. Aluminum, Unprimed, Alkyd, 3 Coat:
   1. One coat etching primer.
   2. Eggshell: Two coats of alkyd enamel.

G. Pavement Marking Paint:
   1. Specified in Section 02765 – Pavement Markings.

2.04 PAINT SYSTEMS - INTERIOR

A. Wood, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Eggshell: Two coats of latex enamel.

B. Wood, Transparent, Varnish, Stain:
   1. Filler coat (for open grained wood only).
   2. One coat of stain.
   3. One coat sealer.
   4. Satin: One coat of varnish.

C. Concrete/Masonry, Opaque, Alkyd, 3 Coat:
   1. One coat of block filler.
   2. Eggshell: Two coats of alkyd enamel.

D. Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
   2. Eggshell: Two coats of alkyd enamel.

E. Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with alkyd primer.
   2. Eggshell: Two coats of alkyd enamel.

F. Galvanized Metals, Alkyd, 3 Coat:
   1. One coat galvanize primer.
   2. Eggshell: Two coats of alkyd enamel.

G. Aluminum, Unprimed, Alkyd, 3 Coat:
   1. One coat etching primer.
   2. Eggshell: Two coats of alkyd enamel.

H. Gypsum Board/Plaster, Latex-Acrylic, 3 Coat:
   1. One coat of alkyd primer sealer.
   2. Eggshell: Two coats of latex-acrylic enamel.

I. Fabrics/Insulation Jackets, Alkyd, 3 Coat:
   1. One coat of alkyd primer sealer.
   2. Eggshell: Two coats of alkyd enamel.

J. Specialty or “Faux” Finishes: Provide specialty finishes using application techniques required to match approved samples.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D 4442.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D 4442.

3.02 PREPARATION

A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Surfaces: Correct defects and clean surfaces which affect work of this section.

C. Marks: Seal with shellac those which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

G. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.

H. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

J. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

L. Interior Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

M. Interior Wood Items to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

N. Exterior Wood to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

O. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand wood surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Division 15 and Division 16 for schedule of color coding of equipment, duct work, piping, and conduit.

B. Paint shop-primed equipment, where indicated.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Finish equipment, piping, conduit, and exposed duct work in utility areas in colors according to the color coding scheme indicated.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for field inspection.

3.06 CLEANING

A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.07 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically noted.
   2. Fire rating labels, equipment serial number and capacity labels.
   3. Stainless steel items.

B. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
   1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
   2. Paint shop-primed items occurring in finished areas.
   3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of Eggshell black paint to visible surfaces.
   4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

C. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

D. Paint all interior walls and ceilings per the Finish Schedule in the Construction Drawings. For additional clarity, exposed ceiling in the following rooms shall be painted as noted:

   1. Black/blackout: Rooms 102, 103, 104, 105, 122, 128, 129, 134, 135, 136, 137, 147 (a blackout line on the walls will be established in the field following installation of mechanical ductwork)

   2. White/whiteout: Rooms 118 and a portion of Room 117 (as indicated on the First Floor Reflected Ceiling Plan in the Construction Drawings)

END OF SECTION

SECTION 10165

TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plastic laminate toilet compartments.

B. Urinal screens.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Concealed steel support members.

B. Section 06100 - Rough Carpentry: Concealed wood framing and blocking for compartment support.

C. Section 10800 - Toilet, Bath, and Laundry Accessories.

POWDER SHIELD TOILET ENCLOSURES

THE CORINTHIAN TYPE: FP-500 Overhead Braced

MATERIALS: Bonderized, Galvanized Steel

THICKNESS: Doors .....22 Gauge, Finished to 1" (25.4mm)
Panels .....20 Gauge, Finished to 1" (25.4mm)
Pilasters.....20 Gauge, Finished to 1 1/4" (31.75mm)

Doors:
Finished to 1"(25.4) thick, constructed of two sheets of 22-gauge, bonderized, galvanized steel formed and cemented under pressure to a honeycomb core. Door face sheets are welded at intervals around the entire perimeter. All edges to be finished with a 20-gauge interlocking molding. Corners are finished with pre-formed painted stainless steel (type 304) reinforcements. Corners are to be welded internally to ensure that the galvanized rust resistant coating is not removed. Doors shall have internal steel reinforcements to secure hardware items.

