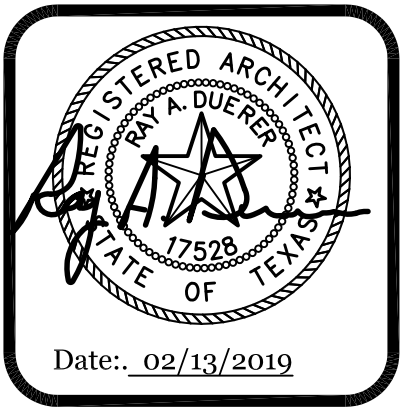
PROJECT SPECIFICATION MANUAL

10,720 SF Retail Shell Building & Associated Site Work

SPRING STUEBNER @ SPRING PLAZA
SPRING, TEXAS



Date:. 02/13/2019

CDA
Architects
Member American Institute of Architects
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Houston, Texas 77070
832/678-9232 Fax 832/678-9240

SECTION 00 01 10

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GEOTECHNICAL DATA

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Provisions established within the General and Supplementary General Conditions of the Contract, and the Drawings and applicable requirements of Division 1 collectively govern this section.

1.2 SCOPE

The Owner has furnished a geotechnical engineering service report with respect to the building and site. The report referenced as Project No. 19-1003, Geotechnical Engineering Study New Retail Building, Spring Stuebner Road, Spring, Texas was prepared by Paradigm Consultants, Inc., Houston, Texas dated February 2019. This report copy is bound in this manual, and work defined in such is hereby made a part of the Project Requirements.

A. The data from the Subsurface Soil Investigation report is not intended as representations or warranties for continuity of such conditions. It is expressly understood that the Architect and Owner will not be responsible for the accuracy or applicability of the data given herein.

B. Additional test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner or Architect, provided such operations are acceptable to the Architect.

C. Bidders are expected to examine the site and subsurface investigation reports and then decide for themselves the character of the materials to be encountered.

2. PART 2 PRODUCTS

(Not Applicable)

3. PART 3 EXECUTION

(Not Applicable)

END OF SECTION

(See attached 32 page report)

Geotechnical Engineering Study
New Retail Building
Spring Stuebner Rd
Spring, Texas

Prepared For

CDA Architects
Houston, Texas

Prepared By

Paradigm Consultants, Inc.
9980 W. Sam Houston Pkwy. South, Suite 500
Houston, Texas 77099
TBPE Reg. No. F-001478

February 2019

February 4, 2019
Paradigm Project No. 19-1003

Paradigm
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Mr. Ray A. Duerer, AIA, LEED AP
CDA Architects
17200 State Hwy. 249, Suite 230
Houston, Texas 77064

Geotechnical Study
New Retail Building
Spring Stuebner Rd
Spring, Texas

Mr. Duerer:

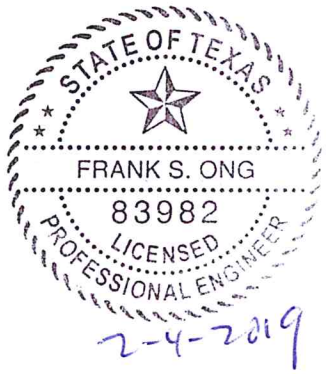
Paradigm Consultants, Inc. presents this report of our geotechnical study for the above referenced project. This study was authorized with a signed *Professional Services Agreement* on January 9, 2019. Our services were performed in general accordance with our Proposal No. 18-338, dated December 26, 2018.

Our report presents options that will affect the design, construction, performance, and cost of the structure, and involve compromises and varying levels of risk associated with movement, building distress, and other factors. These issues should be discussed with the Owner and appropriate members of the Owner's design team including the Geotechnical Engineer to help ensure that the issues and options are understood and applied in a manner commensurate with the Owner's budget, tolerance of risk, and expectations of performance and maintenance.

We appreciate the opportunity to work with you during the design phase of this project and look forward to the opportunity to provide construction materials testing and monitoring services during the construction phase. If we may be of further assistance, please call us at your convenience.

Sincerely,

Ahmed Neamah, EIT
Staff Engineer



Frank Ong, P.E.
Engineering Manager

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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Important Information about your Geotechnical Engineering Report

EXECUTIVE SUMMARY

CDA Architects engaged Paradigm Consultants, Inc. to provide geotechnical design recommendations and construction considerations for a new retail building located at Intersection of Stuebner Road and Spring Plaza Road in Spring, Texas. This summary presents selected highlights of our findings and recommendations as a courtesy to the reader. It does not present crucial details needed for the proper application of our findings and recommendations. The findings of this study and recommendations are related through the full report only.

The subsurface soils, based on intercepted soils from four exploratory soil borings, consist of silty sand, lean clay and fat clay within the 20-ft explored depth. Groundwater was not encountered during our field exploration.

The building can be supported on drilled-and-underreamed piers bearing at a depth of 11 ft below existing grade. The foundations can be sized using net allowable bearing pressures of 5.0 kips/ft^2 for total load and 3.5 kips/ft^2 for dead load plus sustained live load. A bell-to-shaft ratio of 3:1 may be considered. If a 3:1 bell-to-shaft ratio in the pier excavation is not possible due to the presence of sand layer at a location during construction, a reduced bell-to-shaft ratio or straight-sided shaft with a design bell diameter will be required. We recommend test piers be drilled to determine the construction feasibility.

The clays within the anticipated zone of seasonal moisture change have plasticity indices ranging from 7 to 33. These soils have a low to high shrink-swell potential with changes in moisture content. Two floor systems can be considered to address the risk and consequences of movement for the floor: a structurally supported floor slab or a slab-on-grade. To reduce potential movements of a slab-on-grade, we recommend a minimum 2-ft thick buffer of select fill be prepared beneath the slab. This method will also require that the concrete pavement is placed around the building perimeter with no exposed soil adjacent to the slab.

Paradigm recommends 5-in. thick concrete paving for passenger vehicle parking areas only, 6-in. thick concrete paving for passenger vehicle driveways, and 7-in. thick concrete paving for the entrance, access to dumpster pads, and heavy truck traffic areas. For planning purpose, the pavement subgrade should be stabilized with lime-fly ash to an 8-in. depth. The appropriateness of stabilizer and application rate for the subgrade should be determined at the time of construction.

INTRODUCTION

Paradigm Consultants, Inc. (Paradigm) presents this report of our geotechnical study for the new retail building located at Spring Stuebner Rd in spring, Texas. This study was authorized with a signed *Professional Services Agreement* on January 9, 2019. Our services were performed in general accordance with our Proposal No. 18-338, dated December 26, 2018.

The objectives of this study were to develop design recommendations and construction considerations for building foundations, paving, and subgrade preparation. Our study included the following tasks:

- Drilling and sampling four soil borings to explore the subsurface stratigraphy and groundwater levels;
- Geotechnical laboratory tests to aid in soil classification and determine the engineering properties of the soils encountered at the sites;
- Analysis of the field and laboratory test data to model the soil stratigraphy;
- Evaluation of the construction requirements and soil stratigraphy to develop foundation and paving design and construction related recommendations; and
- Preparing this report presenting our findings and recommendations.

FIELD EXPLORATION AND LABORATORY TESTING

Our field exploration included drilling and sampling two 20-ft borings and two 5-ft borings. The approximate boring locations are shown on Figure 1. The borings were located in the field using the proposed development plan and existing landmarks.

Drilling Operations

DAS, a subcontractor to Paradigm, drilled and sampled soil borings on January 24, 2019 using truck mounted drilling equipment. Paradigm's field representative was on-site to monitor drilling activities, direct the sampling efforts, and log the boreholes. Our field operations were performed in general accordance with ASTM International (ASTM D 1452[1]).

Soil Sampling

Soil was sampled continuously at 2-ft intervals to 12-ft depth (unless terminated at shallower depth) with additional samples taken between 13-ft and 15-ft depths, and at 5-ft intervals thereafter to the completion of the borehole. The sampling method is determined based on the anticipated soils.

Soils interpreted to be cohesive soils (clay) during field operations were sampled by hydraulically pushing a 3-in. diameter, thin-walled steel tube a distance of about 24 in. Our field sampling procedures were in general accordance with ASTM D 1587.[2] For each recovered sample, our representative extruded the sample in the field, visually classified the soil, and measured the penetration resistance using a pocket penetrometer. A representative portion of the recovered sample was wrapped in aluminum foil and placed into a plastic bag for transport to our laboratory.

Water-Level Measurements

Drilling protocol includes dry augering from ground surface to the depth where water or borehole sidewall instability occurs. If neither water nor instability is encountered, dry-auger drilling techniques are used to the full depth of the boring. If water is encountered, the water level within the borehole is measured at 5-minute intervals for at least 15 minutes before drilling resumes using wet rotary methods.

Laboratory Testing

Paradigm performed geotechnical laboratory tests in general accordance with ASTM methods on selected soil samples to aid in soil classification and determine engineering properties. The test methods performed are presented in Table 1.

Table 1: Laboratory Test Methods

Test Name	Test Method
Moisture Content	ASTM D 2216[3]
Liquid and Plastic Limits and Plasticity Index	ASTM D 4318[4]
Amount of Materials in Soils Finer than the No. 200 Sieve	ASTM D 1140[5]
Unconfined Compressive Strength of Cohesive Soil	ASTM D 2166[6]
Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soil	ASTM D 2850[7]

Boring Logs

Paradigm's field representative logged each soil boring recording the drilling method, sampling method and interval, and penetration resistance. Details of the stratigraphic conditions encountered at each boring location were recorded on the field log in general accordance with ASTM D 5434.[8] Identification and descriptions of the soils were based on visual-manual procedures described in ASTM D 2488.[9]

The boring logs were developed using the stratigraphic and soil property data obtained during our field exploration and laboratory testing programs. Each log represents our interpretation of general soil and water conditions at the boring location. The boring logs include the type and interval depth for each sample, the corresponding penetration resistance, and the results of the index properties and strength testing. Soil classifications were based on the Unified Soil Classification System (ASTM D 2487[10]). The boring logs and a key to the terms and symbols used on the logs are included in Appendix.

When a penetration resistance value of 4.5 tsf is recorded and penetration resistance is used to determine soil consistency, Paradigm describes consistency as very stiff to hard. In the absence of unconfined compressive strength data, Paradigm does not expressly state that soil is hard consistency. In the absence of the appropriate field and/or laboratory test data at the interval depth, no estimate of consistency or density is noted.

ASTM D 2487 classifies soil as either fine-grained or coarse-grained with the percentage of soil particles finer than the No. 200 sieve size used to differentiate between coarse-grained and fine-grained soil. Clay and silt are fine-grained soils and have 50% or more of their particles finer than the No. 200 sieve size. Gravel and sand are coarse-grained soils and have less than 50% of their particles finer than the No. 200 sieve size.

Clay has a plasticity index (PI) of 4 or greater and the plot of plasticity index versus liquid limit falls on or above the “A” line of the plasticity chart. Silt typically has a PI less than 4 and the plot of plasticity index versus liquid limit falls below the “A” line of the plasticity chart. For clay and silt, the descriptor “with sand” is used if 15% to 30% of the particles are sand size. If more than 30% of the particles within a clay or silt sample are sand size, the descriptor “sandy” is used. Fat clay has a liquid limit greater than or equal to 50, and lean clay has a liquid limit less than 50. Silty clay (CL-ML) has a PI between 4 and 7.

SURFACE AND SUBSURFACE CONDITIONS

General surface conditions were noted during our field exploration program. Subsurface conditions were evaluated by drilling four exploratory soil borings within the project site. Discussions of the site, subsurface and groundwater conditions encountered during our field exploration are presented in the following sections.

Surface Conditions

The site is generally level and covered with grass. Surface soils at the boring locations and along the routes taken to access the boring locations were firm.

Subsurface Conditions

The subsurface soils, based on intercepted soils from four exploratory soil borings, consist of silty sand, lean clay and fat clay within the 20-ft explored depth. Additional details of encountered soils with laboratory test results are presented on boring logs in Appendix.

Groundwater was not encountered during our field exploration. Short-term water level observations should not be interpreted to represent long-term conditions. Water levels vary seasonally and with climatic conditions.

Expansiveness of Soils Encountered. The clays within the anticipated zone of seasonal moisture change, the existing ground surface to a depth of about 10 ft, have a low to medium swell/shrinkage potential (Holtz & Gibbs[11], Raman[12], and Chen[13]), as shown in Table 2. PIs for the tested clays within the upper 10-ft depth ranged from 7 to 33.

Table 2: Potential for Expansion

Expansion Potential	Plasticity Index Range	Liquid Limit Range
Low	PI<18	----
Medium	15 ≤ PI ≤ 28	35 ≤ LL ≤ 50
High	25 ≤ PI ≤ 41	50 ≤ LL ≤ 70
Very High	PI > 35	LL > 70

FOUNDATION RECOMMENDATIONS

The foundation system for the proposed structures must satisfy two independent engineering criteria with respect to foundation soils. First, the foundation system should be designed with an appropriate factor of safety against failure of the foundation soils. Second, the movement to the foundation system due to compression (consolidation) or expansion (swell) of the soils supporting the foundation system must be within tolerable limits for the structure.

Foundation Design

The field and laboratory data acquired indicate that competent soils were encountered within the 20-ft depth explored. Recommended foundation design parameters for a drilled pier foundation system are outlined in Table 3.

Table 3: Foundation Design Parameters

Parameter	Recommendation	Comments
Foundation Type	Drilled-and-Underreamed Pier	
Bearing Depth, ft	11	Below existing grade
Bearing Material	Lean Clay	
Net Allowable Bearing Pressure*, q_{all}		
Total Load, kips/ft^2	5.0	Includes factor of safety (F.S.) of 2
Dead Load plus Sustained Live Load, kips/ft^2	3.5	Includes factor of safety (F.S.) of 3
Lateral Resistance, $q_{lateral}$, kips/ft^2	1.0	Includes F.S. of 3; neglect upper 5 ft
Pier (Footing) Spacing	At least two underream or shaft diameters; whichever is greater	Measured center-to-center
Bell to Shaft Ratio	3:1	2:1 or Straight-sided if sloughing is encountered
Pier Reinforcement	Minimum of 0.5% to 1% of concrete area	Extend the full depth of shaft and underream

Notes: * May be increased 33% for transient loading conditions such as wind.

A bell-to-shaft ratio of 3:1 may be considered. If a 3:1 bell-to-shaft ratio in the pier excavation is not possible due to the presence of sand layer at a location during construction, a reduced bell-to-shaft ratio or straight-sided shaft with a design bell diameter will be required.

Foundation Installation

Installation considerations include test pier, water conditions, reinforcing and concrete placement, and monitoring. These topics are discussed in the following sections.

Test Pier. We recommend test piers be drilled to verify the construction feasibility of drilled-and-underreamed piers, as planned. Test piers provide beneficial information for the contractor about cleaning, sloughing, and water conditions. Installation of underreamed piers may proceed provided the bearing surface is clean before concrete placement. If test piers are drilled, at least two piers should be installed across the site. The geotechnical engineer or his qualified representative should observe test pier installation.

Test piers should be drilled with the largest diameter shaft and bell with the largest bell to shaft ratio proposed for the project. The piers should extend to the recommended bearing elevation. Piers should be located within the footprint of the building but should not be located at working pier locations. Test piers may be backfilled with concrete, cement-stabilized sand, or flowable fill. Cement stabilized sand should meet a specification similar to Item 400 of TxDOT *Standard Specifications for Construction of Highways, Streets and Bridges.*[14] Flowable fill should meet a specification similar to Item 434 of *Specifications for the Construction of Roads and Bridges within Harris County*.[15] Excavated soil should not be used to backfill test piers. For planning purposes, test piers should remain open for 2 hr to evaluate sidewall stability. Production drilling may proceed immediately after test pier installation provided no difficulty is encountered during test pier installation.

Water Conditions. Based upon the observations during the field exploration, seepage into drilled-and-underreamed piers is not anticipated during the excavation. If water in excess of about 2 in. accumulates at the bottom of the excavation, the water should be pumped out before concrete placement. Water levels vary seasonally and with climatic conditions. Therefore, the contractor should verify that groundwater will not adversely affect pier installation prior to foundation construction.

Reinforcing and Concrete Placement. Reinforcing steel should be clean and free of any bond-inhibiting coating or mud. Reinforcing steel should be properly positioned and supported to assure the design concrete cover around the reinforcing steel is achieved. Before concrete placement, the bottom of each excavation should be cleaned. If water in excess of about 2 in. accumulates at the bottom of the excavation, the water should be pumped out before concrete placement.

Concrete should be placed in pier excavations within 2 hr after excavation to reduce the potential for soil sloughing and/or perched water seepage from the excavation walls. If sloughing soils are encountered in the excavation, it may be necessary to place reinforcing steel and concrete immediately after completion of excavation. Concrete should conform to applicable requirements of ACI 301,[16] ACI 318,[17] and ASTM C 94/C 94M.[18] The concrete slump should be 5 in. ± 1 in. Concrete should be placed with a tremie to direct the concrete toward the bottom of the foundation excavation. The concrete should not be allowed to ricochet off the walls of the excavation or the reinforcing steel. Pier design and placement should comply with the requirements of ACI 318, ACI 336.3R[19] and ACI 336.1.[20]

Monitoring. Depth to competent bearing soils is based on conditions encountered at the boring locations. Significant variations can occur over short horizontal distances from the boring locations. Our representative should be present during foundation construction to verify that the proper bearing stratum has been reached, the pier dimensions are as designed, the reinforcing steel is as specified, and that the excavation is clean and dry before reinforcing and concrete placement.

Foundation Performance

The recommended depth of the pier foundation system is predicated on existing and anticipated soil and water conditions. It is generally acknowledged that the depth of seasonal moisture change or “active zone” in the Houston and surrounding areas is about 10 ft below grade. That is, the moisture content of the soils to that depth undergo moisture fluctuations caused by climatic conditions often characterized by cycles of dry then wet weather. In addition, geotechnical engineers have documented that factors other than climate can exert an influence to much greater depths. Instances of trees affecting subgrade moisture as far as 15 to 20-ft below the ground surface have been reported. The recommended bearing depth of the pier foundations will provide protection of the piers from significant influence by seasonal moisture change but will not necessarily provide protection from non-climatic factors. Discussions of climatic and non-climatic factors affecting foundation performance as well as site specific factors are presented in the Slab Performance section of this report.

FLOOR SLAB SYSTEM

The in-situ clays encountered during our field exploration program generally have low to moderately shrink/swell potential with soil moisture changes. A range of options from structurally-isolated floor slab to slab-on-grade may be considered for floor slab design. The selection of a specific option depends on risk of movement and consequential damage to the structure.

Structurally Isolated Floor Slab

The use of a structurally isolated floor slab with crawl space or void form is the most effective method to avoid the effects of moisture-related soil movement. A structurally supported floor should be selected if equipment installed on the first floor or if building elements or finishes on the first floor will be sensitive to movement and movement approaching 1 in. cannot be tolerated. If the potential for slab movement must be eliminated, we recommend the structural slab. Void forms should be used to provide at least 6-in. void beneath the slab to accommodate swelling movement of the subgrade soils. The building subgrade for a structurally isolated floor slab, if selected, should be prepared to provide a level and firm surface for placement of the collapsible void forms.

Slab-on Grade

To reduce potential movements of a slab-on-grade, we recommend a minimum 2-ft thick buffer of select fill be prepared beneath the slab. This method will also require that the concrete pavement is placed around the building perimeter with no exposed soil adjacent to the slab.

Recommendations for subgrade preparation, select fill soils, and moisture conditioning of natural soils are presented in the *Site Development Considerations* section of this report.

Grade Beams. Grade beams can be used to transfer loads to the drilled piers and to stiffen the floor slab. The depth of exterior and interior grade beams can be varied according to the structural requirements of the floor slab. We recommend the depth of the exterior grade beams be at least 2.5-ft below the lowest adjacent grade. We do not recommend the use of void boxes below grade beams because of the potential to collect free water within the void space.

Finished Grade Conditions. Slab-on-grade construction should proceed as soon as possible after completion of the building pads to prevent changes in the density and moisture conditions of the building pad soils. If construction is delayed and the fill soils are exposed to inclement weather or traffic, recompaction or moisture adjustment of the pad to at least 6-in. depth may be needed to return the soils to the specified density and moisture range. Alternately, protection of the fill soils with plastic sheeting or the placement of a protective fill layer may be considered. The plastic sheeting or protective fill layer must be removed before slab construction. The final lift should be moisture adjusted and recompacted before the floor slab is placed. Construction should not proceed on dry or saturated subgrade.

Leveling Course. A leveling course, typically bank sand, is commonly used beneath floor slabs in the Gulf Coast area. Because of the potential for a granular course to act as a conduit for water, we recommend that the leveling course be limited to about 2-in. thickness or eliminated.

Vapor Retarder. ACI 302.1R, Guide for Concrete Floor and Slab Construction[21] recommends that a vapor retarder with a permeance of less than 0.3 US perms (ASTM E 96[22]). The thickness of the vapor retarder should not be less than 10 mils, placed under the concrete floor slab on ground to reduce the transmission of water vapor from the supporting soil through the concrete slab. The vapor retarder should function as a slip-sheet to reduce subgrade drag friction. Local practice is to place the concrete floor directly on the vapor retarder. The vapor retarder should be installed according to ASTM E 1643[23]. Water that collects within the building pad area after the vapor retarder is placed should be removed before concrete placement.

Utility Bedding and Backfill. Cement-stabilized sand is a preferred bedding material for utilities within the limits of the building and paving. Cement stabilized sand should meet the requirements of Item 400.3 of the TxDOT Specifications (Cement Stabilized Backfill[24]), or equivalent. Backfill for utility trenches within and for a distance of 10 ft from the building footprint should be select structural fill or cement-stabilized sand. Material and placement criteria for structural fill were presented in the *Building Pad Preparation* section. A testing

frequency of one in-place density and moisture test for each 75 linear feet of utility trench or a minimum of two tests per lift should be included in the project specifications.

A bentonite seal should be placed within utility trenches where the trenches exit the building footprint. The seals should be located within 5-ft of the building and should be at least 2-ft in length; bentonite should not be placed under grade beams. The bentonite seal will prevent water infiltration into the utility bedding and backfill.

Slab Performance

Throughout much of the State, buildings supported on pier foundations use a slab-on-grade supported on a constructed building pad of relatively low-plasticity fill. This system is widely used and generally provides Owners with years, if not a lifetime, of acceptable performance. Nevertheless, a slab-on-grade presents a risk of poor long-term building performance.

The practice of most geotechnical engineers is to provide at least two options for the floor slab system: 1) a structural slab elevated above the site grade and supported by a deeper foundation system, and 2) a slab-on-grade. These two systems will not provide comparable assurance of performance. The structural slab relies on support by the foundations, typically piers that are placed at a sufficient depth to greatly reduce the risk of movement due to most causes of moisture fluctuation. A slab-on-grade, however, is susceptible to the inherent instability of the supporting clay subgrade, including any clay fill that will shrink or swell with any moisture fluctuation whether it occurs during or following construction.

Thus, the selection of the floor slab system should be made by the Owner with the counsel of the design and construction team to adequately advise the Owner of the risks each system presents and the relative costs. Owners select the least expensive system only to discover later that the performance of the system does not meet their expectations. This discussion is intended to assist the Owner in that decision.

Design methods for slab-on-grade construction consider only climatic factors and are based on average climatic conditions being present before construction and throughout the structure life. Maintaining balanced soil moisture conditions in the subgrade throughout the structure life reduces the potential for differential movements. Early in the life of the structure, the performance of a slab-on-grade will be affected by the soil moisture conditions at the time of construction, and they may be different than the conditions that existed during the geotechnical study. The conditions will be affected by the weather before and during construction, construction techniques, and site preparation including drainage. Steps should be taken to reduce moisture content fluctuations within the near-surface soils. Positive drainage to carry runoff away from the structure will minimize excess migration into the soils. Following construction, Owner influences begin to control soil moisture and the potential for soil movement. Rainfall, drainage, irrigation, or unintended water sources such as broken or leaking irrigation or utility lines can disrupt the post-construction moisture conditions and

cause soils to swell. Landscaping, particularly trees, and dry weather can cause shrinkage of the clays and settlement.

The amount of movement considered acceptable to many Owners is less than that tolerated by the structural members. Movements often result in cracks in brick or masonry veneer or walls; cracks in drywall; separation of the joints in trim; cracks in tile floors, walls, and countertops; and distortion to windows and doors making them difficult to open and close. While these consequences of movement are annoying and may be unsightly, they do not necessarily indicate unacceptable structural performance or failure. Movements sufficient to cause those types of distress should be anticipated if a slab-on-grade floor slab is constructed on active clay soils.