Panels:
Finished to 1" (25.4) thick, constructed of 2 sheets of 20-gauge bonderized, galvanized steel, formed and cemented under pressure to a honeycomb core. All partition edges are finished with a 20-gauge interlocking molding. Corners are finished with pre-formed painted stainless steel (type 304) reinforcements.

Pilasters:
Finished to 1 1/4" (31.75) thick, constructed of two sheets of 20-gauge, bonderized, galvanized steel, formed and assembled with a honeycomb core. Face sheets are electrically welded at intervals around the entire perimeter. All pilasters will have a 4" (102) high #4 finish stainless steel plinth (type 304) and have straight, flat sides with rounded edges to match the pilaster profile.

Pilasters will have leveling bolts threaded to the pilaster support bracket. Floor mounting will be with #12 x 21/2" (63.5) screws and shields. Headrail is anodized aluminum .050 (1.27) wall thickness with anti-grip profile. The headrail is set into a 16ga. channel reinforcement which occupies the full width of the pilaster and is electrically welded in place for maximum strength.

FITTINGS:
Wall fittings are die cast chrome plated. Minimum of two fittings at each connection.

HARDWARE:
Each compartment will be complete with all hardware, door hinges, latch, stop and keeper, coat hook, as well as all necessary fittings and fastenings for a complete installation. Hinges and door strikes are fastened by means of tamper- proof Torx-Pin Head through bolts, which are polished chrome plated. All other screws to be tamper-proof Torx-Pin Head chrome plated. Doors are to be hung on a concealed, *"stay-set"*, fully adjustable, non-rising door mechanism. Upper hinge pin shall be 3/8" (9.525) diameter steel. All hinges will have wrap-around flanges with a minimum of 5/8" (15.875) wrap onto pilaster. All doors will have a concealed ADA approved slide latch with external *"in-use"* indicator.

FINISH:
All rust inhibitive coated material shall be chemically cleaned and painted with multiple coats of Epoxy Hybrid Powder applied electrostatically. Color: Nickel Silver 304

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attached panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 ERECTION TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10441

INTERIOR SIGNS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Unframed signs, with embossed face, for interior applications.

1.02 QUALITY ASSURANCE

A. Supplier: Obtain all products in this section from a single supplier.

B. Regulatory Requirements: Products shall meet requirements of the Americans With Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.

C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

1.03 SUBMITTALS

A. Submit in accordance with requirements of section 01300.

B. Product Data: Submit product data for specified products. Include material details for each sign specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.

D. Samples: Submit supplier’s standard color chart for selection purposes and selected colors for verification purposes.

E. Installation: Submit supplier’s installation instructions.

F. Closeout Submittals:
   1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
   2. Submit warranty documents specified herein.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.

D. Handle products in accordance with manufacturer's instructions.

1.05 WARRANTY

A. Project Warranty: Comply with requirements of Division 1.

B. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official.

C. Warranty Period: One year from product ship date.

PART 2 PRODUCTS

2.01 SIGNAGE SYSTEMS

A. Acceptable Manufacturers:
   1. Interior sign products indicated in this section are manufactured by ASI-Modulex and establish a standard of quality for products of this section. Substitutions permitted under provisions of Section 01600.

B. Acceptable Product: EmBoss ADA-Ready Sign System, manufactured by ASI-Modulex with requirements indicated for materials, thickness, finish colors, designs, shapes, sizes and details.

2.02 SIGN MATERIALS

A. Mounting Panel: Acrylic.

B. Face: Vacuum formed 1.5 mil, clear, scratch resistant PVC/vinyl acetate bonded to acrylic mounting panel.

2.03 FABRICATION OPTIONS

A. Tactile Graphics and Text:
   1. Fabrication process: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer's vacuum formed embossing process.
   2. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.

B. Mounting Panel Options:
   1. .080 inch thick matte finished acrylic.

C. Background Appearance Options:
   1. Solid color: Select from manufacturer's standard range.
   2. Subsurface custom graphics.

D. Tactile Lettering and Graphics Color Options: Select from 3M standard vinyl colors.

E. Overall panel size: 6 x 8 inches.

F. Shape: Standard.

G. Selected from manufacturer's standard letter styles and color charts.

2.04 INSTALLATION METHODS

A. System VT, vinyl tape.

2.05 FABRICATION - GENERAL

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

B. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.

C. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.

D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.