Climatic Factors. Average annual climatic conditions are documented in the area, but these conditions occur in cycles of dry weather followed by wet weather. Such cycles coupled with the time of construction have a significant influence on the long-term performance of the structure. If construction proceeds during or immediately after a dry period, the soils within the upper 5 ft to 10-ft depth are expected to be dry. When moisture is introduced, such as, through infiltration of rainfall along the slab edges, the dry soils likely will swell. Conversely, if construction proceeds after a wet period, the soils likely are wet and have experienced some swell. Although additional swell may occur, the amount of swell likely will be less than that experienced by dry soils. Shrinkage of wet soils likely will occur during dry periods.

Non-Climatic Factors. Factors unrelated to climate may result in soil movements that may be greater than those resulting only from climatic influences. The presence of many non-climatic factors is generally beyond the direct influence of the design team and is often manifested during the structure life. Non-climatic factors that affect the moisture content of the site soils include the presence of trees (existing and recently removed) and landscaping, inadequate drainage or altered drainage during the structure life, and the availability of moisture from unplanned sources such as roof drains, air conditioning drains, or below-grade utility or irrigation system leaks. Design methods cannot account for movements resulting from these non-climatic factors. Since the slab performance is related to soil properties, climatic factors, non-climatic factors, and the interaction between factors that may occur during the structure life, the actual amount of movement that can be expected over the life of the structure cannot be quantified. Non-climatic factors and their potential effects on structure performance are discussed in the following paragraphs.

Drainage. Improper drainage can have significant negative effects on the performance, especially if the structure were constructed during or immediately after a dry period. The following are general notes concerning proper drainage considerations:

- Positive drainage away from the structure must be designed, constructed, and maintained throughout the structure life.

- Landscaping systems must maintain the positive drainage away from the structure and not permit water to impound adjacent to the structure.

- Downspouts from roof drainage systems and air conditioning unit drains should be designed to discharge water away from, and preferably 10-ft or more from, the foundation.
- Drainage through drainpipes to the storm sewer is preferred for all roof drains.

- Splash blocks are not effective in draining water away from the foundation and should not be used.

- Water drains should be tied to the storm sewer and not be allowed to drain along the boundary of the building with discharge at the foundation.

Unplanned Water Sources. Following the effects of landscaping and improper drainage, unplanned water releases such as from poorly constructed or broken below-grade utility lines, pool leaks, irrigation system leaks, or other unintended or unanticipated water sources are the most prevalent causes of poor foundation and slab-on-grade performance. The sources may be particularly problematic because they often go unnoticed for weeks or months causing significant movement of the soils and significant distress to the structure. Again, design methods do not account for soils movements resulting from these non-climatic factors.

Summary. Based on our experience, a slab-on-grade is selected for well over 95% of light loaded structures. Few problems may develop when subgrade moisture conditions are affected only by climatic factors. However, where non-climatic factors over which the design team has little or no control are allowed to influence the subgrade moisture variations, the result is frequently unsatisfactory foundation performance. Therefore, the selection of a slab-on-grade carries a substantially greater risk than a structurally-isolated floor slab. The Owner should understand that with the selection of a slab-on-grade, they must accept the associated risks and consequences.

PAVEMENT RECOMMENDATIONS

We understand that the pavement for the service drives and parking lot will be concrete paving. Design, material requirements, and maintenance considerations for the pavement and subgrade preparation are discussed in the following section.

Design Considerations

ACI 330R[25] was used as the basis for rigid pavement recommendations. The recommended concrete thicknesses have performed satisfactorily under similar use conditions and have an anticipated life of 15 to 20 years provided the paving sections are based on a properly prepared and stabilized subgrade as outlined in Subgrade Preparation.

Rigid Paving Section

Paving should consist of 5-in. thick hydraulic cement concrete paving for vehicle parking areas only, 6-in. thick concrete paving for passenger vehicle driveways, and 7-in. thick concrete paving for entrance, access to dumpster pads, and truck traffic areas. The pavement subgrade can be stabilized with lime-fly ash to an 8-in. depth. Subgrade stabilizations are presented in the *Site Development Considerations* section of this report.

Concrete Mixture. The concrete paving mixture should be proportioned to achieve a compressive strength of at least 3500 lb/in.^{2} at 28 days or a minimum flexural strength of 500 lb/in.^{2} in third-point loading (ASTM C 78[26]) at 7 days.

Joints. Although the ACI 330R addresses design and construction of joints to control cracking and facilitate construction, the Guide does not consider the possible effects of joint layout on subgrade performance. The following are some general notes regarding joint placement:

- Spacing between joints should comply with Table 3.5 below from ACI 330R:

Pavement thickness, in.	Maximum spacing, ft
4, 4.5	10
5, 5.5	12.5
6 or greater	15

  Note that joint spacing should not exceed 15 ft;

- Avoid doweled expansion joint with winged retention plate on pavements less than 8 in. thick;

- Panels between joints should be square, or nearly so, with the ratio of length to width no greater than 1.5;

- Isolation or doweled joints should be installed between the building or penetrations such as inlets or manholes and adjoining pavement;

- Isolation joints should be installed at junctions of pavement with walks, curbs, or other obstructions where independence of movement is needed;

- Install a joint at any change in direction;
- Joints should be installed perpendicular to tangent along curve in pavement, preferably at point of smallest diameter;
- Reinforce re-entrant corners with three #3 diagonal or corner bars;
- Do not allow joints intersections to form a “T”;
- Avoid, if possible, longitudinal joints in or near wheel paths, particularly where heavy vehicles are expected; and
- Avoid positioning joints where water flows along the joint since joint sealant is not 100% effective in sealing moisture infiltration. Water intrusion at joints is frequently a major contributor to subgrade damage and loss of subgrade support.

Distributed Steel Reinforcement and Dowels. Local practice is to use distributed steel reinforcement in hydraulic cement concrete pavements to control opening of intermediate cracks that develop between joints in response to shrinkage, temperature differentials, uneven subgrade support, or load-related stresses. The function of the distributed steel is to hold together the crack’s fracture faces.

ACI 330R addresses distributed steel reinforcement and provides an equation to determine the required area of distributed steel. Plain smooth dowels are recommended to provide load transfer across contraction joints while permitting the joints to move. ACI 330R contains recommendations for dowel size, length, and spacing. Avoid locating a dowel closer than three times the pavement thickness from a joint parallel to the dowel.

Maintenance. During the paving life, maintenance to seal surface cracks and reseal joints within concrete paving should be performed to achieve the desired paving life. Adequate drainage should be provided to prevent or retard influx of surface water from areas surrounding the paving. Water penetration into the pavement subgrade leads to paving degradation.

Subgrade Preparation

The appropriateness of stabilizer and application rate for the subgrade, preferably, should be determined at the time of construction. However, based on the conditions encountered in our borings, a mixture of lime and fly ash appears to be the better choice for stabilization. Texas Department of Transportation (TxDOT) Specifications, Item 265,[27] should be used as procedural guide for placing, mixing, and compacting the stabilizer and the soils. A commercially available blend of 30% quicklime and 70% fly ash known as TRU-BLN® can be considered. Application rate of 48 lb/yd^2 to 8-in. depth is expected to be appropriate for

stabilization. The type and amount of stabilizer needed for stabilization will depend on the characteristics of the material used to raise grade and should be determined at the time of construction.

Stabilized soils should be compacted to at least 95% of the maximum dry density determined by standard effort (ASTM D 698[28]). The moisture content should be within a range of optimum to 3% wet of the optimum moisture content. A testing frequency of one in-place density and moisture test for each 2,500 ft² or less should be considered, with a minimum of three tests.

EXTERIOR SIDEWALKS, PATIOS, AND SURFACE PAVING

Lightly-loaded exterior sidewalks, patios, and similar concrete surface paving are very susceptible to movement when supported on an expansive subgrade. If surface paving is adjacent to building slabs, differential movement may occur between the exterior concrete paving and building slabs creating problems such as binding of outward-swinging doors and trip hazards. If surface paving is attached to the building, differential movement may cause the surface paving to move upward more that the building slab and cause reverse drainage toward the buildings.

We recommend that consideration be given to stabilizing the subgrade soils supporting sidewalks, patios and, surface paving abutting the slab in a manner similar to that for vehicular pavements or by extending the low-expansion buffer beyond the building limits to support the exterior concrete to reduce differential movement between the slab (or grade beam) and abutting exterior concrete. The buffer should extend at least 5-ft beyond the limits of the exterior concrete.

SITE DEVELOPMENT CONSIDERATIONS

To plan the construction, initial earthwork will include wet weather site condition, site drainage, stripping, proofrolling, and select fill placement and testing. Recommendations for each of these preparation items are presented in the following sections. Material specifications and placement criteria for select fill soils are also provided.

Wet Weather Site Conditions

The surficial soils are very sensitive to changes in soil moisture. If construction is initiated in the dry weather, these soils can become dry and hard. If construction is initiated just after or during a rainy season or rain events, then the surf soil can become wet and weak, unable to support construction equipment in some circumstances. There are several options that can be taken to resolve this issue:

1. Remove the wet, weak soil and replace with select fill, properly compacted, or

2. Wait until the weather dries the soil and then begin or resume construction. Tilling will help expedite the drying process only if additional rain does not occur before the soil is compacted, or

3. Use chemical additives such a lime/fly ash blend to dry the soil as well as bind the soil particles together.

If this situation of wet, weak soil due to rains and poor drainage occur, the contractor should be prepared to use an appropriate procedure to complete construction. It is suggested that one or all of these methods be placed in the bid documents so that there will be a bid item on which to base an economic judgment of the solution to fit the goals of the owner.

Site Drainage

Based on our experience with similar projects, drainage should be established early in the site development and maintained as the site grades change. Drainage could be critical if construction begins following or during a period of wet weather.

Stripping

The exposed soils within and 5-ft beyond the proposed building and paving areas should be stripped of vegetation, topsoil, debris, and other deleterious materials. For planning purposes, we recommend a stripping depth of at least 6 in. Stripped soils should not be used as select fill but may be suitable for landscaping purposes.

Proofrolling

Proofrolling is a method to evaluate the performance of the surface soils within 18-in. under load application. Proofrolling should be performed in building and paving areas using a heavy rubber-tired vehicle such as loaded dump truck, a large maintainer or pneumatic equipment weighing about 20 tons. Proofrolling operations should be observed by our representative to delineate areas that require remediation. Remediation typically involves removing and replacing the soft areas; disking, drying and recompacting the soils; or treating the soils with a chemical additive.

Select Fill Placement and Testing

Select fill for the building pad should consist of lean clay or clayey sand, free of roots, organics, and deleterious materials. The select fill should have at least 35% passing the No. 200 sieve and have a PI between 12 and 20, with a liquid limit less than 35. Representative samples of the fill materials should be tested to confirm their material characteristics.

Select fill should be placed in maximum 8-in. thick loose lifts and compacted to 95% of the maximum dry density (ASTM D 698). Over-compaction should be avoided. The moisture contents for select fill should be within 1% dry to 3% wet of the optimum moisture content. Fill placement greater than one 6-in. thick compacted lift should be tested and documented by the geotechnical engineer or an experienced soils technician. A testing frequency of one in-place density and moisture test for each 2,500 ft^2 or less per lift of fill should be considered, with a minimum of two tests per lift.

CONSTRUCTION OBSERVATION

As dictated by common practice, our geotechnical engineering analysis and recommendations are based on the information on the subsurface conditions obtained from small diameter, widely-spaced borings and our judgment based on our education and experience. Because the borings indicate subsurface conditions only at the specific locations and time and only to the depths penetrated, they do not necessarily reflect strata variations that may exist between boring locations. Therefore, the validity of the recommendations in this report is based in part on assumptions about the stratigraphy made by the geotechnical engineer. Because variations may not be evident until construction begins, Paradigm should be retained to observe foundation installation and perform construction materials monitoring and test, particularly earthwork construction, during the construction phase of the project.

Our involvement enables Paradigm's geotechnical engineer or his/her representative to monitor the foundation and earthwork activities and be available to personally evaluate unanticipated conditions, conduct additional tests, if necessary, and to provide alternative recommendations where appropriate. Therefore, our recommendations on issues such as final bearing elevation, depth of undercutting unsuitable materials, and appropriateness of subgrade stabilization agent and quantity should be considered preliminary until actual subsurface conditions are revealed during construction.

LIMITATIONS

Opinions, conclusions, and recommendations presented in this geotechnical engineering report are based on the data obtained from the field and laboratory programs, our interpretation of the data, and information received from our client and construction professionals associated with the project. If changes in the nature, design, or location of the project are made, the opinions, conclusions, and recommendations contained in this report are not valid unless the changes are reviewed by Paradigm and the recommendations included within this report are modified or verified in writing by Paradigm. If subsurface conditions different from those described are noted during construction, recommendations in this report must be reevaluated.

The scope of our services did not include environmental assessment, compliance with applicable laws, geologic faults, and wetlands. Our scope did not include the investigation, detection, or design related to the presence of any biological pollutants. The term “biological pollutants” include, and is not limited to, mold, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Design Review

Paradigm should review the design drawings and specifications before being released for construction. Our review will confirm that the geotechnical recommendations and construction criteria presented in this report have been correctly interpreted and implemented. Paradigm is not responsible for any claims, damages, or liability associated with non-compliance with or misinterpretation of the recommendations and construction criteria presented in our geotechnical report. Design review is not within the scope of services authorized in this study. We would be pleased to submit a budget for this activity.

Standard of Care

This study was performed in a manner consistent with the level of care and skill ordinarily exercised by reputable geotechnical engineers practicing contemporaneously in the local area. No warranty or guarantee, express or implied, is made or intended.

Report Reproduction

Paradigm’s report was prepared exclusively for CDA Architects and its project team for use in preparing design and construction documents. This report shall not be reproduced or used for any other purpose without Paradigm’s express written authorization. If included in construction documents, the report should be provided in its entirety with the caveat that it is included as a construction reference. Specific project requirements including options selected from this report must be obtained from the design drawings and specifications.

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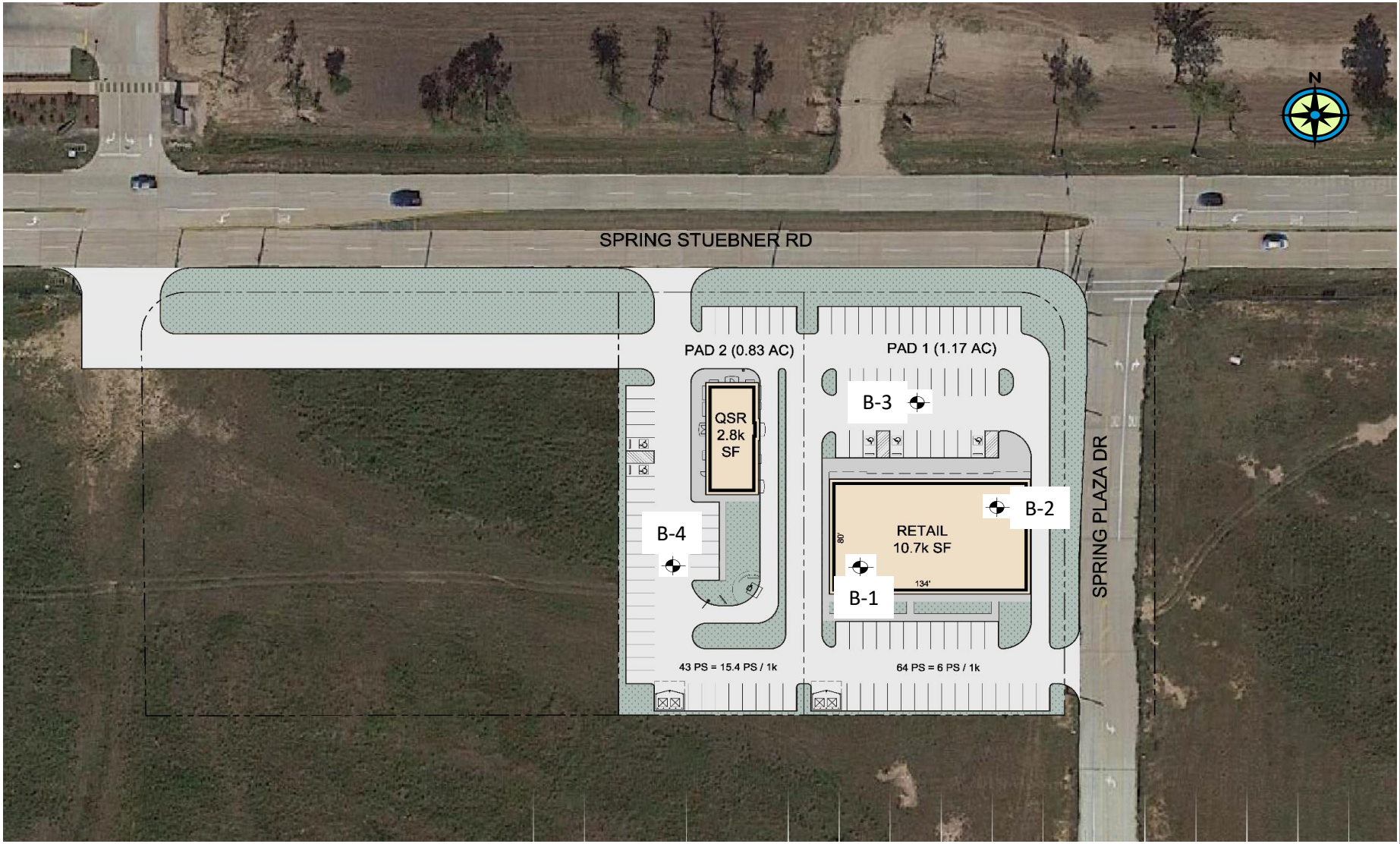

Reference: Base map provided by Client
Note: Boring locations are approximate
Legend: ⌖ Boring location

NEW RETAIL BUILDING SPRING STUEBNER RD SPRING , TEXAS	**Paradigm Consultants, Inc.** 9980 West Sam Houston Parkway South, Suite 500 Houston, Texas 77099
CDA ARCHITECTS HOUSTON, TEXAS	PROJECT NO. 19-1003 FIGURE 1 PLAN OF BORINGS

Appendix

SOIL BORING LOGS

LOG OF BORINGS

Project: New Retail Building
Spring Stuebner Rd
Spring, Texas
Client: CDA Architects
Houston, Texas

Project No.: 19-1003
Boring Number: 1
Surface Elevation:
Drilled: 1/24/19 - 1/24/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 20 ft

Borehole Water Levels:
First encountered — No water encountered
After elapsed

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
	1		P = 0.5	18.1		25	15	10						SANDY LEAN CLAY (CL): Firm, dark brown and tan.
	2		P = 2.0	13.8										SANDY LEAN CLAY (CL): Stiff to hard, reddish brown and gray.
	3													- with ferrous stains, 2 to 12 ft.
	4		P = 1.75	16.2		36	13	23						- with ferrous nodules, 2 to 4 ft.
	5													
	6		P = 4.5	13.7		47	14	33						
	7													
	8													- with ferrous nodules, 8 to 12 ft.
	9													
	10		P = 4.5	17.1					118	2590	3.02		Bulge, Multiple Shear, Vertical Fracture	
	11													
	12													
	13		P = 4.5	15.8		43	15	28	125	3850	3.59		Bulge, Multiple Shear, Vertical Fracture	
	14													
	15													
	16													
	17													
	18		P = 4.5											
	19													
	20													

Remarks:

Borehole terminated at 20-ft depth

03GEOTECH1 19-1003 BORING LOG.GPJ 05 GEOTECH.GDT 2/4/19

LOG OF BORINGS

Project: New Retail Building
Spring Stuebner Rd
Spring, Texas
Client: CDA Architects
Houston, Texas

Project No.: 19-1003
Boring Number: 2
Surface Elevation:
Drilled: 1/24/19 - 1/24/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 20 ft

Borehole Water Levels:
First encountered — No water encountered
After elapsed

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
	1		P = 3.0	12.4										SILTY SAND (SM): Dark brown.
	2		P = 0.5	16.1										SANDY LEAN CLAY (CL): Firm to hard, reddish brown and gray.
	3													- with ferrous stains and ferrous nodules, 2 to 15 ft.
	4		P = 1.5	15.3		44	14	30						
	5													
	6		P = 2.0	13.3										
	7													
	8		P = 4.5	13.5		47	16	31	119	1920	4.37		Bulge, Multiple Shear, Vertical Fracture	
	9													
	10		P = 4.5	17.1										
	11													
	12													
	13		P = 4.5+	15.2										
	14													
	15													
	16													
	17													
	18		P = 4.5+	13.5					110	4250	11.3	20	Bulge	- becoming light brown and gray, 18 to 20 ft.
	19													
	20													

Remarks:

Borehole terminated at 20-ft depth

03GEOTECH1 19-1003 BORING LOG.GPJ 05 GEOTECH.GDT 2/4/19

LOG OF BORINGS

Project: New Retail Building
Spring Stuebner Rd
Spring, Texas
Client: CDA Architects
Houston, Texas

Project No.: 19-1003
Boring Number: 3
Surface Elevation:
Drilled: 1/24/19 - 1/24/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 5 ft

Borehole Water Levels:
First encountered — No water encountered
After elapsed

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
	0		P = 1.25	11.9	59.5	22	15	7						SILT (SM): Dark brown.
	1													
	2		P = 0.5	14.8										SANDY LEAN CLAY (CL): Firm to stiff, reddish brown with ferrous stains.
	3													
	4		P = 2.0	16.3					117	1220	5.57		Bulge, Multiple Shear, Vertical Fracture	
	5													

Remarks:

Borehole terminated at 5-ft depth

LOG OF BORINGS

Project: New Retail Building
Spring Stuebner Rd
Spring, Texas
Client: CDA Architects
Houston, Texas

Project No.: 19-1003
Boring Number: 4
Surface Elevation:
Drilled: 1/24/19 - 1/24/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 5 ft

Borehole Water Levels:
First encountered — No water encountered
After elapsed

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
			P = 1.75	16.2		34	12	22						SANDY LEAN CLAY (CL): Firm to stiff, brown and gray.
	1													
	2		P = 0.75	16.6										
	3													
	4		P = 1.75	15.5					116	1540	5.69		Bulge, Single Shear, Vertical Fracture	
	5													

Remarks:

Borehole terminated at 5-ft depth

03GEOTECH1 19-1003 BORING LOG.GPJ 05 GEOTECH.GDT 2/4/19

KEY TO BORING LOG TERMS AND SYMBOLS

MATERIAL SYMBOLS


Fat Clay (CH)


Lean Clay (CL)


Sandy Lean Clay (CL)


Silty Clay (CL-ML)


Silt (ML)


Sandy Silt (ML)


Elastic Silt (MH)


Organic Clay or Silt (OH) High Plasticity


Organic Clay or Silt (OL) Low Plasticity


Peat (PT)


Well Graded Sand (SW)


Poorly Graded Sand (SP)


Silty Sand (SM)


Clayey Sand (SC)


Well Graded Gravel (GW)


Poorly Graded Gravel (GP)


Silty Gravel (GM)


Clayey Gravel (GC)


Fill


Asphalt


Base


Concrete

SAMPLER SYMBOLS


Auger


Thin-walled tube


Split barrel


Core


No recovery

STANDARD PENETRATION TEST (SPT)

N = 25	The sampler was seated 6 in. with blows from a 140-lb hammer then 25 blows were required to advance the sampler through the two 6-in. intervals of the test. The "N" value is the sum of the blows needed to penetrate the final 12 in.
12, 26, 50/3"	The sampler was seated 6 in. by 12 blows from a 140-lb hammer then 76 blows were required to advance the sampler a distance of 9 in. Full penetration of 12 in. below the seating interval could not be achieved before the 50 blow limit was recorded in one interval.
50/4"	Sampler was driven 4 in. of the 6-in. seating interval by blows of a 140-lb hammer before the 50 blow limit was reached.

WATER SYMBOLS


Depth where water was first encountered during drilling

Depth where water was encountered within the open borehole after completion of drilling (see log for elapsed time)

DESCRIPTIVE TERMS

Fine-Grained
(Major portion passing No. 200 sieve)
Silt and Clay

Consistency	Undrained Shear Strength, ksf	SPT "N" Value
Very soft	Less than 0.25	Less than 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	9 to 15
Very stiff	2.00 to 4.00	15 to 30
Hard	Greater than 4.00	Greater than 31

Coarse-Grained
(Major portion retained on No. 200 sieve)
Gravel and Sand

Description	Relative Density	SPT "N" Value
Very loose	0 to 15%	Less than 4
Loose	15% to 35%	4 to 10
Medium dense	35% to 65%	10 to 30
Dense	65% to 85%	30 to 50
Very dense	85% to 100%	Greater than 50

PCI's geotechnical engineer reviewed and compiled the field and laboratory data to develop each boring log. Each log represents our interpretation of general soil and water conditions at the boring location. Strata lines on the log may be transitional and are approximate in nature. Water levels refer only to those conditions observed at the time and location indicated.

SECTION 00 31 32.16

MATERIAL TESTING INFORMATION

The following requirements are Specifications for the testing and inspection services provided by the Engineering Laboratory. This section includes the format in which the Contractor, Architect, Engineering Laboratory and Owner will operate under during the project.

1. PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Qualifications and responsibilities of the Engineering Laboratory.

B. Responsibilities of the Contractor.

C. Testing of materials.

1.2 RELATED SECTIONS

A. Section 01410 - Testing Services

B. Section 03300 - Cast-In-Place Concrete

1.3 REFERENCES

A. ACI 318 - Building Code Requirements for Reinforced Concrete

B. ASTM C31 - Molding and Curing Test Cylinders

C. ASTM C39 - Testing

D. ASTM C42 - Cored Cylinder Tests for Concrete Indicating Deficiencies

E. ASTM C143 - Slump Tests

F. ASTM D424 - Fill Material Plasticity Index Requirements

G. ASTM D698 - Soil Moisture Density Relationship

H. ASTM D2922 - In-place Field Density Tests

I. ASTM E329 - Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel.

J. AISC - Specifications for Structural Joists using ASTM A325 or A490 bolts.

K. AWS D1.1 - Structural Welding Code - Steel

1.4 QUALIFICATIONS OF LABORATORY

A. Meet “Recommended Requirements for Independent Laboratory Qualifications,” published by American Council of Independent Laboratories.

B. Meet basic requirements of ASTM E329, “Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction.

C. Authorized to operate in the State in which the Project is located.

D. Testing equipment calibrated at reasonable intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.5 AUTHORITY AND DUTIES OF LABORATORY

A. Cooperate with Architect and Contractor; provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction.

C. Promptly notify Architect, Owner, Engineer, and Contractor of observed irregularities or deficiencies of work or products.

D. Laboratory is not authorized to:

1) Release, revoke, alter or enlarge on requirements of Contract Documents.
2) Approve or accept any portion of the work.
3) Perform any duties of the Contractor.

E. Promptly submit written report of each test and inspection: 2 copies to Architect, 1 copy to Structural Engineer, and 2 copies to Contractor. Each report shall include:

1) Date issued.
2) Project title and number.
3) Testing laboratory name, address and telephone number.
4) Name and signature of laboratory inspector.
5) Date and time of sampling or inspection.
6) Record of temperature and weather condition.
7) Date of test.
8) Identification of product and Specification Section.
9) Type of inspection or test.
10) Location of sample or test in the Project.
11) Results of test and compliance with Contract Documents.
12) Interpretation of test results that indicate unsatisfactory conditions.

1.6 CONTRACTOR’S RESPONSIBILITIES

A. Cooperate with laboratory personnel and provide access to Work or to manufacturer’s operations.

B. Deliver to laboratory adequate quantities or representative samples of materials proposed for use and which require testing.

C. Provide to laboratory preliminary design mix proposed to be used for concrete, and other materials mixes which require control by testing laboratory.

D. Notify laboratory sufficiently in advance of operations (minimum of 2 days) to allow or laboratory assignment of personnel and scheduling of tests.

E. Furnish incidental labor and facilities:

1) To provide access to work to be tested.

2) To obtain and handle samples at Project Site or at source of product to be tested.
3) To facilitate inspections and tests.
4) For storage and curing of test samples.

F. Make arrangements with laboratory and pay for additional samples and test required for Contractor's convenience

G. Pay for retests for initial tests that do not meet the requirements of the Plans and Specifications. Owner to pay for testing one sample of select fill, and Contractor for testing all subsequent samples..

H. Employ and pay for services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required when the Contractor does not agree with the initial test results.

2. PART 2 - NOT APPLICABLE

3. PART 3 - EXECUTION

3.1 TESTING OF EARTHWORK **(None This Project)**

A. Select Fill:

1) Determine the plasticity index of proposed select fill material prior to use to determine compliance with specified requirements of Section 02210, ASTM D424.

2) Establish moisture-density relationship. ASTM D698, for soil type.

3) Perform "in-place" field density test, ASTM D2922, for each lift of fill material at the following rates:

a. Building Area - one test for each 5,000 square feet of area.
b. Paving Area - one test for each 5,000 square feet of area.
c. Trenches - one test for each 100 linear feet of fill.

B. Backfilling:

Perform "in-place" field density test, ASTM D2922, for all areas backfilled after excavation or trenching at the following rates:

1) Building area - one test for each 100 linear feet of fill. (each lift)
2) Paving area - one test for each 100 linear feet of fill. (each lift)

3.2 Testing of Concrete:

A. A record of all field tests, including slump, air content, ambient and concrete temperature shall be maintained each time strength test specimens are taken.

B. Other information collected shall include location of placement in the structure, date of placement, age of testing compressive strength, type of failure if concrete fails to meet the specified compressive strength, mix specification strength required, mix design, admixtures and dosage used as required, water added at the batch plant after initial

batching, water added at job site to bring concrete to proper slump on truck arrival, and other pertinent information.

C. When deemed necessary by the Owner, all floor slabs shall be inspected for flatness using the Face Numbers Method incorporating the use of a dipstick within 24 hours of finishing.

D. Additional field tests and compression test specimens shall be made when a noticeable change in consistency or workability of the mix occurs.

E. The testing Laboratory shall report any irregularities that occur in the concrete at the job site as well as all test results to the architect and to the contractor.

F. Test specimens shall be transported to the laboratory at approximately 24 hours of age to initiate standard curing and testing procedures.

G. Test Cylinders: During progress of work, mold, cure and test specimens of each different mix placed in any one day. For each concrete placement of 10 to 100 cubic yards, make 4 compression test cylinders during pour. In addition, make one set of cylinders per 100 cubic yards when the pour exceeds 100 cubic yards. Mold and cure test cylinders in accordance with ASTM C-31. Test cylinders in accordance with ASTM C39; one at 7 days and two at 28 days. Hold one cylinder for subsequent testing, if required.

H. Slump Tests:

1) Make slump tests for each set of cylinders in accordance with ASTM C 143, and subsequent tests as deemed necessary to measure the slump.
2) Slump shall conform to limits specified.

I. Strength:

1) The specified compressive strength at 28 days is the strength that is expected to be equaled or exceeded by the averages of all sets of two consecutive strength tests, with no individual test more than 500 psi below the specified strength (ACI 318, paragraph 4.8.2.3) when specimens are cured under standard conditions.

2) Compressive strength of concrete shall be a minimum of 75% of required 28 day compressive strength prior to applying construction loads.

3) Seven day compressive strength should be in the range of 60- 70% of the specified 28 day strength. These tests are for use as a guide prior to loading the structure and as an early warning indicator of defective concrete.

4) When strength of test cylinders falls below design strength and architect has required drilling concrete core specimens, test core specimens in accordance with ASTM C42.

3.3 Erection of Metal Fabrications & Metal Stairs

A. Check 10 percent of structural bolts for proper type and installation.

B. Check for welder’s certifications, and visually check 50 percent of field welds per ASW standards.

3.4 Roofing Inspection ({**None This Project)**

A. Inspect and test as deemed necessary and in compliance with Roofing Manufacturer's warranty.

3.5 Mortar Testing **(None This Project)**

A. As deemed necessary by the Owner, the Engineering Laboratory shall sample and test the mortar and grout for compliance with Section 04100.

END OF SECTION

PART – 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

A. From time to time during the progress of the Work, the Owner may require that testing be performed to determine that materials provided for the Work meet the specified requirements. Such testing includes, but is not necessarily limited to, fill material for the site, concrete, steel, timbers and masonry.

B. Requirements for testing are described in various Sections of these Specifications. Where no testing requirements are described, but the Owner determines that testing is required, the Owner may require testing to be performed under current recognized standards for testing.

C. The Owner will select a pre-qualified, independent testing agency.

D. The Owner will pay for initial services of the testing agency as further described in this Section.

1.3 CODES AND STANDARDS

A. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

B. The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E-329-70 Recommended Practice for Inspection and Testing Agencies for Concrete and Steel Used in Construction.

1.4 PRODUCT HANDLING

A. Promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay to progress of the Work.

PART 2 – PRODUCTS

2.1 PAYMENT FOR TESTING SERVICES

A. The Owner will pay for all initial-testing services requested by the Owner. When the initial tests indicate non-compliance with the Contract Documents, the costs of all initial tests associated with that non-compliance will be deducted by the Owner from the Contract Sum.

B. When the initial tests indicate non-compliance with the Contract Documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same agency and the costs thereof will be deducted by the Owner from the Contract Sum.

2.2 CODE COMPLIANCE TESTING

A. Inspections and tests required by codes or ordinances, or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

2.3 CONTRACTOR'S CONVENIENCE TESTING

A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

PART 3 – EXECUTION

3.1 COOPERATION WITH TESTING AGENCY

A. Representative of the testing agency shall have access to the Work at all times. Provide facilities for such access in order that the agency may properly performs functions.

3.2 SCHEDULES FOR TESTING

A. By advance discussion with the testing agency selected by the Owner, determine the time required for the testing agency to perform its tests and to issue each of its findings. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing agency as required.

3.3 TAKING SPECIMENS

A. All specimens and samples for testing will be taken by the testing agency, all sampling equipment and personnel will be provided by the testing agency, and all deliveries of specimens and samples to the testing laboratory will be performed by the testing agency.

3.1 TESTING OF EARTHWORK

A. Select Fill:

1) Determine the plasticity index of proposed select fill material prior to use to determine compliance with specified requirements of Section 02210., ASTM D424.

2) Establish moisture-density relationship. ASTM D698, for soil type.

3) Perform “in-place” field density test, ASTM D2922, for each lift of fill material at the following rates:
   a. Building Area - one test for each 5,000 square feet of area.
   b. Paving Area - one test for each 5,000 square feet of area.
   c. Trenches - one test for each 100 linear feet of fill.

B. Backfilling: Perform “in-place” field density test, ASTM D2922, for all areas backfilled after excavation or trenching at the following rates:
   1) Building area - one test for each 100 linear feet of fill. (each lift)
   2) Paving area - one test for each 100 linear feet of fill. (each lift)

3.2 Testing of Concrete:

A. A record of all field tests, including slump, air content, ambient and concrete temperature shall be maintained each time strength test specimens are taken.

B. Other information collected shall include location of placement in the structure, date of placement, age of testing compressive strength, type of failure if concrete fails to meet the specified compressive strength, mix specification strength required, mix design, admixtures and dosage used as required, water added at the batch plant after initial batching, water added at job site to bring concrete to proper slump on truck arrival, and other pertinent information.

C. When deemed necessary by the Owner, all floor slabs shall be inspected for flatness using the Face Numbers Method incorporating the use of a dipstick within 24 hours of finishing.

D. Additional field tests and compression test specimens shall be made when a noticeable change in consistency or workability of the mix occurs.

E. The testing Laboratory shall report any irregularities that occur in the concrete at the job site as well as all test results to the architect and to the contractor.

F. Test specimens shall be transported to the laboratory at approximately 24 hours of age to initiate standard curing and testing procedures.

G. Test Cylinders: During progress of work, mold, cure and test specimens of each different mix placed in any one day. For each concrete placement of 10 to 100 cubic yards, make 4 compression test cylinders during pour. In addition, make one set of cylinders per 100 cubic yards when the pour exceeds 100 cubic yards. Mold and cure test cylinders in accordance with ASTM C-31. Test cylinders in accordance with ASTM C39; one at 7 days and two at 28 days. Hold one cylinder for subsequent testing, if required.

H. Slump Tests:
   1) Make slump tests for each set of cylinders in accordance with ASTM C 143, and subsequent tests as deemed necessary to measure the slump.
   2) Slump shall conform to limits specified.

I. Strength:
   1) The specified compressive strength at 28 days is the strength that is expected to be equaled or exceeded by the averages of all sets of two consecutive strength tests, with no individual test more than 500 psi below the specified strength (ACI 318, paragraph 4.8.2.3) when specimens are cured under standard conditions.
   2) Compressive strength of concrete shall be a minimum of 75% of required 28 day compressive strength prior to applying construction loads.
   3) Seven day compressive strength should be in the range of 60- 70% of the specified 28 day strength. These tests are for use as a guide prior to loading the structure and as an early warning indicator of defective concrete.
   4) When strength of test cylinders falls below design strength and architect has required drilling concrete core specimens, test core specimens in accordance with ASTM C42.

3.3 Erection of Structural Steel

A. Check 10 percent of structural bolts for proper type and installation.

B. Check for welder's certifications, and visually check 50 percent of field welds per ASW standards.

3.4 Roofing / Deck Inspection

A. Inspect and test as deemed necessary and in compliance with Roofing Manufacturer's warranty.

END OF SECTION

SECTION 00 41 13

BID FORM

TO: Mr. Shaun Vembutty
Ashton Grey Development
3 Sugar Creek Center, Suite 100
Sugar Land, Texas 77478

BID PROPOSAL FOR:
10,720 SF Retail Shell Building and Associated Site Work Improvements
Spring Stuebner @ Spring Plaza, Spring, Texas

1. The undersigned BIDDER proposes and agrees, if this Bid is Accepted, to enter into an agreement with OWNER, in the form indicated in the Bidding Documents, to perform and furnish all General Construction Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Bidding Requirements. This Bid will remain subject to acceptance for thirty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Documents within fifteen days after receipt of the Agreement from Owner.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

   a. BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

      No: _____ _____ _____ _____
      Dated: _____ _____ _____ _____

   b. BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

   c. BIDDER has given ARCHITECT notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ARCHITECT is acceptable to BIDDER.

   d. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm, or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

4. BIDDER will complete the Work for the lump sum of:

   Base Bid _____ Dollars ($_____)
   (Use words) (Figures)

5. ALTERNATES

ALTERNATE NO. 1 – G.C. to bid all work associated with installing 60 Mil TPO in lieu of Modified Bitumen Roofing.

ADD/(DEDUCT): $ _____

6. UNIT PRICES: If the items listed below are added or the required quantities are increased or decreased by Change Order, the adjustment unit prices set forth below shall apply to such added, increased, or decreased quantities.

Unit Price No. 1: Single 3070 Aluminum entrance door:

(Prior to storefront installation)

_____ Dollars ($_____ Ea.)

(After storefront installation)

_____ Dollars ($_____ Ea.)

Unit Price No. 2: Double 3070 Aluminum entrance doors:

(Prior to storefront installation)

_____ Dollars ($_____ Ea.)

(After storefront installation)

_____ Dollars ($_____ Ea.)

Unit Price No. 3: 3070 Hollow metal door and frame:

_____ Dollars ($_____ Ea.)

Unit Price No. 4: Cut and prepare 3070 opening in concrete tilt-up wall panel for hollow metal door and frame.

_____ Dollars ($_____ Ea.)

Unit Price No. 5: Construct a Non-Bearing One-Hour Rated Wall – UL #U419 – One layer of 5/8" Type "X" Gyp. Board on 6" Metal Studs at 16" O.C. to U/S of Metal Deck. Fill all voids with

appropriate Fire Stopping Material. Include Sound Batt Insulation within wall. Location is to be determined. The wall is to run on the interior from front to rear.

_____ Dollars ($_____Ln.FT..)

7. BIDDER agrees that the Work will be Substantially Complete within the stated calendar days in Bid Form after the date of commencement of the Work.

8. PERMITS AND FEES: All permit and inspection fees, and all temporary and permanent connection, tap, and permit fees and charges due utility companies, and all other fees, charges, and other monies due to utility companies, local authorities, and other authorities having jurisdiction shall be paid by The Owner. Contractor shall coordinate with authorities.

WORK WILL BE SUBSTANTIALLY COMPLETE IN _____ CALENDAR DAYS AFTER THE DATE OF COMMENCEMENT OF THE WORK.

SIGNED: _____

_____

_____

Address

_____

City State Zip Code

Seal if a Corporation

Bidder's Initials_____

SECTION 00 43 21

ALLOWANCE FORM

1. PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing handling and processing allowances.

1) Selected materials and equipment, and in some cases, their installation re shown and specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. Additional requirements, if necessary, will be issued by Modification and/or Change Order.

B. Types of allowances required include the following:

1) Lump sum allowances.
2) Unit-cost allowances.

C. Allowances may be listed in the specification sections in addition to any listed in this Section.

D. Unless noted otherwise, allowance amounts shall be for the purchase and delivery of the product only, F.O.B. jobsite. Include unloading, protection, handling, assembling, coordinating, installation and connecting in the bid price.

E. Include the allowance amount in the Base Bid and retain it within the Contract Sum. The administration will be as directed by the Architect. Adjustments will be documented by Change Orders.

1.3 SELECTION AND PURCHASE

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

1) When requested by the Architect, obtain proposals for each allowance for use in making final selections; include recommendations that are relevant to performance of the Work.

2) Purchase products and systems as selected by the Architect from the designated supplier.

1.4 SUBMITTALS

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

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

1.5 UNUSED MATERIALS

A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.

B. Where it is not economically feasible to return unused material for credit and when requested by the Architect, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

2. PART 2 – PRODUCTS (Not Applicable)

3. PART 3 – EXECUTION

3.1 INSPECTION

A. Inspect products covered by an allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

A. **See Bid Form for requested Alternates.**

END OF SECTION

SECTION 00 43 22

UNIT PRICES FORM

PART – 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for unit prices:

1. A Unit Price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deleted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.

2. Unit Prices include all necessary labor, material, overhead, profit, and applicable taxes to provide and install the item(s) for which a unit price is requested.

3. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Specifications.

B. Schedule: A “Unit Price Schedule” is included in the Bid Form.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 00 11 16

INVITATION TO BID

1. PROJECT:

Ashton Grey Development is accepting bids from select qualified contractors for the construction of a 10,720 SF Retail Shell Building and Associated Site Work. Work to include but not limited to; concrete, structural steel, roofing, insulation, masonry, EIFS, joint sealants, hollow metal door & frames, hardware, aluminum storefront, glass & glazing, painting, plumbing & electrical, etc... as shown on the contract drawings and described in these specifications.

2. PROJECT SCHEDULE:

The project schedule is as follows:

Plans and Specifications Complete	02/13/19
Site Open for Inspection	Daylight Hours
Bids Due	March 19th, 2019 @ 2:00 P.M.
Bid Awards	Within 14 Days of Bid Due
Construction Begins	Within 14 Days of Bid Awards

SECTION 00 62 76

APPLICATION FOR PAYMENT FORM

Contractor shall include the following information with submission of Applications for Payment:

- List Names, Addresses and Phone Numbers of major Subcontractors and Suppliers.
- Updated Construction Progress Schedule.
- Partial Lien Release (or Final Lien Release if applicable) and Sworn Statement from Contractor.
- Partial Lien Releases (or Final Lien Releases if applicable) from major Subcontractors and Suppliers from the preceding application for payment.
- All Lien Releases for both Contractor, major Subcontractors and Suppliers are to contain a statement of the contract amount, the amount of any Change Orders written on the original contract and the revised current contract amount. This information can be provided as an attachment to the Lien Release form.
- A set of As-built plans is to be submitted with the Final Application for Payment.
- In the event that a Contractor, Subcontractor, or Supplier lien is filed against this project, the Owner will withhold from the Application for Payment, an amount equal to one and one-half (1-1/2) times the amount of each claim; provided, however, as each claim is released of record or bonded against and satisfactory evidence of such is delivered to the Owner, withheld funds will be released.

INSTRUCTION SHEET
APPLICATION FOR PAYMENT

A. GENERAL INFORMATION:

AIA Document G702 (attached), Application and Certificate for Payment, is to be used in conjunction with AIA Document G703 (attached), Continuation Sheet. These documents are designed to be used on a project where a Contractor has a direct Agreement with the Owner/Agent.

B. COMPLETING THE G702 FORM:

After the Contractor has completed AIA Document G703, Continuation Sheet, summary information should be transferred to AIA Document G702, Application and Certificate for Payment.

The Contractor should sign the form, have it notarized and submit it, together with G703, to Owner/Agent.

Owner/Agent should review it and, if it is acceptable, complete the Architect's Certificate for Payment on this form. The completed form should be forwarded to the Owner/Agent.

C. COMPLETING THE G703 FORM:

Heading: Complete the information here consistent with similar information on AIA Document G702, Application and Certificate for Payment.

Columns A, B & C: These columns should be completed by identifying the various portions of the project and their scheduled value consistent with the schedule of values submitted to the Owner/Agent at the commencement of the project or as subsequently adjusted. The breakdown may be by sections of the Work or by Subcontractors and should remain consistent throughout the Project. Multiple pages should be used when required.

Column C should be subtotaled at the bottom when more than one page is used and totaled on the last page. Initially, this total should equal the original Contract Sum. The total of column C may be adjusted by Change Orders during the project.

Column D: Enter in this column the amount of completed Work covered by the previous application. This is the sum of columns D and E from the previous application. Values from column F (Materials Presently Stored) from prior payments should not be entered in this column.

Column E: Enter here the value of Work completed until the time of this application, including the value of materials incorporated in the project which were listed on the previous Application and Certificate for Payment under Materials Presently Stored (column F).

Column F: Enter here the value of Materials Presently Stored for which payment is sought. The total of the column must be recalculated at the end of each pay period. This value covers both materials newly stored for which payment is sought and materials previously stored which are not yet incorporated into the Project. Mere payment by the Owner for stored materials does not result in a deduction from this column. Only as materials are incorporated into the Project is their value deducted from this column and incorporated into column E (Work Completed This Period).

Column G: Enter here the total of columns D, E and F. Calculate the percentage completed by dividing column G by column C.

Column H: Enter here the difference between column C (Scheduled Value) and column G (Total Completed and Stored to Date).

Column I: This column is normally used only for contracts where variable retainage is permitted on a line-item basis. It need not be completed on projects where a constant retainage is withheld from the overall contract amount.

Change Orders: Although Change Orders could be incorporated by changing the schedule of values each time a Change Order is added to the Project, this is not normally done. Usually, Change Orders are listed separately, either on their own G703 form or at the end of the basic schedule. The amount of the original contract adjusted by Change Orders is to be entered in the appropriate location on the G702 form.

D. MAKING PAYMENT:

The Owner/Agent should make payment directly to the Contractor based on the amount certified by the Owner/Agent on AIA Document G702, Application and Certificate for Payment. The completed form contains the name and address of the Contractor. Payment should not be made to any other party unless specifically indicated on this form.

SECTION 00 65 19.16

AFFIDAVIT OF RELEASE OF LIENS FORM

GENERAL CONTRACTOR'S PARTIAL RELEASE OF LIEN

For and in consideration of * $_____, the receipt and sufficiency of which are hereby acknowledged, when the amount due and indicated on the partial Request of Payment has been received, the undersigned being duly sworn deposes and says that all labor, material, and services included in this and all previous payments have been fully paid and indebtedness discharged and furthermore does hereby waive, release, and relinquish any and all claims, demands, and right of lien for all work, labor, material, machinery, equipment, fixtures, and services performed and furnished for the premises built for Owner hereinafter described, to-wit:

_____

up to and including_____ , 20_____.

IN WITNESS WHEREOF, the undersigned has caused these presents to be duly executed this _____ day of _____ , 20 _____.

_____
_____ (Name of Company)

_____By_____
_____(Signature)

_____
_____ (Title)

*____Only the amount of partial payment requested; not a cumulative to total.

_____

STATE OF)
) SS:
COUNTY OF)

Personally appeared before me this _____ day of _____, 20____, duly sworn on oath says:
That he is _____
of _____ , and that he is authorized to execute this instrument on behalf of said_____ .

My commission expires:

_____ _____
Notary Public

NOTARY SEAL

SECTION 00 65 19.16

AFFIDAVIT OF RELEASE OF LIENS FORM

GENERAL CONTRACTOR'S FINAL RELEASE OF LIEN

Date:

The Request for Payment submitted herewith contains a request for $_____ which sum is due the subcontractors and materialmen and for $_____ which sum is due the principal contractor herein for the week performed under the Project.

Affiant further stated all payroll taxes or contributions imposed upon the affiant by statute or law has been paid.

Affiant further stated that all the foregoing is true and complete to the best of his knowledge, information and belief.

Further affiant saith not.