B. Scheduling of installation by Owner or it's representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.02 INSTALLATION

A. Install product in accordance with supplier's instructions.

B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

C. Install product level, plumb, and at heights indicated.

D. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:
   1. Interior Signs: Within 1/4 inch vertically and horizontally of intended location

3.03 CLEANING, PROTECTION AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1

3.04 SIGN SCHEDULE

A. Schedule: Provide signs at the elevator and all restrooms.

END OF SECTION

SECTION 10523

FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

1.02 RELATED SECTIONS

A. Section 09260 – Gypsum Board Assemblies: Metal blocking and shims.

1.03 REFERENCES

A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 1998.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

C. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

D. TEXAS ACCESSIBILITY STANDARDS (TAS) of the Architectural Barriers Act Article 9102, Texas Civil Statutes.

1.04 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate rough-in measurements for recessed cabinets.

C. Product Data: Provide extinguisher operational features and color and finish.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers, Cabinets and Accessories:
   1. Larsen's Manufacturing Co.

2. J.L. Industries Inc.
2. Substitutions: Under provisions of Section 01600.

2.02 FIRE EXTINGUISHERS

A. Multi-Purpose Dry Chemical Type: Cast steel tank, with pressure gage.
   1. Size 10.
   2. Finish: Baked enamel, red color.

2.03 FIRE EXTINGUISHER CABINETS

A. Fire extinguisher cabinets indicated in this section are manufactured by Larsen's Manufacturing Company and establish a standard of quality for products of this section. Substitutions permitted under provisions of Section 01600
   1. Acceptable Product: Model No. 2409-6R, Vertical Duo, clear aluminum finish, vertical lettering, manufactured by Larsen's Manufacturing Company.

B. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with Texas Accessibility Standards.

B. Install in accordance with manufacturer's instructions.

C. Install cabinets plumb and level in wall openings.

D. Secure rigidly in place.

END OF SECTION

SECTION 10651

OPERABLE PANEL PARTITONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. General
   1. Furnish and install operable partitions and suspension system. Provide all labor, materials, tools, equipment, and services for operable walls in accordance with provisions of contract documents.

1.02 RELATED WORK BY OTHERS

A. Preparation of opening will be by General Contractor. Any deviation of site conditions contrary to approved shop drawings must be called to the attention of the architect.
B. All header, blocking, support structures, jambs, track enclosures, surrounding insulation, and sound baffles as required in 1.04 Quality Assurance.
C. Prepunching of support structure in accordance with approved shop drawings.
D. Paint or otherwise finishing all trim and other materials adjoining head and jamb of operable partitions.

1.03 SUBMITTALS

A. Complete shop drawings are to be provided prior to fabrication indicating construction and installation details. Shop drawings must be submitted within 60 days after receipt of signed contract.

1.04 QUALITY ASSURANCE

A. Preparation of the opening shall conform to the criteria set forth per ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.
B. The partition STC (Sound Transmission Classification) shall be achieved per the standard test methods ASTM E90.
C. Noise isolation classifications shall be achieved per the standard test methods ASTM E336 and ASTM E413.
D. Noise Reduction Coefficient (NRC) ratings shall be per ASTM C423.
E. The manufacturer shall have a quality system that is registered to the ISO 9001 standards.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Proper storage of partitions before installation and continued protection during and after installation will be the responsibility of the General Contractor.

1.06 WARRANTY

A. Partition shall be guaranteed for a period of one year.

B. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and specifications are based on manufacturer's literature from Hufcor Inc. & Modernfold, Inc unless otherwise indicated. Other manufacturers to comply with the minimum levels of material and detailing indicated on the drawings and in conformance with provisions of Section 01600 – Product Requirements.

2.02 MATERIALS

A. Product to be top supported Series 641 individual, omni-directional as manufactured by Hufcor Inc.
   1. Panels shall be nominally 4” thick, to 48” in width.
   2. Panel faces shall be of Class “A” rated gypsum laminated to appropriate substrate to meet the STC requirement in 2.04 Acoustical Performance.
   3. Frames shall be of 16 gauge painted steel formed to capture and protect vertical edges of the face material.
   4. Vertical interlock between panels shall be of tongue and groove configuration, shall provide panel-to-panel interlock, and shall prevent sound leaks between panels. The lead panel shall seal against the adjacent wall without the need for wall mounted jambs.
   5. Horizontal top seals shall be retractable, provide 1” nominal operating clearance, and exert upward force when extended. All panels, including pass door panels and lever closure panels, shall have retractable top & bottom seals
   6. Horizontal bottom seals shall be retractable, provide up to 2” nominal operating clearance, and exert downward force when extended.
   7. Horizontal trim shall be of aluminum.