_____
(Signature)

_____
(Title)

_____
(Company)

STATE OF _____)
) SS:
COUNTY OF _____)

_____ Before me, A Notary Public, in and for the State of _____, came _____, by me known, and made oath that he is _____ of _____ and that he has read the foregoing affidavit and subscribed the same and that he knows it to be true to the best of his knowledge, information and belief.

My commission expires:

_____ _____
Notary Public

Notary Seal

SECTION 00 70 00

CONDITIONS OF THE CONTRACT

1.0 GENERAL CONDITIONS

A modified AIA Document A201 General Conditions of the Contract for Construction, 2007 Edition shall constitute the General Conditions between the Owner and Contractor. It will be made available to the successful bidder after bids are received.

SECTION 00 73 19

HEALTH AND SAFTEY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.2 GENERAL

A. Contractors are required to observe all Job Site Safety Rules. The Owner will not permit any person or organization to jeopardize the safety or well-being of any employee or invitee on premises because of the willful disregard or negligence of sound, established safety rules. The following safety rules present a minimum outline of conditions that must be adhered to while performing work. In addition all other Federal, State, local, and O.S.H.A. safety rules are to be observed.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 Aisles and Passageways

A. Where mechanical handling equipment is used, sufficient safe clearance shall be allowed for aisles, at loading docks, through doorways and wherever turns or passage must be made.

B. Aisles and passageways used by mechanical equipment shall be kept clear and in good repair with no obstruction across or in aisles that could create hazards.

C. Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, or any other circumstances where a person could fall from one level to another.

3.2 Chains, Cables, Ropes, Hooks, Etc.

A. Chains, cables, ropes, hooks, etc. including those on overhead and gantry cranes, shall be visually inspected daily for deformation cracks, excessive wear, twists, stretch, etc., and if found defective shall be replaced or repaired.

B. All U-bolt wire rope clips on hoist ropes on overhead and gantry cranes shall be installed so that the U-bolt is in contact with the dead end (short or non-load carrying end) of the rope.

C. Clips shall be installed in accordance with the clip manufacturer's recommendation. All nuts on newly installed clips shall be retightened after one (1) hour of use.

3.3 Cylinders, Compressed Gas, Used in Welding

A. Compressed gas cylinders shall be kept away from excessive heat, shall not be stored where they might be damaged or knocked over by passing or falling objects, and shall be stored at least twenty (20) feet away from highly combustible materials.

B. All compressed gas cylinders shall be secured by chains or other approved means to prevent accidental toppling.

C. Where a cylinder is designed to accept a valve protection cap, caps shall be in place except when the cylinder is in use or is connected for use.

D. Acetylene cylinders shall be stored and used in a vertical, valve-end-up position only.

E. Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease) a minimum distance of twenty (20) feet or by a non-combustible barrier at least five (5) feet high having a fire-resistance rating of at least one-half (1/2) hour.

3.4 Electrical Wiring

A. Temporary wiring shall not contain open splices. All splices shall be insulated and protected from accidental contact with any materials that could become energized through such contact.

B. Any temporary wiring shall be routed overhead in such manner that it cannot be accidentally damaged or the integrity of such wiring be compromised.

C. All temporary wiring shall be taken out of service and removed when the work is completed.

D. All temporary wiring shall be disconnected from the power source at the end of the work shift.

3.5 Fire Protection

A. Portable fire extinguishers suitable to the conditions and hazards involved shall be provided and maintained in an effective operating condition. A minimum of one (1) 10 lb. fire extinguisher shall be available in each area where work is being performed.

B. Portable fire extinguishers shall be conspicuously located and mounted where they will be readily accessible. Extinguishers shall not be obstructed or obscured from view.

3.6 Flammable Liquids Incidental to Primary Task

A. Flammable liquid storage is prohibited in all areas of the Project Building.

B. Flammable liquids incidental to a particular task must be kept in approved, covered, safety containers and only in that quantity required for use on that specific shift.

3.7 Floor Openings and Open Sides

A. Every floor, open-side floor, or platform on every floor level shall be appropriately guarded per O.S.H.A. standards.

3.8 Head Protection

A. Head protection equipment (safety helmets) shall be worn when and where there is a possible danger of head injuries from impact, flying or falling objects or electrical shock.

B. Contractor shall provide a quantity of spare safety helmets at the project site. These spare safety helmets shall be maintained in a clean and sanitary manner, for use in emergencies, for the Project Engineer and for the casual visitors.

C. Areas which require head protection (safety helmets) shall be identified with appropriate signage.

3.9 Ladders, Portable

A. Stepladders shall be equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in the open position.

B. Ladders shall be inspected frequently and those that have developed defects shall be withdrawn from service.

C. Non-self-supporting ladders shall be erected on sound base at a minimum 4 to 1 pitch and placed to prevent slipping.

D. The top of a ladder used to gain access to a roof must extend at least three (3) feet above the roof level and be adequately secured to prevent slipping.

E. The top platform of a stepladder shall not be used as a step.

3.10 Storage

A. All stored materials stacked in tiers shall be stacked, blocked, interlocked and limited in height so that the pile is secure against sliding or collapse.

B. Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion or pest harborage. Vegetation control shall be exercised where necessary and required by the Project Engineer.

3.11 Trash

All sweepings, solid or liquid wastes, refuse and garbage shall be removed in such a manner as to avoid creating a menace to health and safety and as often as necessary to maintain good sanitary conditions. This shall include a "sweep-up" and removal of the debris from the work areas and buildings at least once a day at the end of the work shift.

3.12 Welding - General

A. Welding equipment shall be selected as being proper to perform the work intended and shall be properly installed. Employees designated to operate welding equipment shall be properly instructed and qualified to operate the equipment.

B. Proper shielding and eye protection to prevent exposure of personnel from welding hazards shall be provided.

C. Proper precautions (isolating welding and cutting, removing fire hazards from vicinity, providing a fire watch, etc.) for fire prevention shall be taken in areas where welding or other "hot work" is being accomplished. At least one (1) fully charged portable fire extinguisher shall be provided as part of the approved welding equipment.

D. All valves on tanks shall be shut off and lines bled at the conclusion of the task.

E. Electrode lead cables shall be frequently inspected. Cables with damaged insulation or exposed bare conductors shall be replaced.

3.13 All O.S.H.A. standards applicable to the project, methods and location must be followed. Any noticed infractions or violations of these standards will be brought to the attention of the person in charge for immediate correction.

END OF SECTION

SECTION 01 11 00

SUMMARY OF WORK

The intent of the Contract Documents is to provide a complete functioning structure or installation as indicated.

The transportation, unloading, storing, erection or installation, testing and making operable of all parts of the Project shall be included under this Contract.

Certain material and equipment items (Shown on the drawings and/or enumerated in the specifications) are regularly and usually furnished by Tenant. All such indicated items will be delivered to the site of the Project by Tenant, and shall be installed by the Contractor. Contractor shall receive, unload, store, handle on the job site, and be responsible for all such materials and equipment.

Pad preparation for the building is as indicated and the Geotechnical Investigation Report and is within the scope of this project. Refer to the attached specification section containing the Geotechnical Investigation Report for further information.

END OF SECTION

SECTION 01 14 13

ACCESS TO SITE

The Owner shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide facilities for observation thereof.

1. If the laws, ordinances, rules or regulations of any public authority, the specifications or the Owner's instructions require any work to be specially tested or approved, the Contractor shall give the Owner notice of its readiness in time to permit Owner to observe such tests or to inspect the same prior to the time for giving such approval.

2. Access Guidelines

2.1 Contractor shall provide for access to the work at all times for the Owner and the Architect and/or their representatives.

2.2 No portion of the work shall be excluded from such access as stated in number 1 above.

2.3 Contractor shall provide proper facilities for access and observation by the above persons, as well as any and all applicable city and county inspection authorities/officials.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

1.0 Contract Documents

1.1 Contractor shall be furnished with one Digital PDF version of Drawings and Specifications.

1.2 The Contractor shall keep one set of all Drawings and Specifications available at the site, in good order, available to the Owner.

1.3 Any additional copies of above required by the Contractor will be available through the Architect.

1.4 Additional instructions and detail drawings as may be required to fully explain the work will be furnished during the course of the job.

1.5 Anything mentioned in the Specifications and not on the Drawings or vice versa, shall be considered as mentioned on both the Specifications and the Drawings.

1.6 In case of discrepancies between Contract Documents, the Agreement shall take precedence over the Specifications, and the Specifications shall in turn take precedence over the large-scale Details, and the latter over the small scale Plans. The Contractor shall report all discrepancies to the Architect.

1.7 Figures shall have precedence over scaled measurements and details over general drawings.

2.0 Record Drawings

2.1 Upon completion of the Project, the Contractor shall provide the Owner with record drawings of all site utility lines or conduits which are in variance with the Contract Drawings.

2.2 Record drawings shall also be furnished for relocated piping or conduit within the Building from that shown on the Contract Drawings.

3.0 Shop Drawings / Submittals

3.1 The Contractor shall thoroughly check and pass upon all shop drawings and schedules to see that they conform to the requirements of the Owner's Drawings and Specifications.

3.2 All structural steel and joists shop drawings shall be sent to the office of the Structural Consulting Engineer for review and approval. The M.E.P. shop drawings shall be sent to the office of the M.E.P. Consulting Engineer for review and approval. The Architectural submittals shall be sent directly to the Architect. All Submittals will be returned to the Architect and forwarded to Contractor and Owner.

3.3 The Contractor, upon receipt of shop drawings and/or schedule, shall forward sufficient copies for applicable Engineer, the Architect, and the Owner to keep a record copy and return any extra copies to the Contractor. If an insufficient number of submittals is submitted, the contractor may not receive a reviewed copy.

3.4 Shop Drawings must be submitted on the following items (when applicable) in sufficient time to allow two weeks for review without inhibiting the project schedule. This is a minimum list of required submittals and should not be interpreted as a complete list of required submittals. Any items where submittals are requested in the Drawings or Specifications should also be submitted.

DIVISION 03000 - Non-Slip Grit Products, Hardening Compounds, Sealing Compounds, Curing Compounds, Concrete Mix Designs (for Slabs, Footings, walls, paving, a and curbs), Tilt-wall shop drawings (with rebar, embed plates, inserts, and openings)

DIVISION 04000 - Mortar Mix, Grout Mix, Masonry Veneer Data and Samples, Glass Block and Mortar Data and Samples, CMU data and samples, Masonry Accessories and Reinforcing, Wall Ties, Masonry Cleaner, Cast Stone Shop Drawings, Sealers for Masonry

DIVISION 05000 - Heavy and Light Gauge Studs, Tracks, Light Drywall Products, Metal Fabrications, Metal Stairs and Railings, Cable Railing Drawings and Data, Anchor Bolts (with plans), Reinforcing, Joist and Metal Decking, Struct. Steel, Rebar

DIVISION 06000 - Plywood Sheathing, Gypsum Sheathing, Accessories, Paneling Samples and data, Plastic Laminate Samples

DIVISION 07000 - Waterproofing compound, Waterstop material, Flashing Adhesive, Mastic Damproofing, Water Repellant Treatment Data, Insulation Data, EIFS Data and Samples with applicable Shop Drawings, Roofing Membrane and Accessories, Sheet Metal Drawings and Data, Sealants, Joint Materials

DIVISION 08000 - Metal Doors and Frames Data, Aluminum Doors and Frames Data, Access Doors and Panels, Storefront System Drawings and Data, Door and Finish Hardware Schedules and Data, Glass Data

DIVISION 09000 - Ceiling Grid Data, Ceiling / Wall Reveals, Backerboard, Gypsum Products, Wall Tile Samples with Grout, Floor Tile Samples with Grout, Tile Adhesive Data, Ceiling Panel Data, Ceiling Accessories, Resilient Flooring Samples and Data, Cove Base Samples and Data, Adhesive Data, Stair Tread Samples and Data, Carpet Samples and Data, Paint Colors and Manufacturer Data, FRP Samples and Data, Adhesive Data, Accessories

DIVISION 10000 - Toilet Partition Drawings and Data, Finish Samples, Data for all Toilet Accessories, Any other Specialties

DIVISION 14000 - Elevator Data and Drawings, Finish Samples

DIVISION 15000 - Roof Top Equipment and curbs, Fans, Hoods, Plumbing Fixtures, Water Heaters, Plumbing Pipe material, Ductwork and insulation, Diffusers and Grilles, Fire Protection Systems

DIVISION 16000 - Switchgear, Panelboards, and Transformers, Light Fixtures and Lamps, Energy Management Systems, Wiring Devices, Conduit and Wire, Disconnect Switches, Starters, and Contractors

3.5 Where items deviating from the Specifications and/or Drawings have been approved by the Owner from the Official Substitution Sheet or under the provisions of the “Approved Equal” clause and process, shop drawings for these substituted items shall be submitted to the Owner for approval before fabrication. The Contractor shall submit at least five (5) copies of each drawing or schedule marked “For Approval.” The Architect will retain one

(1) copy thereof. The Contractor shall make any corrections required and forward two (2) corrected copies marked “Final” to the Owner.

3.6 Approval by the Owner or Contractor of shop drawings and/or schedules shall not relieve the Contractor of any responsibility for deviations from the Owner’s Drawings and Specifications unless he has, in writing, called the Owner’s attention to such deviations at the time of submission, nor shall it relieve him from the responsibility for errors of any sort in shop drawings and/or schedules, nor from responsibility for the proper fitting and construction of the work.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

This section expands requirements regarding quality assurance and control of the installation, references, field samples, mock-ups, inspecting and testing laboratory services, and manufacturers' field services and reports described to permit direct reference from individual Product specification sections

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances

C. References and standards.

D. Mock-up.

E. Inspecting and testing laboratory services.

F. Manufacturers' field services.

1.2 RELATED SECTIONS

A. Section 00 31 32.16 – Material Testing Information

B. Section 00 60 00 – Product Requirements

1.3 QUALITY ASSURANCE - 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/Engineer 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. Perform Work 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, or disfigurement.

1.4 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/Engineer before proceeding.

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

1.5 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus 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 by date of issue current on date specified in the individual specification sections, except where a specific date is established by code.

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

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

1.6 MOCK-UP

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/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.7 TESTING SERVICES

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

B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Architect/Engineer and Owner.

C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Architect/Engineer, Contractor, and Owner indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1) Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services.
2) Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing does not relieve Contractor to perform Work to contract requirements.

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

1.8 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 and as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Owner.

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

2. PART 2 PRODUCTS

Not Used.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

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

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

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

3.2 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.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 QUALITY ASSURANCE

A) Reference Standards

1) Conform with the provisions of standards referenced in the sections of the Specifications with the same force and effect as if the Standards referenced were bound or copied directly into the section, except that:
   a) Conform with more stringent provisions when contained elsewhere in the Contract Documents; and
   b) Conform with the more stringent provision when two or more Standards are referenced; and
   c) Conform with the more stringent provision when the Standard referenced and the governing regulations differ unless the governing regulation require conformance to the less stringent provision without exception.
2) Submit for clarification and conform to the decision of the Architect when the Standard referenced:
   a) Presents options which have not specifically been selected in the Contract Documents; or
   b) Contain provisions which conflict with other provisions in the Contract Documents; or
   c) It is uncertain or not clear which if differing provisions is more stringent.
3) Conform to the provisions of the most recent issue of the Standard referenced as of the date of the Contract Documents.

B) Abbreviations and Acronyms of Organizations:
1) The designation or title of the Standards referenced contain abbreviations or acronyms for the organization issuing the Standard and are defined to mean the associated names indicated in the List of Organizations at Paragraph 1.2 (B)(3).
2) The names, addresses, and telephone numbers given in the List of Organizations are subject to change and are believed to be, but are not assured to be, accurate and up to date as of the issue date of this Section.
3) List of Organizations - Certain Standards issued by the following organizations are referenced in the Specifications. Copies may be obtained from the issuing organization.

AA Aluminum Association
900 19th Street N.W., Suite 300
Washington, DC 20006
202/862-5100

AABC Associated Air Balance Council
1518 K Street N.W., Suite 503
Washington, DC 20005
202/737-0202

AAMA American Architectural Manufacturer's Association (formerly Architectural Aluminum Manufacturer's Association)
2700 River Road, Suite 118
Des Plaines, IL 60018

312/699-7310

AAN American Association of Nurserymen
1250 Eye Street N.W., Suite 500
Washington, DC 20005
202/789-2900

AASHTO American Association of State Highway and Transportation Officials (formerly
American Association of State Highway Officials)
444 North Capitol Street, Suite 225
Washington, DC 20001
202/624-5800

ACI American Concrete Institute
P. O. Box 19150
Detroit, MI 48219
313/532-2600

ACPA American Concrete Pipe Association
8320 Old Courthouse Road
Vienna, VA 22180
703/821-1990

ADC Air Diffusion Council
230 N. Michigan Avenue, Suite 1200
Chicago, IL 60601
312/372-9800

AGA American Gas Association
1515 Wilson Blvd.
Arlington, VA 22209
703/841-8400

AHA American Hardboard Association
520 N. Hicks Road
Palatine, IL 60067
312/934-8800

AHAM Association of Home Appliance Manufacturers
20 N. Wacker Drive
Chicago, IL 60606
312/984-5800

AInA American Insurance Association
85 John Street
New York, NY 10038
212/669-040

AISC American Institute of Steel Construction
400 N. Michigan Avenue, 8th Floor
Chicago, IL 60611
312/670-2400

AITC American Institute of Timber Construction

333 W. Hampden Avenue
Englewood, CO 80110
800/525-1625

AJCHN American Joint Committee on Horticultural Nomenclature (available from the American Association of Nurserymen)

ALSC American Lumber Standards Committee
P. O. Box 210
Germantown, MD 20874
301/972-1700

AMCA Air Movement and Control Association
30 W. University Drive
Arlington Heights, IL 60004
312/394-0150

ANSI American National Standards Institute
1430 Broadway
New York, NY 10018
212/354-3300

APA American Plywood Association
P. O. Box 11700
Tacoma, WA 98411
206/565-6600

ARI Air Conditioning and Refrigeration Institute
1501 Wilson Blvd.
Arlington, VA 22209
703/524-8800

ASA Acoustical Society of America
500 Sunnyside Blvd.
Woodbury, NY 11797
516/349-7800

ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
1791 Tullie Circle, N.E.
Atlanta, GA 30329
406/636-8400

ASME American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017
212/705-7722

ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362
805/495-7120

ASSE American Society of Sanitary Engineering
P. O. Box 40362

Bay Village, OH 44140
216/835-3040

ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103
215/299-5400

AWCI-I The Association of Wall and Ceiling Industries - International
1600 Cameron Street
Alexandria, VA 22314-2705

AWI Architectural Woodwork Institute
2310 S. Walter Reed Drive
Arlington, VA 22206
703/671-9100

AWPA American Wood Preservers' Association
P. O. Box 849
Stevensville, MD 21666
301/643-4163

AWS American Welding Society
P. O. Box 351040, 550 Le Jeune Road N.W.
Miami, FL 33135
305/443-9353

AWWA American Water Works Association
6666 W. Quincy Avenue
Denver, CO 80235

BHMA Builders' Hardware Manufacturers' Association
60 E. 42nd Street, Room 511
New York, NY 10165
212/682-8142

BIA Brick Institute of America
11490 Commerce Park Drive, Suite 300
Reston, VA 22091
703/620-0010

CDA Copper Development Association
Box 1840, Greenwich Office Park 2
Greenwich, CT 06836
203/625-8210

CFR Code of Federal Regulations (available from the Government Printing Office)
N. Capitol Street (between G and H Street N.W.)
Washington, DC 20402
(material is usually first published in the Federal Registry)
202/783-3238

CISPI Cast Iron Soil Pipe Institute
1499 Chain Bridge Road, Suite 203

McLean, VA 22101
703/827-9177

CPSC Consumer Product Safety Commission
5401 Westbard Avenue
Bethesda, MD 20816
800/638-2772

CRSI Concrete Reinforcing Steel Institute
933 Plum Grove Road
Schaumburg, IL 60195
312/490-1700

EIA Electronic Industries Association
2001 Eye Street, N.W.
Washington, DC 20006
202/457-4900

EIMA Exterior Insulation Manufacturers' Association
P. O. Box 75037
Washington, DC 20013
202/783-6582

EPA Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460
202/382-2090

ETL ETL Testing Laboratories, Inc.
P. O. Box 2040
Route 11, Industrial Park
Cortland, NY 13045
607/753-6711

FAA Federal Aviation Administration U.S. Department of Transportation
800 Independence Avenue, S.W.
Washington, DC 20590
202/366-4000

FDA Food and Drug Administration U.S. Department of Health and Human Services
5600 Fishers Lane
Rockville, MD 20857
301/443-1544

FGMA Flat Glass Marketing Association
3310 Harrison, White Lakes Prof. Bldg.
Topeka, KS 66611
913/266-7013

FHA Federal Housing Administration

HUD U.S. Department of Housing and Urban Development
451 Seventh Street, S.W.
Washington, DC 20201

202/755-6422

FM Factory Mutual Engineering and Research
1151 Boston-Providence Turnpike
Norwood, MA 02062
617/762-4300

FS Government Services Administration Federal Specifications (WFSIS)
7th and D Street, S.W.
Washington, DC 20406
202/472-2205
202/472-2140

GA Gypsum Association
810 First Street N.E., Suite 510
Washington, DC 20002
202/289-5440

GCA Gunite Contractor's Association
2837 Newell Street
Los Angeles, CA 90039
213/662-5050

HI Hydronics Institute
P. O. Box 218
35 Russo Place
Berkeley Heights, NJ 07922
201/464-8200

HMA Hardwood Manufacturers' Association
2831 Airways Blvd., Suite 205, Bldg. B
Memphis, TN 38132
901/525-8221

IEEE Institute of Electrical and Electronic Engineers
345 E. 47th Street
New York, NY 10017
212/705-7900

IES Illuminating Engineering Society
345 E. 47th Street
New York, NY 10017
212/705-7926

IGCC Insulating Glass Certification Council
Route 11, Industrial Park
Cortland, NY 13045
607/753-6711

IME Institute of Makers of Explosives
1120 19th Street N.W., Suite 310
Washington, DC 20036-3605
202/429-9280

LPI Lighting Protection Institute

P. O. Box 458
Harvard, IL 60033
815/943-7211

MBMA Metal Building Manufacturers' Association
1300 Summer Avenue
Cleveland, OH 44115
216/241-7333

MCAA Mechanical Contractors Association of America
5410 Grosvenor Lane, Suite 120
Bethesda, MD 20814
301/897-0770

MFMA Maple Flooring Manufacturers' Association
60 Revere Drive, Suite 500
Northbrook, IL 60062
312/480-9138

MIA Marble Institute of America
33505 State Street
Farmington, MI 48024
313/746-5558

ML/SFA Metal Lath/Steel Framing Association
600 S. Federal Street, Suite 400
Chicago, IL 60605
312/922-6222

MSS Manufacturers' Standardization Society of the Valve and Fittings Industry
127 Park Street, N.E.
Vienna, VA 22180
703/281-6613

NAAMM National Association of Architectural Metal Manufacturers
600 S. Federal Street, Suite 400
Chicago, IL 60605
312/922-6222

NAMM National Association of Mirror Manufacturers
9005 Congressional Court
Potomac, MD 20854
301/365-4080

NAPA National Asphalt Pavement Association
Calvert Building, Suite 620
6811 Kenilworth Avenue
Riverdale, MD 20737

NCMA National Concrete Masonry Association
P. O. Box 781
Herndon, VA 22070
703/435-4900

NEC National Electric Code (from NFiPA)

REFERENCES

NECA National Electrical Contractors' Association
7315 Wisconsin Avenue
Washington, DC 20037
301/657-3110

NEMA National Electrical Manufacturers' Association
2101 L Street N.W., Suite 300
Washington, DC 20037
202/457-8400

NFPA National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
617/770-3000

NIST National Institute of Standards and NBS Technology (formerly National Bureau of Standards)
U.S. Department of Commerce
Gaithersburg, MD 20899
301/975-2000

NPA National Particleboard Association
18928 Premiere Court
Gaithersburg, MD 20879
301/670-0604

NRCA National Roofing Contractors' Association
6250 River Road
Rosemont, IL 60018
312/318-6722

NRMCA National Ready Mix Concrete Association
900 Spring Street
Silver Spring, MD 20910
301/587-1400

NSF National Sanitation Foundation
P. O. Box 1468; 3475 Plymouth Road
Ann Arbor, MI 48106
313/769-8010

NSPI National Spa and Pool Institute
2111 Eisenhower Avenue
Alexandria, VA 22314
703/838-0083

NWWDA National Wood Window and Door NWMA Association (formerly National Woodwork Manufacturers' Association)
1400 E. Touhy Avenue, #G54
Des Plaines, IL 60018
312/299-5200

OSHA Occupational Safety and Health Administration
U.S. Department of Labor

Government Printing Office
Washington, DC 20402
202/523-6091

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077
312/966-6200

PCI Prestressed Concrete Institute
175 W. Jackson Blvd.
Chicago, IL 60604
312/786-0300

PDI Plumbing and Drainage Institute
1106 W. 77th Street
Indianapolis, IN 46260
317/251-6970

PS Product Standard of NBS (now NIST)
U.S. Department of Commerce
Government Printing Office
Washington, DC 20402
202/783-3238

RIS Redwood Inspection Service
591 Redwood Highway, Suite 3100
Mill Valley, CA 94941
415/381-1304

SBCCI Standard Building Code Congress International
Southwest Regional Office
3355 Bee Caves Road, Suite 202
Austin, Texas 78746-6673
512/327-8278

SDI Steel Deck Institute
P. O. Box 9506
Canton, OH 44711
216/493-7886

SDrI Steel Door Institute
c/o A. P. Wherry and Associates, Inc.
712 Lakewood Center North
14600 Detroit Avenue
Cleveland, OH 44107
216/226-7700

SGCC Safety Glazing Certification Council
Route 11, Industrial Park
Cortland, NY 13045
607/753-6711

SIGMA Sealed Insulating Glass Manufacturers' Association

111 E. Wacker Drive
Chicago, IL 60601
312/644-6610

SJI Steel Joist Institute
1205 48th Street North, Suite A
Myrtle Beach, SC 29577
803/449-0487

SMACNA Sheet Metal and Air Conditioning Contractors' National Association
P. O. Box 70
Merrifield, VA 22116
703/790-9890

SPIB Southern Pine Inspection Bureau
4709 Scenic Highway
Pensacola, FL 32504
904/434-2611

SSPC Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, PA 15213
412/268-3327

SWI Sealant and Waterproofers' Institute
3101 Broadway, Suite 300
Kansas City, MO 64111
816/561-8230

TCA Tile Council of America
P. O. Box 326
Princeton, NJ 08542
609/921-7050

TPI Truss Plate Institute
583 D'Onofrio Drive, Suite 200
Madison, WI 53719
608/833-5900

UBC Uniform Building Code
UPC Uniform Plumbing Code
International Conference of Building Officials
5360 South Workman Mill Road
Whittier, CA 90601
213/699-0541

UL Underwriter's Laboratories
333 Pfingsten Road
Northbrook, IL 60062
312/272-8800

USBPR Federal Highway Administration (formerly U.S. Bureau of Public Roads)
Department of Transportation
400 7th Street, S.W.
Washington, DC 20024

202/626-0660

USDA U.S. Department of Agriculture
Independence Avenue (between 12th and 14th Street, S.W.)
Washington, DC 20250
202/447-8732

WCLIB West Coast Lumber Inspection Bureau
P. O. Box 23145
Portland, OR 97223
503/639-0651

WH Warnocke Hersey International, Inc.
P. O. Box 1078
Antioch, CA 94509
415/432-7344
or
539 Benfield Road
Severna Park, MD 21146
301/647-0773

WIC Woodwork Institute of California
P. O. Box 11428
Fresno, CA 93773
209/233-9035

WMMPA Wood Moldings and Millwork Producers' Association
P. O. Box 25278
Portland, OR 97225
503/292-9288

WWPA Western Wood Products Association
522 S.W. 5th Avenue, Yeon Building
Portland, OR 97204-2122
503/224-3930

SECTION 01 43 23

INSTALLER QUALIFICATIONS

The Contractor shall, within five (5) days from the date of the Agreement, furnish to the Owner the names of sub-contractors and material suppliers proposed for the principal parts of the Project and for such other parts thereof as the Owner may direct. Contractor shall not employ any sub-contractor or material supplier objected to by the Owner, and the Contract Price shall be increased or decreased by the difference in cost occasioned by the elimination of such sub-contractor or material supplier and the substitution by the Contractor of an acceptable alternate.

The term “major material supplier” as used herein shall be defined as a material supplier who is to furnish materials for the Project, the total cost of which if Five Thousand Dollars ($5,000) or more.

The Contractor shall be as fully responsible for the acts and omissions of his sub-contractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons employed directly by him.

Nothing contained in the Contract Documents shall create any direct contractual relation between any sub-contractor and the owner.

If any of the Owner’s other contractors and/or sub-contractor shall make any claim against the Owner for any damage alleged to have been caused by the Contractor, the Contractor agrees to settle such dispute promptly after notice thereof. If such other contractor and/or sub-contractor sues the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor who shall defend such proceedings at his own expense with counsel acceptable to the Owner and, if any judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and pay all costs and expenses incurred by the Owner.

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 The Contractor shall provide, at his own expense, all temporary facilities and utilities (adequate for him, all sub-contractors and all other contractors) from the commencement of the Project until acceptance by the Owner. The Owner shall be the sole judge of adequacy thereof. Specifically, the Contractor shall provide not less than the following:

1.2 The Owner reserves the right, at his own risk, to store materials or install fixtures or equipment in any or all Project buildings before acceptance of the Project and without implying thereby any acceptance of the Project.

PART 2 - UTILITIES

2.1 Water Supply:

A. Contractor will provide a temporary water supply to be located as designated for use by all Trades.

B. Contractor will pay for all water consumed in construction of the Project.

2.2 Light and Power:

A. Contractor will provide temporary light and power adequate for various building operations.

B. Contractor will pay for meter connection and for all temporary light and power consumption.

2.3 Temporary Heat:

A. Provide temporary heating equipment and fuel as required for proper installation of materials.

B. Damage caused to work and material by dampness, cold, lack of ventilation, excessive drying-out, insufficient or abnormal heat are the responsibilities of the Contractor.

C. The permanent heating equipment, if installed in sufficient time for the purpose, may be used by the Contractor at his own expense and responsibility.

D. The methods proposed for temporary heating shall be approved by the Owner.

2.4 Telephones:

A. Provide for installation of telephone service to Contractor’s field office, including multiple lines to provide 24-hour daily fax receipt and transmittal.

B. Contractor is to pay for all costs of phone installation, maintenance and usage.

PART 3 - OFFICES

3.1 Contractor shall provide and maintain office facilities for proper execution of the construction of this Project.

A. Office facility building is to be watertight, heated, lighted and painted. Contractor is to provide with windows, lockable doors, benches, drawing racks, tables, telephones, facsimile machine, etc., as required for proper supervision.

B. Building to be located by Contractor as directed by the Architect and Owner.

C. Contractor and sub-contractor may provide and maintain such other office and storage facilities on the site as required for execution of the work.

D. Contractor shall remove offices upon completion of the Contract, or earlier, if so directed by the Architect, leaving the premises clean and finished as required by the Contract.

3.2 Contractor shall provide and maintain ample sanitary toilet facilities for all workers throughout the Project.

A. Facilities to conform to all local and state sanitary codes and ordinances.

B. Toilets shall be enclosed, weathertight, ventilated, and maintained in a clean, neat and sanitary condition at all times.

C. Remove temporary toilet facilities upon completion of the work, or as directed by the Architect or Owner.

PART 4 - STORAGE

4.1 Contractor shall erect, maintain and use weathertight material storage facilities for the storage of materials subject to damage by exposure to the weather.

4.2 Facilities shall be well ventilated, have floors raised and maintained above ground level, and shall be kept neat and clean.

4.3 Contractor shall bear all costs of temporary storage facilities.

4.4 Contractor shall remove the storage facilities upon completion of the work, or as directed by the Owner or Architect.

PART 5 - ACCESS TO THE SITE

5.1 Contractor shall provide for access to the work at all times for the Owner and the Architect and/or their representatives.

5.2 No portion of the work shall be excluded from such access as stated in 5.1 above.

5.3 Contractor shall provide proper facilities for access and observation by the above persons, as well as any and all applicable city and county inspection authorities/officials.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

This section expands requirements regarding products, their transportation, handling, storage and protection. This section identifies product options and substitution procedures, described to permit direct reference from individual product specification sections.

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.2 RELATED SECTIONS

A. Instructions to Bidders: Product options and substitution procedures.

B. Section 00 40 00 – Quality Requirements

1.3 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

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

1.4 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

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

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

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

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

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.

1.6 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of 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 in accordance with the following article.

1.7 SUBSTITUTIONS

A. Architect/Engineer will not consider requests for Substitutions without Owner approval.

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

C. A request constitutes a representation that the Contractor:

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.
5) Will reimburse Owner, Architect and consultant fees for review and redesign services associated with re-approval by authorities.

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. Requests resulting from failure to allow sufficient time to order and receive material will not be considered.

F. Substitution Submittal Procedure:

1) Submit to the Architect five 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 proposer.
3) The Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

2. PART 2 PRODUCTS

Not Used.

3. PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

1.PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

E. Operation and maintenance data.

F. Spare parts and maintenance Products.

G. Warranties and bonds.

H. Maintenance service.

1.2 RELATED SECTIONS

A. Section 01 51 00 - Construction Facilities and Temporary Controls: Progress cleaning.

B. Section 01 65 00 - Starting of Systems: System start-up, testing, adjusting, and balancing.

C. Section 01 73 00 - Operation and Maintenance Data.

D. Section 01 74 00 - Warranties.

1.3 CLOSEOUT PROCEDURES

A. Final Inspection: Upon request from the Contractor, Owner will either proceed with inspection or advise the Contractor of unfilled prerequisites. Results of the final inspection will be the “Punch-List” for final acceptance.

B. 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/Engineer's review.

C. Provide submittals to Owner that are required by governing or other authorities.

D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

E. Document and turn over all required attic stock and tools to the Owner.

F. Submit final meter readings for utilities and coordinate transfer for future billings with the Owner.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. 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.

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

D. Replace filters of operating equipment.

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

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

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

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

1.6 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) Measured depths of foundations in relation to finish floor datum.
   2) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4) Field changes of dimension and detail.
   5) Details not on original Contract drawings.

G. Submit documents to Architect with claim for Final Application for Payment.

SECTION 01 71 33

PROTECTION OF ADJACENT CONSTRUCTION

PART – 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SURROUNDING SITE CONDITIONS AND PROTECTION

A. Prior to commencement of excavation, the Contractor, the Owner and Architect shall jointly survey those areas immediately adjacent to the project making permanent note and record of any existing damage. This record shall serve as a basis for determination of subsequent damage to this property due to damage resulting from the Contractor's operations. Such damage as noted shall be suitably marked in the area, if possible, and the official record of existing damage shall be signed by all parties making the survey. Any damage of any nature to the adjacent area, not noted in the original survey but subsequently noted, shall be reported immediately to the Owner and Architect.

1.3 BENCHMARKS

A. Prior to commencement of excavation, the Contractor shall establish Benchmarks. Elevations of these Benchmarks shall be taken prior to commencement of work and at intervals of approximately every two (2) weeks, or more often if a change in conditions is noted or suspected, during excavation and construction. The datum used to establish the elevations for these Benchmarks, shall be sufficiently distant from the site so as not to be affected by any settlement resulting from the construction operations.

B. The results of the initial elevations, and subsequent checks, shall be noted in permanent form. Any settlement noted as a result of these elevation checks shall be reported immediately to the Architect by the fastest possible means.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 74 00

CLEANING AND WASTE MANAGEMENT

The Contractor shall be responsible for clean-up during and upon completion of construction. This shall include the removal of all tools, surplus equipment, materials, debris, rubbish, etc. Premises shall be left in a clean, neat condition.

If the Contractor fails to meet the above cleanliness requirements, the Owner shall have the right to engage others to do so at the Contractor's expense.

The Project shall, in general, be turned over to the Owner in a thoroughly clean and workmanlike condition ready for the Owner's use in every respect.

The Contractor shall supply, and keep neatly maintained, a dumpster for removal of construction debris and Owner-supplied equipment and crating material.

SECTION 01 76 00

PROTECTING INSTALLED CONSTRUCTION

Protection of Work and Property from Risk of Loss

The Contractor shall protect the work, auxiliary building, structures, materials, supplies, and adjacent property from any damage. The Contractor shall provide safeguards, including but not limited to fire extinguishers and lights, barriers and enclosures around all pits, excavations, and other places of danger.

If damage (including the breakage of glass) results, in spite of these precautions, the Contractor shall repair the damage. If the damage was caused by the Owner, the Owner will pay the Contractor as outlined in Section 00 73 00 - Supplementary General Conditions - Changes In Work, but if such damage was caused by other persons, the Contractor shall pay for repair of such damage or cause the correction thereof to the Owner's satisfaction.

The Contractor shall not trespass upon or in any way disturb adjacent property without first obtaining written permission to do so from the owner of such adjacent property. The Contractor shall restore all disturbed adjacent property to its original condition as may be agreed in writing between Contractor and such adjacent owner.

The Contractor shall bear risk of glass breakage resulting from vandalism and malicious mischief risks, and shall also bear risk of loss of or damage to his equipment and tools, on the site.

The Contractor shall maintain and pay for Builder's Risk insurance (for a period of at least five days subsequent to the written acceptance by the owner of the property) in a company or companies satisfactory to the Owner in an amount of coverage at least as great as the Contract Sum and shall file certification of such with the Owner.

The provisions of this section shall in no way relieve the Contractor of liability for any loss which he would otherwise be liable.

Handling and Protection of Materials

A. The Contractor shall be responsible for the proper care, protection and handling of materials at the site. Materials, equipment and appliances stored on the premises during construction are so stored at the Contractor's risk. After erection of the structure, storage and handling shall not be done in such a way so as to overload any parts of the structure and not to damage the completed work.

B. In the case of any room or space within the building being used for storage or as a shop or paint room, the Contractor shall make good any damage and shall do all necessary cleaning and restoration arising from such use.

C. Such items as cement, lath, plaster, millwork and like materials affected by weather shall be covered and protected from damage while being transported to the site and thereafter. Damaged materials which in the judgment of the Architect cannot be suitably restored or otherwise treated to make good such damage shall be removed from the premises by the Contractor.

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

A. This section outlines procedures to be followed upon conclusion of the Work and supplements the provisions of the AIA General Conditions.

1.3 SUBSTANTIAL COMPLETION

A. When the Contractor determines that the Work or a designated portion thereof is acceptable to the Owner as substantially complete, the Contractor shall send a written notice to the Owner's representative claiming substantial completion and requesting an inspection of the Work.

B. Within a reasonable time after receipt of the Contractor's notice claiming substantial completion, the Owner's representative will make an inspection of the Work to determine the state of completion and will prepare a punch list of item(s) requiring completion or correction.

1. If during the course of his inspection, the Owner's representative determines that the Work is not substantially complete, he will discontinue the inspection and notify the Contractor that the Work does not comply with the requirements for Substantial Completion.

2. Immediately upon receipt of notice that the Work is not substantially complete, the Contractor shall proceed to correct all deficiencies and at the appropriate state of completion, send a second request for inspection to the Owner's representative.

3. After the Contractor has corrected all major deficiencies, the Architect and the Owner's representative will jointly inspect the Work.

C. Upon determination by the Architect and the Owner's representative that the Work meets the requirements of substantial completion, the Owner's representative will prepare a Certificate of Substantial Completion, AIA Document G704, for the Approval and acceptance of the Owner and the Contractor.

D. The Contractor shall prepare and submit to the Owner's representative a list of items to be completed or corrected within the time limits established in the Certificate of Substantial Completion.

E. The Owner's representative will review and amend the list of items to be completed or corrected and append the list to the Certificate of Substantial Completion.

1.4 FINAL COMPLETION

A. When the Work has been completed fully in accordance with the requirement of the Contract Documents, the Contractor shall send a written notice claiming final completion

and shall specifically note each item on the punch list as being completed or the status of any incomplete items.

B. Upon receipt of the Contractor's notice claiming final completion, the Owner's Representative will perform a final inspection, and if the Work is completed fully in accordance with the requirements of the Contract Documents, the Owner's Representative will issue a Certificate of Completion.

1.5 MANUALS, INSTRUCTIONS AND KEYS

A. The Contractor shall assemble and deliver to the Owner's representative (3) copies of printed or typewritten operating, servicing, maintenance and cleaning instructions and parts lists for all items of equipment provided as part of the Contract. Include names and addresses of equipment suppliers and manufacturers' local representative in manuals. Index manuals containing items of different equipment.

B. Important Note to Owner and Contractors: The responsible Contractor shall instruct the Owner or his representative in the maintenance and operation of plumbing and electrical equipment installed.

1.6 RELEASE OF LIENS

A. The Contractor shall deliver to the Owner a blanket release of liens covering all Work performed under this Contract, including that of Subcontractors, Sub-subcontractors, Vendors, Service Suppliers, Materials and Labor.

B. The Owner's Representative will furnish copies of AIA Document G-706 Contractor's Affidavit of Payment of Debts and Claim and of Liens for the Contractor's use.

C. The Owner's Representative will also provide copies of AIA Document G-707 Contractor's Surety Company to Final Payment unless the Owner provides other forms of this purpose.

D. The forms shall be executed by an authorized officer and notarized. All required attachments shall be included as noted on AIA Document G-706. If exceptions are listed in either AIA Document G-706 or AIA Document G-706A, the Contractor shall furnish bond satisfactory to the Owner for each exception.

1.7 GUARANTEES AND BONDS

A. The Contractor shall have Guarantees upon materials and Workmanship as required by Article 13 of the AIA General Conditions and Special Guarantees and Bonds required by the Contract Documents executed in the Owner's name.

B. Article 13 of the General Conditions is amended by adding the following hereto:

1. "All warranties received by the Contractor as to materials, appliances, and equipment furnished by or purchased by others and incorporated in the Work, shall be transferable and assignable to the Owner in such manner that same will be enforceable by the Owner".

2. Prior to making application for final payment, the Contractor shall collect and deliver all required Guarantees and Bonds to the Owner's Representatives for review and for transmittal to the Owner.

1.8 CERTIFICATE OF OCCUPANCY

A. Apply for and obtain from the Building Official a Certificate of Occupancy in the Owner's name.

B. The Certificate is to be obtained and posted as required by the Building Official prior to the final inspection by the Owner.

C. Temporary Certificate in lieu of a Certificate of Occupancy will be sufficient, as the Owner's prerequisite for his final inspection, only when his specific written approval has been obtained.

1.9 CERTIFICATES OF INSPECTION AND APPROVAL

A. The Contractor shall collect, assemble and deliver to the Owner's Representative all required Certificates of Inspection, Testing and Approval.

1.10 RECORD DRAWINGS

A. Prior to completion of the Work, the Contractor shall purchase one set of reproducible prints and transfer thereto all changes, corrections, dimensions and deviations as noted on the record drawing prints. Each sheet of the prints shall be certified as to correctness by the Contractor, and where any major portion of the Work is performed by a Subcontractor, the tracings reflecting said subcontract Work shall be properly countersigned by the Subcontractor. Certify record drawing prints as follows:

"CERTIFIED CORRECT" (3/8" high letters)
(Name of Subcontractor)

_____

By: _____

Date: _____

B. After all corrections, changes and deviations have been transferred to the prints, the Contractor shall submit the prints to the Architect for review and comments. If additional information is required, or if the drawings are incomplete, the Architect will return the prints to the Contractor for required action. When the record drawings are complete, the Contractor shall, upon notice by the Architect, submit the record drawing prints to the Architect for delivery to the Owner.

1.11 TERMINAL INSPECTION

A. Immediately prior to expiration of the one-year guarantee period, the Contractor shall make an inspection of the Work in the company of the Owner's Representative and the Owner. The Owner's Representative and the Owner shall be given not less then five (5) days notice prior to the anticipated date of terminal inspection.

B. Where any portion of the Work has proven to be defective and requires replacement repair or adjustment, the Contractor shall immediately provide materials and labor necessary to remedy such defective Work and shall prosecute such Work without delay until completed to the satisfaction of the Owner's Representative and the Owner, even

though the date of completion of corrective Work may extend beyond the expiration date of the guarantee period.

C. The Contractor shall not be responsible for correction of Work which has been damaged because of neglect or abuse by the Owner nor the replacement of parts necessitated by normal wear or use.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 78 36

WARRANTIES

A. Guarantees

1. All guarantees shall be in writing and shall be furnished to the Owner prior to final acceptance. Final acceptance shall be given in writing by the Owner upon final completion of all required work including punch list.

2. All work and materials shall be guaranteed for a minimum of one (1) year from the date of acceptance, unless specifically stated otherwise by the Specifications.

B. Warranties

No payments made to the Contractor, nor partial or entire use of the Project by the Owner, shall be an acceptance of any work not done or made in accordance with this Agreement.

The Contractor shall furnish a written warranty of all work done under this Agreement for a period of one (1) year or as otherwise indicated for longer periods of time. Such warranty shall be in the form prescribed by the Owner. The Contractor shall also furnish to the Owner all manufacturer's warranties for all equipment, appliances and fixtures specified or required and installed as a part of this Project.

The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any damage to other work resulting from such defects and/or the remedying thereof, which shall appear within the warranty period. Neither the foregoing nor any other provision in the Contract Documents, nor the time limit of any special warranty shall limit the Contractor's liability for defects from the Plans and Specifications to less than the legal limit of liability under the law of the place of building. The Owner shall give notice of observed defects within reasonable promptness.

All warranties and bonds shall be delivered to the Owner before Final Payment is made.

SECTION 03 11 00

CONCRETE FORMING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. This section includes form materials, waterstops and accessories, required to form cast-in-place concrete and maintain structural integrity until stripping.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 03 30 00 - Cast-in-Place Concrete: Supply of concrete accessories for placement by this section.

B. Section 05 50 00 - Metal Fabrications: Supply of metal fabrications for placement by this section.

C. Division 15: Supply of mechanical items for placement by this section.

D. Division 16: Supply of electrical items for placement by this section.

1.3 RELATED SECTIONS

A. Section 03 20 00 - Concrete Reinforcing.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 03 35 00 - Concrete Finishing

D. Section 03 39 00 - Concrete Curing

1.4 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ACI 347 - Recommended Practice For Concrete Formwork.

D. ANSI/ASME A17.1 - Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks

E. PS 1 - Construction and Industrial Plywood.

1.5 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

B. Forms shall be true to line and using a laser for instrument level.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347 and ACI 301.

B. Maintain one copy of each document on site.

C. Conform to applicable code for design, fabrication, erection and removal of formwork.

D. Design formwork for loads, lateral pressures and allowable stresses in accordance with ACI 347.

E. Design camber into formwork to compensate for anticipated deflection during concrete placement where necessary to maintain specified tolerances.

F. Design formwork to allow removal without damage to concrete surfaces.

G. Contractor is responsible for determining when temporary supports, shores, backshores and other bracing may be safely removed.

H. Unless otherwise scheduled or specified, formwork shall be used to form cast-in-place concrete elements.

I. Where soil is in stable enough condition that it can be shaped to a true and straight surface without caving or sloughing, the following members may be cast against neat cut excavations:

1) Unexposed sides of grade beams cast monolithically with slabs.
2) Sides of footings.

J. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the state where the Project is located.

1.7 DELIVERY, STORAGE, AND HANDLING

Utilize these procedures when void forms are included:

A. Deliver, store, protect and handle products to site avoiding damage. Store materials in accordance with manufacturers instructions with seals and labels intact and legible.

B. Deliver void forms and installation instructions in manufacturer's packaging.

C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.8 COORDINATION

A. Notify Owner and Architect at least 48 hours prior to completion of formwork so that the formwork may be observed. Reinforcing steel or concrete shall not be placed until forms have been observed.

B. Coordinate this Section with other Sections of work which require attachment of components to formwork.

C. Coordinate block-out sizes for rough openings for other work.

2. PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Framing: Kiln dried softwood lumber, PS 20

B. Smooth Forms:

1) Construct formwork with plywood; tempered, concrete-form hard board; dressed lumber with plywood or fiberboard lining; metal; plastic; or metal framed plywood-faced panel material to provide continuous, straight smooth surfaces. Form material shall be free of raised grain, torn surfaces, worn edges, patches, dents or other defects. Furnish material in largest practical sizes to minimize the number of joints. Form material shall have sufficient strength and thickness to withstand the pressure of newly placed concrete without bow or deflection.

2) Use smooth forms on interior and exterior concrete surfaces exposed to view in the completed structure, including exterior face of grade beams.

3) Unless otherwise shown or specified, as a minimum use plywood complying with U.S. Product Standards PS-1, “B-B (Concrete Form) Plywood” Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing ligible trademark or an approved inspection agency.

C. Rough Forms:

1) Construct forms of dressed or underdressed lumber free of knots, splits or other defects; plywood; metal; or other acceptable material. Material shall have sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.
2) Rough forms may be used on concrete surfaces that will not be exposed to view in completed structure unless noted otherwise.