B. Weight of the panels shall be 7.8-10.9 lbs./sq. ft. based on options selected.

C. Suspension system:
   1. For panels to 1000 lbs: Track shall be of clear anodized architectural grade extruded aluminum alloy 6063-T6. Track design shall provide precise alignment at the trolley running surfaces and provide integral support for adjoining ceiling, soffit, or plenum sound barrier. Track shall be connected to the structural support by pairs of min. 3/8” [10] dia. threaded steel hanger rods. Pairs of rods are directly attached to the track, no single point attachment allowed. L, T, or X intersections shall be factory assembled and welded. Guide rails and/or track sweep seals shall not be required.
      a. Each panel shall be supported by two 2-wheeled counter-rotating horizontal carriers. Wheels to be of precision ground steel ball bearings with heat treated and hardened races encased with molded polymer tires.

D. Finishes
   1. Face finish shall be:
      a. Standard upgrade fabrics, color shall be selected from manufacturer’s standard color selector:
         (1) Factory applied vertical ribbed carpet (N.R.C. .20)
   2. Frame and horizontal trim color shall be (select one):
      a. Gray powder coated (standard)
   3. Aluminum track shall be clear anodized

E. Available Accessories/Options
   1. ADA compliant pass door of the same thickness and construction as the basic panels. Pass door panel legs require bottom seals that provide downward force to maintain stability during door operation. Pass door leaf has perimeter trim to protect face finish and to provide visual identification as required by International Building Code. Pass door leaf incorporates a self-adjusting retractable bottom seal providing sound control when door is closed.
      a. Automatic door closer
      b. "Panic" hardware
      c. Exit sign
   2. Finished end cover

2.03 OPERATION

A. Panels shall be manually moved from the storage area, positioned in the opening, and seals set.
B. Retractable Horizontal Seals (standard)
   1. Retractable horizontal seals shall be activated by a removable quick-set operating handle located approximately 42" from the floor in the panel edge.
   2. All retractable seals in each hinged pair shall be operated simultaneously.
   3. Seal activation requires approximately 15 lbs. of force per panel and approximately a 190 degree turn of the removable handle.

C. Final partition closure to be by (select one):
   1. Expanding jamb which compensates for minor wall irregularities and provides a minimum of 250 lbs. seal force against the adjacent wall for optimum sound control. The jamb activator shall be located approximately 45" from the floor in the panel face and be accessed from either side of the panel. The jamb is equipped with a mechanical rack and pinion gear drive mechanism and shall extend 4"-6" by turning the removable operating handle.

D. Stack/Store Panels
   1. Retract seals and move to storage area. Panels to be stored at one end of the track in a pocket as indicated on the drawings.

2.04 ACOUSTICAL PERFORMANCE

A. Acoustical performance shall be tested at a laboratory accredited by the U.S. Dept. of Commerce, National Institute of Standards and Technology, under the National Voluntary Laboratory Accreditation Program (NVLAP) and in accordance with ASTM E90 Test Standards. Standard panel construction shall have obtained an STC rating of 54.
   1. Complete, unaltered written test report is to be made available upon request.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The complete installation of the operable wall system shall be by an authorized factory-trained installer and be in strict accordance with the approved shop drawings and manufacturer's standard printed specifications, instructions, and recommendations.

3.02 CLEANING

A. Cleaning
   1. All track and panel surfaces shall be wiped clean and free of handprints, grease, and soil.
   2. Cartons and other installation debris shall be removed from the job site.

3.03 TRAINING

A. Installer shall demonstrate proper operation and maintenance procedures to owner's representative.
B. Operating handle and owners manuals shall be provided to owner's representative.

END OF SECTION

SECTION 10700

EXTERIOR PROTECTION – ALUMINUM CANOPY

PART 1 –

SUMMARY

A. Section Includes: Fixed Aluminum Canopy with extruded-aluminum components, and hanger rods.

B. Related Requirements: Division 1 –

General Requirements **1.2 REFERENCES**

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. American Welding Society (AWS):
i. Standard D1.2 - Structural Welding Code - Aluminum.