D. Shores: Wood or adjustable metal type with bearing plates and with double wedges at bottom.

E. Carton Forms:

1) Corrugated fiberboard box forms fabricated of natural Kraft with liners an medium, completely impregnated with a polyethylene wax blend, and laminated with a waterproof adhesive. Boxes assembled with steel strappings.
2) Forms shaped to design and dimensions as indicated for formed voids.
3) Forms capable of supporting weight of concrete plus a live load of 20 psf on area

2.2 FORMWORK ACCESSORIES

A. Form Ties: Factory fabricated, adjustable length, removable or snap-off metal ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal. Provide ties so that portion remaining within concrete is at least 1-1/2 in. from outer surfaces. Provide water seal feature on ties used to form grease trap and bar screen structures.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

C. Rustications, Bevels, Chamfers: Mill from Northern White Pine, smooth and free of irregularities. Preformed PVC strips may be used for corner chamfers.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

3.PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members which are not indicated on Drawings.

F. Provide chamfer strips in forms to bevel exposed edges and corners of members. Edges of formed joints and interior corners shall not be beveled unless shown or specified otherwise.

G. Areas of floor which are to be sloped to floor drains or depressed shall be formed out and filled with sand before areas of level floor have been placed.

H. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Coat aluminum conduits, pipes and inserts embedded in structural concrete with heavy bituminous coating to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.

E. Position recessed reglets for brick veneer masonry anchors to spacing and intervals specified in Section 04 20 00.

F. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

G. Install waterstops continuous without displacing reinforcement. Heat seal joints watertight.

H. Place joint filler in expansion joints. Place bond breaker in control joints where scheduled.

I. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

J. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

B. Construct and align formwork for elevator hoistway in accordance with ANSI/ASME A17.1.

C. Camber slabs and beams 1/4-inch per 10 feet in accordance with ACI 301.

3.8 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

B. Thoroughly clean and recoat forms before reuse.

C. Do not reuse wood formwork that is worn or damaged. Do not patch formwork.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. In no case shall forms be removed in less than 7 days except:

1) Formwork for walls, sides of beams, and other parts not supporting weight of concrete may be removed after 24 hours provided that concrete has hardened sufficiently to resist damage from removal operations an provided the removal of these forms will not disturb members supporting weight of concrete.
2) Formwork under beam soffits and structural elements unless noted otherwise - 10 days.
3) Formwork at slabs - 7 days.

E. Contractor, at his option and risk, may remove formwork after 7 full days have elapsed after completion of concrete placement, provided that in-place concrete has attained 75 percent of its specified 28 days ultimate compressive strength. At the Contractor's expense, provide testing and verification of required specified concrete compressive strengths.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

This section includes reinforcing steel and required supports, for cast-in-place concrete.

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.2 RELATED SECTIONS

A. Section 03 11 00 - Concrete Forming.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 03 35 00 – Concrete Finishing: Reinforcement for concrete floor toppings.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements For Reinforced Concrete.

C. ACI SP-66 - American Concrete Institute - Detailing Manual.

D. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.

E. ANSI/ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

G. ANSI/ASTM A496 - Deformed Steel Wire Fabric for Concrete Reinforcement.

H. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

I. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.

J. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

K. ASTM A616 - Rail Steel Deformed and Plain Bars for Concrete Reinforcement.

L. ASTM A617 - Axle Steel Deformed and Plain Bars for Concrete Reinforcement.

M. ASTM A7YY04 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

N. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

O. ASTM A767 - Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.

P. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.

Q. ASTM D3963 - Epoxy-Coated Reinforcing Steel.

R. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

S. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.

T. CRSI - Placing Reinforcing Bars.

U. ASTM A884 - Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI - Manual of Standard Practice ACI 301, ACI 315-90, and ACI 318-95.

B. Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALIFICATIONS

A. Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State where the Project is located.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store steel reinforcement above ground on platforms, skids or other supports.

B. Protect reinforcing, as far as practicable, from mechanical injury, surface deterioration and oxidation caused by exposure to weather.

1.7 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

2.PART 2 PRODUCTS

2.1 REINFORCEMENT

Unless otherwise noted or indicated on the Drawings, reinforcing steel shall conform to the following:

A. Reinforcing Steel, #4 and larger: ASTM A615, 60 ksi.

B. Reinforcing Steel, #2 and #3: ASTM A615, 40 ksi.

C. Smooth Steel Bars: ASTM A615, Grade 60, or ASTM A675, Grade 70 for bars shown on the Drawings as smooth bars.

D. Welded Steel Wire Fabric: ASTM A185 furnished in flat sheets only.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed steel.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel or Stainless steel] type; size and shape as required.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice ACI 318 ANSI/ASTM A184.

B. Fabricate bars to the spaces shown on Drawings by cold bending. Bends shall conform to minimum bend diameters specified in ACI 318. Do not straighten or rebend bars without specific approval.

C. Locate splices as shown on Drawings. Where it is necessary to splice reinforcement at locations other than shown on Drawings, splices shall be approved by Engineer. Use a minimum number of splices located at points of minimum stress. Stagger splices in adjacent. Length of lap splices shall be in accordance with ACI 318 unless shown otherwise.

D. Reinforcing shall be continuous through construction joints unless detailed otherwise.

3. PART 3 EXECUTION

3.1 PREPARATION

A. Clean reinforcement free of scale, loose or flaky rust or other foreign material, including oil, mud or coating that will reduce bond to concrete.

3.2 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Interference's: If reinforcing interferes with location of other reinforcing steel, conduits or embedded items, bars may be moved within specified tolerances or one bar diameter, whichever is greater. If greater movement of bars is required to avoid interference, notify the Engineer. Do not cut reinforcement to install inserts, conduits, mechanical openings or other items without approval of Engineer.

E. Maintain concrete cover around reinforcing as follows unless otherwise shown:

Item	Minimum Coverage
Interior not exposed to weather:	
Slabs and walls	3/4 inch
Beams and girders	1-1/2 inch
Exterior formed surfaces exposed to earth or weather :	
#5 and smaller bars	1 1/2 inch

#6 thru #18 bars	2 inch

Footings:

Top	2 inch
Bottom and sides	3 inch

Surfaces cast against and permanently exposed to earth	3 inch

F. Placement in Forms:

1) Use spacers, chairs, wire ties and other accessory items necessary to properly assemble, space and support reinforcing.
2) Provide accessories of sufficient number, size and strength to adequately prevent deflection or displacement of reinforcement due to construction loads or concrete placement.
3) Use appropriate accessories to position and support bolts, anchors and other embedded items.
4) Tie reinforcing bars at each intersection and to accessories. Blocking reinforcement with concrete or masonry is prohibited.

G. Placement for Concrete on Ground:

1) Support reinforcement on chairs with sheet metal bases spaced approximately 3 feet o.c. each way. Use a minimum of one support for each 9 sq. ft. Tie supports to reinforcing bars.

H. Expansion Joints:

1) Do not extend reinforcement through expansion joint.
2) Where shown or scheduled, install smooth steel bar dowels in expansion joints. Felt wrap one end of dowels.
3) Provide polyethylene plastic slip cover over one end of dowel.

I. Welded Wire Fabric:

1) Install wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh plus 2 inches or 6 inches, which ever is larger, and lace splices with wire.
2) Do not make end laps midway between supporting beams, or directly over beams of continuous structures.
3) Offset end laps in adjacent widths to prevent continuous laps.

J. Field Bending:

1) Shape reinforcing bent during construction operations to meet requirements of the Drawings. Bars shall be cold-bent; do not heat bars.
2) Closely examine reinforcing for breaks. If reinforcing is damaged, replace, Cadweld or otherwise repair as directed by Testing Laboratory.
3) Do not bend reinforcing after it is embedded in concrete.

K. Field Cutting: Field cut reinforcing bars by shearing or sawing. Do not cut bars with a cutting torch unless approved by Architect/Engineer.

L. Welding: Welding of reinforcement bars is prohibited.

3.3 GROUTING OF REINFORCING BARS

A. When required and approved by the Architect, use approved epoxy grout for anchoring reinforcing steel to hardened concrete in accordance with grout manufacturer's instructions.

B. Drill hole in existing concrete in accordance with manufacturer's recommendations. Immediately prior to installation of the reinforcing bar, clean hole free of debris using compressed air.

C. Partially fill hole with epoxy. Use enough epoxy so that when bar is inserted, epoxy grout will completely fill hole around dowel.

D. Dip end of reinforcing bar in epoxy and install into partially filled hole.

3.4 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 00 31 32.16.

END OF SECTION

SECTION 03 30 00

CAST IN PLACE CONCRETE

Any information contained in this section that is found to be contradictory from that of the Structural Engineer shall be governed by that of the Structural Engineer.

This section includes cast-in-place or in situ concrete for structural building frame, slabs on fill or grade and other concrete components associated with building. This section relies on incorporation of ACI 301 by direct reference.

This section includes integral accessory control, expansion and contraction joint devices to encourage concrete cracking and movement to occur at predetermined locations. Water stops and other form accessories are included in Section 03 11 00.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cast-In-Place Concrete consisting of Portland cement, aggregate, water, admixtures; designed, proportioned, mixed, placed and cured.

B. Types of cast-in-place concrete specified: Normal weight concrete.

1.2 RELATED SECTIONS

A. Section 03 11 00.

B. Section 03 20 00.

C. Section 03 35 00.

D. Section 03 39 00.

E. Section 07 92 00.

F. Section 00 31 32.16.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 302 - Guide for Concrete Floor and Slab Construction.

C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

D. ACI 305R - Hot Weather Concreting.

E. ACI 306R - Cold Weather Concreting.

F. ACI 308 - Standard Practice for Curing Concrete.

G. ACI 318 - Building Code Requirements for Reinforced Concrete.

H. ASTM C33 - Concrete Aggregates.

I. ASTM C94 - Ready-Mixed Concrete.

J. ASTM C150 - Portland Cement.

K. ASTM C260 - Air Entraining Admixtures for Concrete.

L. ASTM C330 - Light Weight Aggregates For Structural Concrete.

M. ASTM C494 - Chemicals Admixtures for Concrete.

N. ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Mill Certificates: Required for bulk cement.

C. Product Data: Provide manufacturer's product data sheets on joint devices, attachment accessories, admixtures and bonding agents.

D. Design Mixes:

1. Submit test data on proposed design mixes for each type of concrete in the project including each strength class and any variations in either fly ash source and quantity, admixture, aggregate source or maximum coarse aggregate size. The mix is to be proportioned by one of the following three methods as outlined in ACI 318:
   a. Field Experience Method
   b. Laboratory Trial Batch Method
   c. ACI 318 - Table 5.4

2. Submittals shall include type and brand of cement used; mixed design proportions; brand, type and amount of each admixture; brand and amount of fly ash; slump; amount of entrained air; aggregate sources, gradations, specific gravity and coarse aggregate dry rodded unit weight; total water (including moisture in aggregate); water/cement ratio; and compressive strength test results for 7 and 28 days.

3. Review and acceptance of mix design does not relieve Contractor of his responsibility to provide concrete of quality and strength required by the Contract Documents.

E. Quality Control Submittals:

4. Air-Entraining Admixture Requirements: Manufacturer's instructions to control percent of air content under every condition, including temperature variations and presence of other admixtures.

5. Admixture Requirements: Manufacturer's data confirming that admixtures proposed for use on project conforms to specifications to produce a uniform, workable concrete mix.

6. Admixture Certification: Submit certification that the admixtures proposed for use

with cement containing fly ash are compatible with the fly ash.

7. Aggregate Test Reports: Test data confirming that aggregate proposed for use on project conforms to specifications.

8. Hot and Cold Weather Concrete Plan: Proposed plans for hot and cold weather concrete. Review and acceptance of proposed procedure will not relieve the Contractor of responsibility for the quality of finished product.

9. Jointing Layout: Proposed layout of construction and control joints if different than as shown on the plans. Identify each type of joint in layout.

F. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Concrete construction shall conform to Building Code Requirements for Reinforced Concrete, ACI 318.

C. Acquire cement and aggregate from same source for all work.

D. Provide necessary controls during evaluation of materials, mix designs, production and delivery of concrete, placement, compaction, finishing and curing necessary to assure that work will be accomplished in such a manner as to produce the work in accordance with Contract Documents.

1.7 PROJECT CONDITIONS:

A. Environmental Requirements:

10. Do not place concrete during rain, sleet or snow unless written approval has been obtained from Engineer.
11. Conform to ACI 305R when concreting during hot weather.
12. Conform to ACI 306R when concreting during cold weather.

1.8 FIELD SAMPLES

A. Construct and erect a field sample for architectural concrete surfaces receiving special treatment or finish as result of formwork.

B. Sample Panel: Sufficient size to indicate special treatment or finish required.

C. If requested by Architect/Engineer, cast concrete against sample panel. Obtain acceptance of resultant surface finish prior to erecting formwork.

D. Accepted sample panel is considered basis of quality for the finished work. Keep sample

panel exposed to view for duration of concrete work.

E. Accepted sample may not remain as part of the Work.

1.9 COORDINATION

A. A pre-placement meeting shall be conducted at the job prior to placement of any floor slab. In attendance shall be the Owner/Architect, representatives of the Contractor, the concrete sub-contractor, the electrical and plumbing sub-contractors.

B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

C. Coordinate schedules of concrete pours to allow adequate time for installation of other related work.

D. Verify that anchor bolts and other embedded items to be cast into concrete are properly placed.

2 PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type I - Normal

B. Fine and Coarse Aggregates: ASTM C33.

C. Lightweight Aggregate: ASTM C330.

D. Water: Clean potable water.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260.

1. All exterior concrete walks and drives shall be placed with air-entrained concrete. Sufficient air-entraining agent shall be used to reduce the weight of the concrete by 6 percent to 8 percent.

B. Concrete admixtures shall conform to ASTM C494. Calcium chloride or other accelerating admixtures are prohibited.

C. Fly Ash or other Calcinated Pozzolan are prohibited unless written authorization has been obtained by the Structural Engineer. If approval is obtained, concrete mixture shall conform to ASTM C618, and to the Structural Concrete Notes and Specifications as outlined in the Structural drawings.

E. Admixture: Provide Anti-Hydro Product Specification #3-3 for non-corrosive, monolithic floor hardening admixture.

F. Alternative Admixture: Provide Anti-Hydro Product Specification #3-3A “Anti-Hydro-R” for non-corrosive, monolithic floor hardening admixture use where retardation of normal set-time is desired, including but not limited to ambient temperatures higher than 85 degrees.

2.3 CONCRETE MIX

A. All concrete work shall comply with the latest code requirements and the American Concrete Institute. All concrete shall have a minimum 28 day compressive strength as specified or as governed by requirements indicated on the Drawings.

B. Mix and deliver concrete in accordance with ASTM C94, Alternative No. 3.

C. The compressive strength of the concrete shall be as specified unless indicated otherwise on the Drawings and shall have a minimum of 5 sack mix per cubic yard.

D. Water/Cement Ratio = .50 maximum.

E. Select proportions for normal weight concrete in accordance with ACI301 Method 2

F. Provide concrete to the following criteria unless indicated otherwise on the Drawings:

Item	Strength	Slump (Max/Min)	Thickness
Drilled Footings	Refer to Structural Plans and Specifications		
Footings	Refer to Structural Plans and Specifications		
Grade Beams/Walls	Refer to Structural Plans and Specifications		
Floors	Refer to Structural Plans and Specifications		
Sidewalks	Refer to Structural & Civil Plans and Specifications		

G. Chemical Admixtures: Type A water-reducing, Type F and Type G high-range water reducing admixtures shall comply with ASTM C494.

H. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.

I. Use set retarding admixtures during hot weather only when approved by Architect / Engineer.

J. Air Entrainment: Use air-entraining admixture resulting in concrete with air content at point of placement as follows:

1. Air entraining shall not be used in mix design for slab on grade.

2. Add air entraining agent to normal weight concrete mix for work exposed to exterior, deicer chemicals, or hydraulic pressure:

   a. 4.5%(moderate exposure); 5.5%(severe exposure) 1-1/2” max. aggregate.

   b. 4.5%(moderate exposure); 6.0%(severe exposure) 1” max. aggregate.

   c. 5.0%(moderate exposure); 6.0%(severe exposure) 3/4” max. aggregate.

   d. 5.5%(moderate exposure); 7.0%(severe exposure) 1/2” max. aggregate.

3. Other Concrete: 2% to 4%.

2.4 VAPOR BARRIER

A. Vapor barrior (Under Slab): Shall conform to ASTM E1745, Class A or better and shall have a maximum water vapor permeance of 0.012 perms when tested in accordance with ASTM E96 or F1249. Vapor barrier component no less than 15 mils thick in accordance with ACI 302.1R-96. Approved products:

1. STEGO WRAP VAPOR BARRIER (15 mil) by Stego Industries LLC (877) 464-7834 (www.stegoindustries.com).
2. Or approved equal of similar material, thickness, and other characteristics.

B. Vapor Barrier Installation

1. Provide vapor barrier as specified under all slabs on grade in compliance with ASTM E 1643-98.
2. Start membrane under perimeter grade beam and over subgrade. All joints and seams, both lateral and butt, shall be overlapped 6 inches and taped using vapor barrier manufacturer's recommended tape system. All penetrations must be sealed using specified vapor barrier and tape.
3. Any damaged area after installation of vapor barrier shall be repaired using manufacturer's product and tape. Cover any damage by a minimum overlap of 6 inches in all directions and tape carefully around entire perimeter of repair.
4. Electrical conduit shall be placed above membrane and encased in concrete unless otherwise noted on the drawings.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions:

1. Correct unsatisfactory work prior to pouring concrete.
2. Remove ice and excess water from excavations and formwork.
3. Remove rubbish from formwork immediately prior to placing concrete.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, inserts, seats, plates, reinforcement, pipes, conduits, sleeves, hangers, dampproofing, jointing and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Notify Owner and Testing Laboratory at least 48 hours in advance of scheduled pour to allow time for adequate observations.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301, ACI 302, ACI 304, ACI 318 and as herein specified.

B. The Contractor shall verify that the floor slab meets or exceeds the following specifications:

1. Required Testing Method (minimum standards):

Max. variations of surface flatness:	1/8” in any 1’ direction 1/4” in any 10’ direction

2. Any floor slab areas that do not meet this specification of flatness and levelness shall be removed and replaced at the expense of the concrete sub-contractor.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Install 15mil polyolefin vapor barrier under interior slabs on grade. Lap joints minimum 6 inches and seal watertight by taping edges and ends. RE: Geotech Report.

E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight by taping edges and ends.

F. The contractor must use a ten foot (10') straight edge, minimum, to check the smoothness while the concrete is still in the plastic state.

G. ALL INTERIOR LEVEL CONCRETE FLOORS SHALL BE POURED USING A POWER SCREED AND THE PROPER FORMS. THE CONCRETE SHALL BE POURED IN STRIPS RUNNING EITHER FRONT TO BACK OR SIDE TO ALTERNATING SIDE OF THE STORE. ALL ELECTRICAL PENETRATIONS IN THE SLAB SHALL BE BLOCKED OUT AND POURED BACK AFTER THE ADJACENT FLOOR IS POURED. NO BUTT FLOATS ARE TO BE USED. THERE IS NO LIMIT TO THE NUMBER OF STRIPS THAT CAN BE POURED, HOWEVER, THE WIDTH MUST BE COVERED BY A SINGLE CONTINUOUS POWER SCREED.

H. Special Flooring Conditions:

1. Areas of floor that are to be sloped to floor drains or depressed shall be formed out and filled with sand before areas of level floor have been placed. Such sand filled areas will be chipped out and placed with correct floor slope or depression at a later time. Coordinate the placing of such areas with the Owner.

2. Slope floor to floor drains at 1/8" per foot in areas indicated on the plans.

3. Care shall be taken in placing the sloped areas to make certain these areas are shaped and sloped as called for on the plans and as detailed. All areas not draining properly will be demolished and re-placed at the expense of the General Contractor.

4. Underfloor raceway for electrical wiring, trench drains and floor drains - 2" of concrete is required atop and below. Insert concrete under raceway using

a shovel or trowel. Exercise care so that the placement of the raceway is not altered.

I. Floating and Troweling: Concrete shall be distributed by shoveling and consolidation by vibration or other suitable means. Rakes, “Jitterbugs” and roller tamps are not permitted.

1. Bullfloats shall be used to smooth the surface, leaving it free of lumps and hollows.

2. Concrete shall not be worked until ready for floating. All surface or bleed water shall be removed before floating begins. Floating shall be accomplished with power trowel machines using float shoes. Floating shall begin when the mix has stiffened enough to support the weight of the troweling equipment and operator.

3. It may be necessary to perform two power floatings to bring the surface to the desired condition for power troweling.

4. Both power and hand troweling shall be required. Power troweling shall begin as soon as little or no cement paste clings to the blades. For the first troweling the trowel blades must be kept as flat as possible against the surface. This will help to avoid a "washboard" or "chatter" surface. A minimum of two power trowelings shall be accomplished at the correct time interval for the floor surface.

5. Troweling shall continue until the surface is dense, smooth, free of all minor blemishes and trowel marks.

6. Final hand troweling shall be required to close any pin holes or eliminate minor blemishes bringing the surface to a dense, smooth, polished finish.

J. Joint Conditions:

1. Joints in areas that do not receive floor tile (i.e., backroom and dock) shall be made with wood forms complete with reinforcing dowels in preparation for clean, smooth cold joints, and shall be smooth without grooves at the joints. Cooler floors that are sloped to drain, must be formed properly such that panel walls rest fully supported and flush.

2. Install joint devices in accordance with manufacturer's instructions.

3. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

4. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor finish.

5. Install joint covers in longest practical length, when adjacent construction activity is complete.

6. Apply sealants in joint devices in accordance with Section 07900.

K. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

L. Jointing Patterns: If Drawings indicate jointing patterns, utilized the guidelines as follows:

1. Place floor slabs in strips, or saw cut pattern indicated.
2. Saw cut joints: Cut joints within the ACI time allowance after placing. Use 1/8 inch thick blade, cut into 1/4 depth of slab thickness.

M. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

N. Place concrete continuously between predetermined expansion, control, and construction joints.

O. Do not interrupt successive placement; do not permit cold joints to occur.

P. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/8 inch in 10 feet in any direction when measured with metal straight edge. If variations greater than this exist, the contractor shall grind the floor to bring the surface within the level requirements. Patching or filling of low spots shall not be permitted.

3.4 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing and other items to be cast in.

C. Apply sand and cement slurry coat on base course by scrubbing into the surface, immediately prior to placing toppings. Do not allow grout to set or dry before the topping is placed.

D. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels, dimension not to exceed 20 feet.

E. Screed toppings level, maintaining surface flatness of maximum 1/8 inch in 10 feet.

3.5 SIDEWALKS AND CURBS

A. Provide sidewalks as indicated on plans with contraction and expansion joints. Provide concrete ramps as indicated from finished sidewalk, down to finished parking lot surface. See plan for number of ramps and locations. Ramps should slope to conform to OSHA & ADA requirements.

B. ALL exterior concrete ramps shall have non-slip finish (see section 03340). Handicap ramps shall have integral color concrete with color as selected by Architect to match shopping center standard.

C. Concrete curbing is required as indicated on drawings.

3.6 CONCRETE FINISHING

A. Finish concrete floor surfaces to requirements of Section 03 35 00.

B. All interior floors (except as indicated shall receive a smooth, hard steel trowel finish free of any trowel marks or other imperfections.

3.7 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure concrete floor surfaces in accordance with ACI 308 and to the requirements of Section 03 39 00.

D. Floors in areas receiving ceramic tile flooring shall be wet cured. UNDER NO CIRCUMSTANCES SHALL CHEMICAL HARDENERS OR CURING AGENTS BE APPLIED TO THE CONCRETE. Such areas require precision concrete finishing to receive thin set tile bedding properly. No rough or broken surfaces will be accepted. Floors will be checked for damage.

E. All interior concrete floor work except as indicated otherwise shall be coated with a curing compound. Application shall be in strict accordance with manufacturer's instructions.

F. The Contractor shall be held responsible in all of the above work to insure that the floors are acceptable for the application of the surface material.

3.8 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Division 01.

B. Provide free access to Work and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

D. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

E. Three concrete test cylinders will be taken for every 100 cubic yards of concrete or fraction thereof, for each class of concrete placed and not less than one test for each day’s pour of each class of concrete.

F. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. One slump test will be taken for each set of test cylinders taken.

3.9 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify

Architect/Engineer upon discovery.

C. Patch imperfections in accordance with ACI 301.

3.10 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

4 PART 4 INSPECTIONS

4.1 GENERAL

A. After the concrete has been poured and finished, the Contractor must immediately notify an independent testing laboratory to determine the finish tolerance of the surface. Expenses of testing to be paid by the Contractor. Coordination of tests are the Contractor's responsibility.

B. The inspecting laboratory will have 24 hours in which to inspect the flatness of the slab and furnish the Contractor information as to whether or not the specifications have been met using the Face Numbers Method incorporating the use of a "dipstick". If the tolerances are not met, the Contractor must correct and/or replace the slab at his own expense. Method of correction must be approved by the Architect. No plaster or floorstone is acceptable.

C. Not less than one test for each 100 cu. yd. of concrete or fraction thereof, for each class of concrete placed will be required, and in any event not less than one test for each day's pour of each class of concrete.

D. Specimens shall be made and cured in accordance with ASTM C-31.

E. Samples from which compressive test specimens are molded shall be secured in accordance with ASTM specifications C-172.

F. Contractor shall notify testing laboratory 48 hours prior to a placement of concrete in order for technician to complete mix and slump test and to check floor flatness after finishing.

1. All concrete slabs shall be tested for excessive surface alkalinity (ph) and excessive moisture vapor. The architect of record shall be notified in advance of such testing. Test results shall be submitted to the Owner, Engineer, Architect, and General Contractor. Moisture is to be tested using the Calcium Chloride Moisture Test Kit developed by the Rubber Manufacturer Association with a minimum of one test per 1,000 square feet. An acceptable level is Less Than 3-lbs of moisture per 1,000 square feet per 24 hours. Surface alkalinity is to be tested using a pH Paper Test or a Phenolphthalin Test each with a minimum of one test per 1,000 square feet. An acceptable pH reading is a level Less Than 9. **Neither carpet nor tile is to be installed on a slab testing at unacceptable levels.**

4.2 CYLINDER TESTING

A. Each test shall consist of not less than three standard 6" x 12" cylinders.

B. The standard age of test shall be 28 days, but 7 day tests may be used provided the relation between the 7 day and 28 day strengths of the concrete is established by tests for the materials and proportions used.

C. The cylinders shall be tested in accordance with ASTM specifications C-39.

4.3 ENFORCEMENT OF STRENGTH REQUIREMENTS

A. When it appears that strength requirements are not being met, the Owner/Architect shall have the right to order changes in design mix to produce concrete strengths to meet requirements.

B. When concrete fails to conform to strength requirements or when test of field-cured cylinders indicate deficiencies in protection and curing; the Owner/Architect may require cored cylinder tests in accordance with ASTM C-42.

C. If such tests confirm that strength requirements have not been met, load tests made in accordance with A.C.I. 318 may be required by the Architect.

D. If the above tests indicate the necessity, the defective parts shall be removed and replaced, or shall be reinforced as directed by the Architect at Contractor's expense, including cost of tests.

E. If such tests indicate that the structure adequately meets specification requirements, the test results of defective cylinders will be waived and the cost of tests will be paid for the contractor.

4.4 SLUMP TESTS

A. Tests for slump shall be made at the place of deposit and in accordance with ASTM C-143.

B. Tests shall be made periodically where cylinders are made, and as often in the opinion of the Owner when a change in consistency of the concrete mix is noted.

C. Unless otherwise noted or specified, the slump shall be within the limits for vibrated concrete as indicated in 2.3.F.

END OF SECTION

SECTION 03 35 00

CONCRETE FINISHING

This section includes surface finishing of concrete floor slabs and toppings, including special finishing sometimes encountered with slab finishing.

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finishing slabs-on-grade, monolithic floor slab, and separate floor toppings.

B. Surface treatment with concrete hardener, sealer, and slip resistant coatings.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete

B. Section 03 39 00 - Concrete Curing.

C. Section 07 92 00 - Joint Sealers.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 302 - Guide for Concrete Floor and Slab Construction.

C. ASTM E1155-87 - Determining Floor Flatness and Levelness Using the F-Number System

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301and ACI 302.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's packaging including application instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Temporary Lighting: Minimum 200W light source, placed 8 feet above the floor surface, for each 425 sq ft of floor being finished.

B. Do not finish floors until interior heating system is operational.

C. Temporary Heat: Ambient temperature of 50 degrees F minimum.

D. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.7 COORDINATION

A. Coordinate the work with concrete floor placement and concrete floor curing.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. COMPOUNDS - HARDENERS AND SEALERS

1) Hardening Compounds: Colorless solution of magnesium fluosilicate, zinc fluosilicate and wetting agent containing not less than 2 lb. Fluosilicate per gallon.

a. Sonneborn Building Products
b. Lapidolith®
c. Dayton Superior
d. Day-Chem Hardener™

2) Sealing Compounds:

a.	Sonneborn Building Products	-	“Sonothane”
b.	Malone Chemicals	-	“Formula 66” (in Sellersburg)
c.	Creteseal	-	“CS2000” (spray apply system)

3) Self-Leveling Compound:

a.	SIKA Corp. 1-800-993-7452	-	#90

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that floor surfaces are acceptable to receive the work of this section.

3.2 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301and ACI 302.

B. Steel trowel surfaces which are scheduled to be exposed.

C. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/8 inch per foot typical or as indicated on drawings.

D. All exterior concrete sidewalks and delivery slabs shall have a non-slip broom finish. Site paving shall have a broom finish. Compactor pads shall have a smooth, hard steel trowel finish. Tool edges to ½” radius unless noted otherwise.

3.3 TOLERANCES

A. Maximum Variation of Surface Flatness in any direction when tested by the testing firm For Concrete Floors:

1) 1/8” in any one (1’) foot dimension.
2) 1/4” in any ten (10’) foot dimension.

B. Maximum Variation of Surface Flatness Under Seamless Resilient Flooring: 1/8 inch in 10 feet.

C. Correct defects in the defined traffic floor by grinding or removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION

SECTION 03 39 00

CONCRETE CURING

This section includes procedures for curing horizontal and vertical concrete surfaces.

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.2 RELATED SECTIONS

A. Section 03 30 00.

B. Section 03 35 00.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 302 - Recommended Practice for Concrete Floor and Slab Construction.

C. ACI 308 - Standard Practice for Curing Concrete.

D. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.

B. Applicator: Experienced in application of specified products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver curing materials in original sealed manufacturer's packaging with seal and labels intact, and including application instructions. Store in cool dry place.

B. Use materials out of original containers only.

2. PART 2 PRODUCTS

2.1 MATERIALS

A. Curing Compounds: Curing compounds shall be one of the following:

1)	Gifford-Hill & Co., Inc	-	“Sealco 309”
2)	Maximent Co.	-	“Maxseal”
3)	West Chemical Products	-	“Concrete Floor Treatment”
4)	Hillyard Chemical Co.	-	“Chem-Seal”
5)	Sonneborn Building Products	-	“Kure-N-Seal”
6)	Euclid Chemical	-	“Kurez Dr Vox”

3.PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.2 CURING PROCEDURES

A. Cure surfaces in accordance with ACI 308.

B. Objective: Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures. Maintain a minimum loss and a relatively constant temperatures. Maintain a minimum loss and a relatively constant temperature during time necessary for hydration of cement and proper hardening of concrete.

C. After placing and finishing operation, maintain concrete above 50 degrees F and in a moist condition for at least 7 days by application of curing compound.

D. All interior concrete floor work with exception of toilet rooms shall be coated with curing compound.

E. Application shall be in strict accordance with manufacturer's instructions.

F. Restrictions on Use of Curing Compound

1) Do not use a curing compound on surfaces that are to be rubbed or that are to receive additional concrete, mortar, topping or other cementitious finishing materials.

2) Do not use curing compounds for curing slabs under quarry tile or resinous flooring.

G. Duration of Curing: Continue curing until cumulative number of days or fractions of days during which ambient temperature is above 50 degrees F has totaled 7 days. Prevent rapid drying at end of curing period.

H. Formed Surfaces: Minimize moisture loss from steel forms heated by sun and wood forms in contact with concrete by keeping forms wet during final curing period.

I. Temperature:

1) Cold Weather: When mean daily temperature of atmosphere is less than 40 degrees F, maintain ambient temperature of concrete between 50 degrees and 70 degrees for the required curing period. When necessary, make arrangements for heating, covering, insulation or housing concrete work in advance of placement to maintain required temperature and moisture conditions without injury. When combustion heaters are necessary in an enclosed or protected area where concrete slabs are being placed, vent heaters.

2) Hot Weather: When necessary, make arrangements for installation of windbreaks, shading, fog spraying or wet covering of light color in advance of placement. Take such protection measures as quickly as concrete hardening and finishing operations will allow.

3) Temperature changes: Control changes in temperatures of concrete at a rate as uniform as possible. Do not permit a temperature change to exceed 5 degrees F in any one hour or 50 degrees F in any 24-hour period.

3.3 CURING COMPOUND APPLICATION

A. Apply curing compound as soon as concrete surfaces begin to take initial set after finishing.

B. Spray compound on surfaces using two coats, applying second at right angle to first, at rate of 400 sq. ft. per gallon.

C. Restrict traffic on surfaces during cure.

3.4 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04 05 00

COMMON WORK RESULTS FOR MASONRY

I. Masonry Walls

A. Minimum brick requirements shall be front, sides, and rear, or as elevations indicate.

B. All exterior and party walls shall be erected and guaranteed water and airtight (sealed to roof deck).

C. All exterior and interior masonry work shall have tooled concave joints - horizontal and vertical.

D. All work to be performed in accordance with the Drawings, Specifications and the best accepted standards of the trade. Perform all work in safest manner possible.

E. Lay all masonry units in full beds of mortar with shoved joints.

F. Protect material before, during, and after erection.

G. Lay masonry plumb, true to line, with level, accurately spaced courses; keep bond plumb.

H. Keep exposed faces of all masonry free of mortar, stains, smears, and mortar drippings.

I. Point and fill holes and cracks in exposed joints with mortar at completion of work.

J. Lay no masonry when temperature is below 45^{o} F.

K. Coordinate work with all other trades.

L. All exposed masonry work shall be thoroughly cleaned of all mortar stains, drippings and discoloration. Clean with water, stiff brush and/or approved cleaning agent as required. No high pressure spray shall be used. A detergent masonry cleaner, Sure Klean 600 or approved equal shall be used. Cleaning shall be done as job progresses, consistent with the best practices of Basic Masonry Materials and Methods concrete masonry Construction.

M. All adjacent surfaces to masonry being cleaned that is subject to being stained is to be fully protected during the masonry cleaning process. Staining caused by masonry Cleaning will not be accepted.

N. Contractor shall provide field mock-up samples of all masonry and E.I.F.S. material for review and approval. Coordinate with E.I.F.S. subcontractor.

END OF SECTION

SECTION 04 05 13

MASONRY MORTARING

This section includes mortar for all masonry work.

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Mortar and grout for masonry.

1.2 RELATED SECTIONS

A. Section 04 21 00.

B. Section 04 22 00.

C. Section 04 43 00.

D. Section 04 72 00.

1.3 REFERENCES

A. ASTM C94 - Ready-Mixed Concrete.

B. ASTM C144 - Aggregate for Masonry Mortar.

C. ASTM C150 - Portland Cement.

D. ASTM C207 - Hydrated Lime for Masonry Purposes.

E. ASTM C270 - Mortar for Unit Masonry.

F. ASTM C387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.

G. ASTM C476 - Grout for Masonry.

H. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

I. ASTM C1019 - Method of Sampling and Testing Grout.

J. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.4 SUBMITTALS

A. Samples: Submit two samples of mortar, illustrating mortar color and color range.

B. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 45 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS - PREMIX MORTAR

A. Colored Mortar: Provide pre-bagged mortar mix as manufactured by Rainbow Products or approved equal. Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Color to be selected by architect.

2.2 MATERIALS

A. Portland Cement: ASTM C150, Type I, except Type lll may be used for cold weather construction.

B. Mortar Aggregate: ASTM C144, standard masonry type.

C. Hydrated Lime: ASTM C207, Type S.

D. Grout Course Aggregate: ASTM C404.

E. Water: Clean and potable.

2.3 MORTAR MIXING

A. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, re-temper only within two hours of mixing.

E. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 45 degrees F.

2.4 GROUT MIXES

A. Bond Beams/Lintels: 2,500 psi strength at 28 days; 8-10 inches slump; mixed in accordance with ASTM C476, Fine grout.

B. Engineered Masonry: 2,500 psi strength at 28 days; 8-10 inches slump; mixed in accordance with ASTM C476, Fine grout.

2.5 GROUT MIXING

A. Transit mixed grout shall be in accordance with ASTM C94.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476, Fine grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Request inspection of spaces to be grouted.

3.2 INSTALLATION

A. Work grout into masonry cores and cavities to eliminate voids.

B. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

C. Do not displace reinforcement while placing grout.

D. Remove excess mortar from grout spaces.

3.3 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 40 00.

B. Test and evaluate mortar in accordance with ASTM C780.

C. Test and evaluate grout in accordance with ASTM C1019.

END OF SECTION

SECTION 04 21 00

CLAY UNIT MASONRY

1PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Masonry Unit requirements.

B. Reinforcement, anchorage, and accessories.

1.2 RELATED SECTIONS

A. Section 00 31 32.16

B. Section 01 40 00

C. Section 04 50 00

D. Section 04 05 13

E. Section 05 40 00

F. Section 07 13 00

G. Section 07 60 00

H. Section 07 92 00

I. Section 09 29 00

1.3 REFERENCES

A. ACI 530 - Building Code Requirements for Masonry Structures.

B. ACI 530.1 - Specifications For Masonry Structures.

C. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.

D. ASTM A123 - Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.

F. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.

G. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

H. UL - Fire Resistance Directory.

1.4 SUBMITTALS

A. Product Data: Provide data for fabricated wire reinforcement.

B. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with accepted industry standards for masonry construction.

B. Do not lay units that are wet or frozen.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for masonry construction.

1.8 MOCKUP

A. Construct a masonry wall into a panel sized four (6) feet wide by six (8) feet high as detailed by Architect, which includes mortar and accessories on structural stud backup.

B. Locate where directed by Architect.

C. Mockup may not remain as part of the Work.

1.9 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01660.

B. Accept masonry units on site. Inspect for damage.

1.11 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.

1.12 COORDINATION

A. Coordinate work under provisions of Section 01310.

B. Coordinate the masonry work with burnished block veneer, cast stone veneer and installation of window anchors.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS - BRICK UNITS

A. Field Brick: Interstate Wheat L-3

1. Provide solid soldier units with adjacent side finish at end units.

B. Accent Brick: Interstate Mocha.

1. Provide solid soldier units with adjacent side finish at end units.

2.2 REINFORCEMENT AND ANCHORAGE

A. Joint Reinforcement: Truss type; steel wire, hot dip galvanized to ASTM A641 after fabrication, standard weight 9 gauge, “Dur-O-Wall” or approved equal.

B. Triangular Wall Ties: Hot-dipped galvanized steel, 3/16” diameter sufficient to embed at least 1-1/2 inches into each wythe with a maximum of 5/8 inch mortar cover on the exterior side.

C. Masonry Wall Ties to Steel: Wire Bond type II-101, hot-dipped galvanized, 9 inches long by 3/4 inches wide, 12 gauge anchors screwed to structural steel studs.

D. Dovetail Anchors: Provide dovetail slots and 3/16” diameter triangular wire ties at concrete tilt walls with brick veneer. Contractor recommended alternate method shall be submitted to Architect for approval prior to installation. Slots and ties to be galvanized to ASTM A123.

2.3 MORTAR AND GROUT

A. Mortar and Grout: As specified in Section 04 05 13.

2.4 FLASHINGS

A. Plastic Flashings: Sheet polyethylene; 20 mil thick.

B. Pre-coated Galvanized Steel: ASTM A525, G90; 26 gage core steel, shop pre-coated with color as selected.

C. Galvanized Steel: ASTM A525, G90 finish, 26 gage core steel.

D. Lap Sealant: Butyl type where indicated on drawings.

E. Refer to Section 07 61 00 for additional requirements.

2.5 ACCESSORIES

A. Joint Filler: Refer to Section 07 92 00.

B. Building Paper: No. 30 asphalt saturated felt.

C. Weeps: Cotton rope of length required to produce 2” exposure on exterior and 18” in cavity.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. Refer to Section 04 05 00.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 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. Brick Units:

1. Bond: 1/3 Running for King Size units (unless noted otherwise on the drawings)
2. Coursing: Three units and three mortar joints to equal 8 inches.
3. Mortar Joints: Concave.

3.4 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 are not permitted.

D. Remove excess mortar 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. Isolate top joint of masonry walls from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 WEEPS

A. Install weeps in veneer at a maximum of 30 inches o.c. horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls. Provide a minimum of one weep hole for each vertical plane where width of plane is 30 inches or less.

3.6 CAVITY BEHIND VENEER

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.

3.7 REINFORCEMENT AND ANCHORAGE

A. Install horizontal joint reinforcement 16 inches o.c.

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 joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Secure wall ties to stud framed back-up and in embed dovetail slots at maximum 16 inches o.c. vertically and 16 inches o.c. horizontally. Place at maximum 3 inches o.c. each way around perimeter of openings, within 12 inches of openings

F. Reinforce joint corners and intersections with galvanized strap anchors 16 inches o.c.

3.8 MASONRY FLASHINGS

A. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, and at bottom of walls.

B. Turn flashing up minimum 8 inches and seal to concrete or seal to sheathing over steel stud back-up.

C. Lap end joints minimum 6 inches and seal watertight.

D. Turn flashing, fold, and seal at corners, bends, and interruptions.

E. Prepare masonry surfaces smooth and free from projections which could puncture flashing.

F. Place through-wall flashing on bed of mortar and over with mortar.

G. Seal penetrations in flashing with mastic before covering with mortar.

3.9 LINTELS

A. Install loose steel lintels over openings. Refer to Structural drawings.

B. Maintain minimum 6 inches bearing on each side of opening.

3.10 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 elliptical core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Size control joint in accordance with Section 07900 for sealant performance.

3.11 TOLERANCES

A. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.12 CUTTING AND FITTING

A. Cut and fit for conduit and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 CLEANING

A. Clean work under provisions of Section 04 05 00.

B. Remove excess mortar and mortar smears.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.14 PROTECTION OF FINISHED WORK

A. All finished Work shall be protected to avoid delay in the overall progress of the work. The Contractor shall provide suitable protection to prevent damage.

B. Without damaging completed work, provide protective boards at exposed external corners that may be damaged by construction activities.

END OF SECTION

SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Concrete masonry unit masonry walls, reinforcement, anchors and accessories.

B. The requirements of this section are in addition to the requirements of the General Conditions, Supplementary Conditions and Division 01000 General Requirements.

1.02 RELATED SECTIONS

A. Section 04 05 13

1.03 REFERENCE STANDARDS

A. ACI 530 – Building Code Requirements for Masonry Structures.

B. ACI 530.1 – Specifications for Masonry Structures.

C. ASTM C90 – Load-Bearing Concrete Masonry Units.

D. ASTM-C150 - Portland Cement

E. ANSI A41.1 - Building Code Requirements for Masonry

1.04 SYSTEM PERFORMANCE REQUIREMENTS

A. Submittals

1. Submit the following in accordance with Section 01 30 00:

a. Product Data: Submit manufacturer's Technical Product Data, installation instructions and recommendations for each product. Include data substantiating that materials comply with specified requirements.
b. Samples of Concrete Masonry Units (in small scale) showing full extent of colors.
c. Samples for verification purposes of Full size units for each different unit required showing full range of color, texture, and dimensions to be expected in completed construction.
d. Material Certificates for the following (signed by the manufacturer and contractor certifying that each material complies with requirements):

i. each different cement product required for mortar and grout including name of manufacturer, brand, type, and weight slips at time of delivery.
ii. each type and size of masonry anchors, ties, and metal accessories.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50 degrees F. prior to, during, and 48 hours after completion of masonry work.

B. During freezing or near freezing weather, provide adequate equipment or cover to maintain a minimum temperature of 50 degrees F. and to protect masonry work completed or in progress.

1.06 PROTECTION

A. Maintain protective boards at exposed external corners which may be damaged by construction activities. Provide such protection without damaging completed work.

B. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS AND MORTAR

A. Masonry:

- Standard smooth face CMU (8”x8”x16”)

B. Mortar: Specified in Section 04 05 13

C. All units shall be of modular size and shall be straight, uniform, sound, clean and free from cracks and chips. Texture shall be fine, based on a block mix approximately 3.00 fineness modulus.

D. Waterproofing: all units shall be made with an integral waterproofing agent in the mix so as to render the finished unit water resistant - one (1) pound of stearate solids per bag of cement.

Curing: units shall be cured by atmosphere pressure, high temperature steam method and shall be 28 days old prior to delivery to the job site. Moisture content of units shall not exceed 40% before being placed in the wall. None of the units shall be placed directly on the ground while being stored and the contractor shall be responsible for providing and maintaining the protection necessary to prevent re-wetting of delivered units prior to their use.

2.02 ACCESSORIES

A. Horizontal Reinforcing: Specified in Section 04 05 00.

B. Anchors and Ties: Specified in Section 04 05 00.

C. Structural Reinforcing: Refer to Structural drawings.

PART 3 - EXECUTION

3.01 PREPARATION

A. Supply metal anchors to other trades for placement. Provide a sufficient quantity and direct their correct placement.

B. Insure items built -in by other trades for this work are properly located and sized.

C. Establish all lines levels and coursing. Protect from disturbance.

3.02 WORKMANSHIP AND INSTALLATION

A. Place masonry in accordance with lines and levels indicated on drawings.

B. Mortar Joints: Concave Joints shall be used for walls which will remain exposed to view. Keep control joints clear of mortar.

C. Fully bond external and internal corners and intersections.

D. Buttering corners of joints deep or excessive furrowing of mortar joints is not permitted.

E. Do NOT shift or tap masonry units after mortar has taken initial set. Where adjustments must be made, remove mortar and replace.

F. Perform job site cutting with proper power tool to provide straight and true unchipped edges.

G. Where non-bearing masonry extends to underside of floor, roof deck or structural system, stop masonry short 3/8 inch to 1/2 inch to allow for live load deflection. Fill gap with joint filler. Provide structural anchorage in accordance with ANSI A41.1.

H. Insure masonry courses are uniform in height. Make vertical and horizontal joints equal and of uniform thickness.

I. Lay concrete block in full bed of mortar, properly jointed with other work.

J. Remove excess mortar and projections. Take care to prevent breaking block corners.

3.03 TOLERANCES

A. Maximum variation from masonry unit to adjacent masonry unit to be 1/32 inch.

B. Lay concrete unit masonry to receive flush material plumb (with flush mortar joints).

C. Maintain flush face on sight exposed masonry surfaces.

3.04 CONTROL JOINTS

A. Locations: As shown on drawings. If not shown on drawings, space no more than 25’ o.c.

B. Do NOT continue horizontal masonry reinforcing across control joints.

3.05 BUILT-IN WORK

A. As work progresses build in items supplied by other trades plumb and true.

B. Do NOT build in organic materials which will be subjected to rot or deterioration.

3.06 CUTTING AND FITTING

A. Cut and fit concrete blocks as required for the work of other sections. Cooperate fully with other sections of work to insure correct size, shape and location.

3.07 POINTING AND CLEANING

A. Remove excess mortar and smears upon completion of masonry work.

B. Point and replace defective mortar. Match adjacent work.

C. Clean solid surfaces using non acidic solution which will not harm masonry or adjacent materials.

END OF SECTION

SECTION 04 43 00

STONE MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Natural stone, or cultured stone as indicated on drawings.

B. Reinforcement, anchorage, and accessories.

1.2 RELATED SECTIONS

A. Section 04 05 00

B. Section 04 05 13

C. Section 07 92 00

1.3 REFERENCES

A. ACI 530 - Building Code Requirements for Masonry Structures.

B. ACI 530.1 - Specifications For Masonry Structures.

C. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.

D. ASTM A123 - Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.

F. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.

G. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

H. UL - Fire Resistance Directory.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s specifications and installation instructions and recommendations.

B. Shop Drawings: Submit complete shop drawings showing dimensions, alignments, joint locations and sizes, supports, attachment devices, accessories, complete pattern layout plan, corner details and installation details of proposed method of anchorage. If any stone scheduled has noticeable grain, show grain direction. Indicate field-measured dimensions.

C. Samples:

1. Stone materials: Submit at least three samples each not less than 6” x 6” size for each stone type or variety; submit additional samples if required to adequately show range of color, grain and variation, including at least one sample to show each extreme of variation and one to show the typical or predominant characteristics.