C. ASTM International (ASTM):
i. ASTM D 3451 - Standard Guide for Testing Powder Coatings.

1.3 SUBMITTALS

A. Submit within 15 days after contract award.

B. Shop Drawings: Indicate size, material, and finish. Include plan elevation pages to clearly outline canopy locations. Include installation procedures, details of joints, attachments, and clearances. Provide lead time for product on shop drawings. Note possible conflicts where applicable.

C. Samples or color charts showing manufacturer's full range of

colors from standard line. **PART 2 -PRODUCTS**

2.1 APPROVED MANUFACTURERS

A. Specifications are based on Architectural Fabrication, Inc. – Helios Canopy. All extruded aluminum, flush deck, hanger rod canopy. Architectural Fabrication, Inc. - Manufacturer and Installer is located at 4711 Vermont Ave Fort Worth TX 76115. (800) 962-8027 www.sign-awning.com

B. Substitutions are acceptable assuming they comply with these specifications, are submitted based on Section 01XXX – Substitution Requirements, and have a minimum 10 years experience.

2.2 MATERIALS

A. Framing: Aluminum Tubes, fascia, clip angles: 6063-T6 Alloy extruded aluminum.

B. Decking: 6061-T6 or 6063-T5 Alloy extruded aluminum deck pans (roll form is NOT acceptable).

C. Hanger Rods: Galvanized steel and powder coat. Prime and paint is not acceptable

D. Connections: Wall plates and Canopy mounting brackets are to be aluminum.

E. Hardware: Nuts, washers, steel fasteners, and clevis pins shall be stainless steel

F. Flashing: Shall be minimum 0.040 inch aluminum fabricated to prevent leakage, and sealed with a sonoplastic NP-1 in clear or color match. Other equivalent sealant is acceptable.

G. Fasteners and Accessories: Eyebolts, lag screws, masonry anchors, and pipe spacers in sizes required to suit application and per pre-engineered canopy load requirements

H. Finish: Powder-coat finish per ASTM D 3451, complying with finish manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness. Color to be selected from standard color line.

PART 3 –

EXECUTION

3.1

A. Preassemble awning frames in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

3.2 INSTALLATION

A. Install canopies per manufacturer’s written instructions and as indicated on Drawings.

B. Locate and place canopies level, plumb, and at indicated alignment with adjacent work.

C. Use concealed anchorages where possible.

D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory. Make required alterations and refinish entire unit or provide new units.

E. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint or elastomeric coating on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

END OF SECTION

SECTION 10800

TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms.

B. Grab bars.

1.02 RELATED SECTIONS

A. Section 10165 – Plastic Laminate Toilet Compartments.

1.03 REFERENCES

A. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1997a.

B. ASTM A 269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 1998.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1999a.

D. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1999.

E. ASTM C 1036 - Standard Specification for Flat Glass; 1991 (Reapproved 1997).

F. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

G. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

H. TEXAS ACCESSIBILITY STANDARDS (TAS) of the Architectural Barriers Act Article 9102, Texas Civil Statutes.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

C. Samples: Submit two samples of each accessory, illustrating color and finish.

D. Manufacturer's Installation Instructions: Indicate special procedures, and conditions requiring special attention.

1.05 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products scheduled are those manufactured by American Specialties, Inc. The scheduled products establish an acceptable standard of quality.

B. Substitutions permitted under provisions of Section 01600.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide 3 keys for each accessory to Owner; master key all lockable accessories.

C. Stainless Steel Sheet: ASTM A 666, Type 304.

D. Stainless Steel Tubing: ASTM A 269, Type 304 or 316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M, with G90/Z275 coating.

F. Mirror Glass: Float glass, Type I, Class 1, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with GSA CID A-A-3002.

G. Adhesive: Two component epoxy type, waterproof.

H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

B. Galvanizing for Items other than Sheet: ASTM A 123/A 123M to 1.3 oz/sq yd. Galvanize ferrous metal and fastening devices.

C. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

A. Products listed are those manufactured by American Specialties, Inc. The listed products establish an acceptable standard of quality.

B. Schedule: Refer to drawings for toilet accessory schedule.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations, and as indicated on drawings and as follows:

END OF SECTION