2. Sealant materials: Submit proposed custom colors for review; match Architect’s sample(s).

3. Grout color: Submit samples of custom colored grouts to match Architect's samples or verbal descriptions; re-formulate and re-submit each color until acceptance of grout colors is obtained. Identify each sample with description and proportions of ingredients, including brand names. Number of different colors required shall not exceed the number of stone types scheduled. If requested by Architect, submit samples, mounted on boards not less than 6" by 6", of grout joints between two or more pieces of stone of each type used where that grout occurs: if requested, submit three such samples of each accepted grout.

4. Expansion joints and other materials: Submit at least three samples of all components that will be exposed to view in the finished work.

D. Mock-ups: Build mock-ups where directed by Architect of each type of stonework specified in this Section. Re-build and/or re-work mock-ups as necessary until acceptance by Architect is obtained. Reviewed and accepted mockups shall serve as a minimum standard for judging quality of material and workmanship. Accepted mock-ups may not be incorporated into the Work.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with accepted industry standards for masonry construction.

B. Do not lay units that are wet or frozen.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for masonry construction.

1.8 MOCKUP

A. Construct a masonry wall into a panel sized four (4) feet wide by six (6) feet high as detailed by Architect, which includes mortar and accessories on structural stud or CMU backup.

B. Locate where directed by Architect.

C. Mockup may not remain as part of the Work.

1.9 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 01000.

B. Accept masonry units on site. Inspect for damage.

1.11 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.

1.12 COORDINATION

A. Coordinate the masonry work with cast stonework.

2 PART 2 PRODUCTS

2.1 SUPPLIERS - STONE UNITS

Upchurch – Kimbrough Attn.: Robert Ottman Phone: 713-957-1520

2.2 MATERIALS

A. Stone: Stone shall be chopped 3.5” to 5.5” thick (chopped face will be expressed).

B. Coursing: Coursing to be Modified Random Ashlar Pattern. Install veneer with horizontal joints coursing out in heights that will vary between 3” and 12”. Each Stone will vary in length between 8” and 30” and be roughly squared.

B. Variation: Lay Stone in uniform blend, so as to avoid patching of colors in finished wall veneer. Patches of similar color variations will be corrected by masonry contractor at the architect’s discretion.

C. Weight: Stone weighs approximately 175 pounds per cubic foot. It will be delivered in end dump trailers in loads of approximately 23-24 tons each. Provide stable, level surface to dump / store materials on.

D. Color: Color of Stone to be Valley Ranch Blend mixed range by Alamo Stone Supply.

2.3 REINFORCEMENT AND ANCHORAGE

A. Joint Reinforcement: Truss type; steel wire, hot dip galvanized to ASTM A641 after fabrication, standard weight 9 gage, “Dur-O-Wall” or approved equal.

B. Triangular Wall Ties: Hot-dipped galvanized steel, 3/16” diameter sufficient to embed at least 1-1/2 inches into each wythe with a maximum of 5/8 inch mortar cover on the exterior side.

C. Masonry Wall Ties to concrete tiltwall: HB #345-BT-Flexible Tie or approved equal, hot-dipped galvanized, 4 inches long, attached to concrete tiltwall with Powers Fastners Inc. (Rawl) SPIKE carbon steel zinc plated (according to manf. specs.) 3/16” x 1-1/4” deep with mushroom head or approved equal.

2.4 MORTAR AND GROUT

A. Mortar and Grout: None.

2.5 FLASHINGS

A. Plastic Flashings: Sheet polyethylene; 20 mil thick.

B. Pre-coated Galvanized Steel: ASTM A525, G90; 26 gage core steel, shop pre-coated with color as selected.

C. Galvanized Steel: ASTM A525, G90 finish, 26 gage core steel.

D. Lap Sealant: Butyl type where indicated on drawings.

E. Refer to Section 07600 for additional requirements.

2.6 ACCESSORIES

A. Joint Filler: Refer to Section 07900.

B. Building Paper: No. 30 asphalt saturated felt.

C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. Refer to Division 04.

D. Finish connection and anchorage hardware, including gravity supports, tie-backs, z-clips, angle clips, metal ties, dowels, structural silicone and threaded inserts of sufficient size, thickness and strength for proper support of applied loads in a secure manner. All metallic fastening devices shall be non-corroding. All fastening shall be completely concealed. All mounting details shall be submitted to the Architect for review prior to installation.

E. Test joint sealant materials specified in Section 07920 for compatibility with the cast stone materials specified. Do not use incompatible sealant that result in staining of stone, or absorption of sealant components by the stone.

F. Colored grout for joints and pointing: Pigmented with synthetic iron oxide pigments; color(s) as selected by Architect.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 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.

3.4 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 are not permitted.

D. Remove excess mortar 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. Isolate top joint of masonry walls from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 WEEPS

A. Install weeps in veneer at 30 inches o.c. horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls. Provide minimum of one weep hole for each vertical plane where width of plane is 30 inches or less.

3.6 CAVITY BEHIND VENEER

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.

3.7 REINFORCEMENT AND ANCHORAGE

A. Install horizontal joint reinforcement 16 inches o.c.

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 joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Secure wall ties to wall structure at a maximum 16 inches o.c. vertically and 16 inches o.c. horizontally. Place at maximum 3 inches o.c. each way around perimeter of openings, within 12 inches of openings

F. Reinforce joint corners and intersections with galvanized strap anchors 16 inches o.c.

3.8 MASONRY FLASHINGS

A. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, and at bottom of walls.

B. Turn flashing up minimum 8 inches and seal to concrete or seal to sheathing over steel stud back-up.

C. Lap end joints minimum 6 inches and seal watertight.

D. Turn flashing, fold, and seal at corners, bends, and interruptions.

3.9 LINTELS

A. Install steel lintels over openings. Refer to Structural drawings.

B. Maintain minimum 6 inches bearing on each side of opening.

3.10 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 elliptical core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Size control joint in accordance with Section 07900 for sealant performance.

3.11 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.12 CUTTING AND FITTING

A. Cut and fit for conduit and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 CLEANING

A. Clean work under provisions of Section 04050.

B. Remove excess mortar and mortar smears.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.14 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 71 33.

B. Without damaging completed work, provide protective boards at exposed external corners that may be damaged by construction activities.

END OF SECTION

SECTION 04 72 00

CAST STONE MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Cast Stone trim as indicated on Drawings.

B. Related Sections: Section 04 05 13.

1.02 SUBMITTALS

A. Submit for review in accordance with Section 01 30 00.

B. Product Data: Submit manufacturer's specifications and installation instructions and recommendations.

C. Shop Drawings: Submit complete shop drawings showing dimensions, alignments, joint locations and sizes, supports, attachment devices, accessories, complete pattern layout plan, corner details and installation details of proposed method of anchorage. If any stone scheduled has noticeable grain, show grain direction. Indicate field-measured dimensions.

D. Samples:

1. Stone materials: Submit at least three samples each not less than 2" x 2" size for each stone type or variety; submit additional samples if required to adequately show range of color, grain and variation, including at least one sample to show each extreme of variation and one to show the typical or predominant characteristics.

2. Sealant materials: Submit proposed custom colors for review; match Architect's sample(s).

3. Grout color: Submit samples of custom colored grouts to match Architect's samples or verbal descriptions; re-formulate and re-submit each color until acceptance of grout colors is obtained. Identify each sample with description and proportions of ingredients, including brand names. Number of different colors required shall not exceed the number of stone types scheduled. If requested by Architect, submit samples, mounted on boards not less than 12" by 12", of grout joints between two or more pieces of stone of each type used where that grout occurs: if requested, submit three such samples of each accepted grout.

4. Expansion joints and other materials: Submit at least three samples of all components that will be exposed to view in the finished work.

E. Mock-ups: Build mock-ups where directed by Architect of each type of stonework specified in this Section as well as sealants or waterproofing as may be indicated in other Sections of these specifications. Re-build and/or re-work mock-ups as necessary until acceptance by Architect is obtained. Reviewed and accepted mockups shall serve as a minimum standard for judging quality of material and workmanship. Accepted mock-ups may NOT be incorporated into the Work.

1.03 QUALIFICATIONS

A. Acceptable Suppliers of Cast Stone shall be (or approved equal):

Site Works, Ed McCune	Phone 713-861-7923	Fax 713-861-8478
Precision Development, Shawn Smith	Phone 713-667-1310	Fax 281-665-1545
AHI Supply, Robert Ottman	Phone: 713-957-1520	Fax 713-957-1268

PART 2 - PRODUCTS

2.01 SOURCES

A. Approved Supplier: See Section 1.03.

2.02 MATERIALS

A. Stone: Provide stone in types or varieties, textures, finishes and thickness' as scheduled or otherwise indicated on Drawings, and as specified herein, or in matching varieties as selected by Architect.

B. Grain: As indicated on drawings. In layout and cutting of work, match grain direction and effect as closely as possible. If not otherwise indicated, request clarification from Architect.

C. Color: Integral color Cast Stone requires Architect approval.

D. Waterproofing: all units shall be made with an integral waterproofing agent in the mix so as to render the finished unit water resistant.

2.04 ACCESSORIES

A. Finish connection and anchorage hardware, including gravity supports, tie-backs, z-clips, angle clips, metal ties, dowels, structural silicone and threaded inserts of sufficient size, thickness and strength for proper support of applied loads in a secure manner. All metallic fastening devices shall be non-corroding. All fastening shall be completely concealed. All mounting details shall be submitted to the Architect for review prior to installation.

B. Test joint sealant materials specified in Section 07920 for compatibility with the cast stone materials specified. Do not use incompatible sealant that result in staining of stone, or absorption of sealant components by the stone.

C. Colored grout for joints and pointing: Pigmented with synthetic iron oxide pigments; color(s) as selected by Architect.

2.05 SETTING METHODS

A. Set and anchor as indicated on the Drawings. If not indicated, set materials as follows:

1. Exterior horizontal surfaces: Reinforced Portland cement mortar setting beds.

2. Exterior vertical and sloped surfaces:

a. Provide positive anchorage through non-corroding adjustable metal anchors and ties for overhead keystones and other overhead trim; submit proposed method of anchorage to Architect for acceptance. Neither corrugated galvanized steel straps nor flexible wires are acceptable for ties or anchorage, unless otherwise specifically reviewed by Architect.

b. Set column base and wall base stone tile with latex-modified Portland cement mortar.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. Employ only trained and experienced competent installers.

3.02 PREPARATION

A. Assure that stud walls, structural framing systems and other substrates are plumb, built accurately to dimensions according to Contract Drawings and Shop Drawings, and installed in accordance with all pertinent codes and regulations.

3.03 INSTALLATION

A. Install Stone Trim in accordance with supplier's instructions and recommendations except to the extent more stringent requirements are indicated in Contract Documents and reviewed shop drawings.

B. Comply with all pertinent codes, laws, ordinances and regulations.

C. Install all stone in proper alignment in accordance with the Contract Documents and reviewed shop drawings.

D. If horizontal steel support or other framing is used, install at maximum 30" o.c. spacing unless otherwise shown on the Drawings.

E. Install trim components in same manner as slabs or as otherwise indicated on reviewed shop drawings.

F. All Cast Stone work shall conform with the "Standard Specification for Cast Stone" as published by:

The Cast Stone Institute
Pavilions at Greentree, Suite 408
Marlton, NJ 08503

3.04 CLEANING AND PROTECTION

A. Clean all dirt, adhesives and sealant from stonework using water and mild detergents or solvents as appropriate and recommended by the manufacturer and fabricator. Do not use acids, harsh cleaning compounds or wire brushes.

B. Touch-up marred and chipped surfaces to match adjacent undamaged surfaces, to the satisfaction of the Architect and/or Owner.

C. Protect finished stonework from damage. Provide non-staining temporary wood guards at corners and other surfaces subject to damage. If damage occurs, remove damaged items and replace with new undamaged matching components.

D. On completion of construction, remove all temporary protection.

END OF SECTION

SECTION 04 73 13

CALCIUM SILICATE MANUFACTURED STONE MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Calcium silicate masonry units.

1.02 RELATED SECTIONS

A. Section 04 05 00 - Common Work Results for Masonry.

B. Section 04 05 13 - Masonry Mortaring.

C. Section 04 72 00 - Cast Stone Masonry.

D. Section 05 12 00 - Structural Steel Framing.

E. Section 07 92 00 – Joint Sealants.

1.03 SAMPLES

A. Submit samples as specified in Section 01 30 00 and 04 05 00.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: manufacturer having sufficient plant facilities to produce the shapes, quantities and size of Products required in accordance with the project schedule.

B. Installer: Company or person specializing in commercial masonry work of a similar nature with three years documented experience.

C. Mock-up: To be determined by Owner, Architect and GC based on the scope of work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver calcium silicate masonry units in protective film. Prevent damage to units.

B. Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.

C. Store units in a manner designed to prevent damage and staining of units.

D. Stack units on timbers or platforms at least 3 inches above grade.

E. Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time.

F. Cover stored units with protective enclosure if exposed to weather.

G. Do not use salt or calcium-chloride to remove ice from masonry surfaces.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers of calcium silicate masonry units having Products considered acceptable for use:
   1. Arriscraft International, as distributed by Upchurch – Kimbrough.

      Attn: Robert Ottman Phone: 713-957-1520

2.02 MATERIALS

A. Calcium Silicate Masonry Units (Georgia): to ASTM C73, Grade SW; solid units that have been pressure formed and autoclaved; 3-5/8" bed depth; special shapes as indicated; and as follows:
   1. Modular Size: 3-5/8” W, 7-5/8" H, 23-5/8" L;
   2. Texture: smooth finish as indicated on the exterior elevations;
   3. Color: Magnolia color; (verify with Architect before purchase)
   4. Product & Manufacturer’s Name: Renaissance® Masonry Units by Arriscraft.

B. Mortar: 1:1:6 Portland cement-hydrated lime-sand mix, as specified in Section 04 05 13.

C. Wall Ties and Anchorages: as specified.

E. Joint Sealants and Backer Rods: non-staining type, as specified in Section 07 92 00.

F. Flashing, Vents, and Masonry Accessories: as specified.

2.03 FABRICATION TOLERANCES

A. Fabricate calcium silicate masonry units to the following tolerances:
   1. Unit Length: plus or minus 1/16".
   2. Unit Height: plus or minus 1/16".
   3. Deviation From Square: plus or minus 1/16", with measurement taken using the longest edge as the base.
   4. Bed Depth: plus or minus 1/8".
   5. Custom Unit Dimensions: plus or minus 1/8".

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions are ready to receive work.

B. Inspect materials for fit and finish prior to installation. Do not set unacceptable units.

C. Beginning of installation means acceptance of existing conditions.

3.02 CUTTING MASONRY UNITS

A. Cut masonry units with wet-saw.

B. Pre-soak units using clean water prior to cutting.

C. Clean cut units using a stiff fiber brush and clean water. Allow units to surface dry prior to placement.

D. Finish cut edges to match face when exposed in wall.

3.03 WETTING MASONRY UNITS

A. Where the ambient air temperature exceeds 100°F or exceeds 90°F with a wind velocity greater than 8 mph, pre-wet masonry units.

B. Lay wetted units when surface dry.

3.04 COURSING

A. Place masonry to lines and levels indicated.

B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.

C. Lay masonry units in stack bond or as indicated on the exterior elevations.

D. Course one masonry unit and one mortar joint to equal 12 inches.

D. Maintain mortar joint thickness of 3/8 inch.

E. Tool joints when thumbprint hard as specified.

3.05 PLACING AND BONDING

A. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints and deep or excessive furrowing of mortar joints are not permitted.

B. Fully bond intersections, and external corners.

C. Do not adjust masonry units after laying. Where resetting of masonry is required, remove, clean units and reset in new mortar.

D. Install lintels as scheduled.

E. Install wall ties and anchorages as specified.

F. Install flashings, vents, and masonry accessories as specified.

G. Construct movement joints as specified or indicated on the drawings. If not indicated, coordinate Best Practices joint locations with Architect before installation of the units.

3.06 FIELD QUALITY CONTROL

A. Inspection: Owner will inspect installed masonry and reject masonry that is chipped, cracked, or blemished (streaked, stained or otherwise damaged), as described below.
   1. Masonry will be inspected to be free of cracks or other blemishes on the finished face or front edges of the masonry units exceeding 3/8 inch or that can be seen from a distance of 10 feet.
   2. Units shall exhibit a texture approximately equal to the approved sample when viewed under diffused daylight illumination at a 20 foot distance.

3. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under diffused daylight illumination from a 20 foot distance.
4. Efflorescence will not be cause for rejection.

B. Make Good rejected masonry as directed by Owner.

3.07 ADJUSTING AND CLEANING

A. Repair chips on smooth finished units with patch kits furnished by manufacturer.

B. Clean masonry units as specified in Section 04 05 00.

C. Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.08 PROTECTION

A. Protect units from damage resulting from subsequent construction operations.

B. Use protection materials and methods which will not stain or damage units.

C. Remove protection materials upon Substantial Completion, or when risk of damage is no longer present.

END OF SECTION

SECTION 05 05 00

COMMON WORK RESULTS FOR METALS

1. PART 1 – GENERAL

1.1 DESCRIPTION

1. The work includes but is not limited to structural steel, steel studs, and miscellaneous fabrications.

2. Miscellaneous Fabrications include but are not limited to railings, ladders, roof opening frames.

1.2 QUALITY ASSURANCE

1. Comply with AISC “Code of Standard Practice for Steel Buildings and Bridges”, latest edition. A WS D1.1 “Structural Welding Code”.

2. Comply with requirements of architect of record.

1.3 SUBMITTALS

1. Submit shop drawings to architect of record.

2. PART II – PRODUCTS

2.1 MATERIALS

1. Furnish all labor, materials, including all accessory items, connections, anchoring and fastening devices, bolts, nuts, screws, etc., enumerated below and/or indicated on the Drawings and Details for the completion of the structural steel work indicated.

2. Structural Steel Shapes, Plates, Bars; ASTM A36. Conform to ASTM A-36, except for material specifically noted on the drawing (Fy-50 ksi) shall conform to ASTM A-572, Grade 50.

3. Steel Pipe; ASTM A53, Type E or S grade B

4. Steel Tubing; Cold-Formed ASTM A 500, grade B; hot –formed ASTM A 501.

5. Anchor bolts and fasteners, ASTM 325 as required by architect of record. ASTM A 307 anchor bolts are acceptable in non-tension applications.

6. Primer; Fabricators standard rust inhibiting primer.

7. Steel studs and C joists, ASTM A446, grade C.

8. Canopies and overhangs shall be installed per Drawings.

9. Provide all structural support steel required for roof top mechanical equipment, and HVAC equipment.

10. Column spacing and bays shall conform to drawings. Roof shall slope 1/4”/Ft. minimum.

3. PART III – EXECUTION

3.1 ERECTION

1. Set frames accurately to lines and elevations indicated. Level and plumb individual members within AISC tolerances. Comply with AISC specifications for bearing, alignment and welds.

2. Touch-up paint all exposed and/or abraded areas after erection.

3. Welds of all metal fabrications shall be ground smooth and prepared for final painting.

4. All structural steel encased in concrete, masonry or in contact with earth shall be painted with bituminous paint.

3.2 METAL FASTENINGS

1. Standard Threaded Fasteners

   A. Standard bolts and nuts: ASTM A-307

   B. Plain washers: ANSI B27-2.

2. Anchor Bolts

   A. Conform to Section 1.c of ASTM A-307.

3. High Strength Threaded Fasteners

   A. ASTM A-325.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

Any information contained in this section that is found to be contradictory from that of the Structural Engineer shall be governed by that of the Structural Engineer.

PART 1 - GENERAL

1.1 Structural Steel Tubing

A. Fy 36 ksi hot-rolled tubing ASTM A-501.

1.2 Structural Pipe

A. Conform to ASTM A-53, Grade B.

1.3 Structural Steel Fabrication

A. Fabricate structural steel in accordance with the AISC Specifications with the modifications and additional requirements specified in this SECTION.

B. Shop connections shall be welded.

C. Field connections shall be welded or bolted as shown on Plans.

D. Submit five (5) copies of shop drawings to Structural Engineer for approval prior to start of fabrication.

1.4 Structural Steel Erection

A. Erect structural steel in accordance with AISC Specifications with modifications and additional requirements as specified in this SECTION.

B. Column bases and bearing plates: Attached column bases and similar structural members shall be aligned with wedges or shims.

1.5 Preparation of Coatings

A. Remove loose mill scale, loose rust and other foreign materials to the standards SSPC SP-2 and SP-1.

1.6 Shop Primer

A. Performance Properties: Bonding and rust inhibiting equal to Spec. TT-P-86 Type I or II, SSPC-Paint 4-64T or TT-P636C iron oxide zinc or chromatealkyd primer.

B. Proprietary Primers: Use is permissible when performance properties equal those mentioned above.

C. Primer Thickness: 2.0 mils min. dry film, except for minor deficiencies.

1.7 Galvanizing

A. Locations: Where exposed to the exterior.

B. Specifications: ASTM A 123, after fabrication. Minimum of 1.8 oz. Zinc per sq. ft.; bolts, Nuts, washers galv. To ASTM A 153; no field welds.

END OF SECTION

SECTION 05 21 00

STEEL JOIST FRAMING

1 PART 1 – GENERAL

1.1 DESCRIPTION

1. The extent of steel joists, joist girders and metal decking is shown on drawings.

1.2 QUALITY ASSURANCE

1. Joists shall be fabricated in accordance with the latest Steel Joist Institute Specifications, and meet the spacing requirements of Factory Mutual Bulletin I-28 in conjunctions with the type of decking used.

2. Provide joists fabricated in compliance with the Steel Joist Institute (SJI) specifications and load tables for K-Series and KS-Series Open Web Steel Joists. Provide joist girders in compliance with SJI Specifications and Load Tables with G-Series joist girders.

1.3 SUBMITTALS

1. Submit five (5) copies of shop drawings to Structural Engineer for approval prior to start of fabrication.

2 PART II – PRODUCTS

2.1 MATERIALS

1. Steel: Comply with SJI “Specifications”.

2. All material for joists and chords and webs shall have a minimum yield point of 50 ksi.

3. Material for joist anchors, bearing plates, bridging and other accessories shall have a minimum yield of 36 ksi.

4. Fasteners: ASTM a 325 or A490 structural bolts, nuts and hardened washers.

5. Steel Primer Paint: Manufacturers standard.

3 PART III – EXECUTION

3.1 JOISTS:

1. Do not start placement until supporting work is in place and secured.

2. Comply with requirements of architect of record.

3. Coordinate placement to eliminate conflict with all roof openings.

3.2 FINISHING:

1. Joists shall receive one (1) shop coat of standard primer paint.

2. Touch-up all exposed or abraded joists after installation.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

1 PART 1 – GENERAL

1.1 DESCRIPTION

1. The extent of steel joists, joist girders and metal decking is shown on drawings.

1.2 QUALITY ASSURANCE

1. Provide metal deck in compliance with:

   AISC “Specification for the Design of Cold-Formed Steel Structural Members”.
   AWS “Structural Welding Code”.
   SDI “Design Manual for Floor Decks and Roof Decks Provide roof deck which is listed in “Factory Mutual Approval Guide” for “Class I” fire rated construction.

2. Roof deck shall be designed in accordance with the “Basic Design Specification” as adopted by the Steel Deck Institute and Factory Mutual Bulletin 1-28. Conform to Factory Mutual I-90 for windstorm resistance and class 1 for fire resistance.

1.3 SUBMITTALS

1. Submit five (5) copies of shop drawings to Structural Engineer for approval prior to start of fabrication.

2 PART II – PRODUCTS

2.1 METAL DECKING

1. Deck shall be painted metal decking as requested by Owner. Provide add alternate bid for pricing comparison. Structural Engineer strongly suggests the use of galvanized metal decking in lieu of painted metal deck. Refer to Structural drawings for further detail.

2. Deck shall be either intermediate or wide rib and a minimum of 22 gauge.

3. Provide units of size and gauge as required by architect of record. Steel for painted metal deck: ASTM A 611 Grade C.

4. Steel for galvanized metal deck: ASTM A 446, Grade A.

5. Galvanizing: ASTM A525, G60.

6. Miscellaneous shapes, extensions, connectors, closure strip, bracing as required by the architect of record.

3 PART III – EXECUTION

3.1 METAL DECK

1. Complete installation to conform to published recommendations of deck manufacturer.

2. Seal the deck at the tops of all walls by means of closure strips.

3. Place on supporting framework, adjust to final position accurately aligned and on proper bearing.

4. Secure as required by architect of record.

5. Provide additional support, closers, etc. at all openings.

3.2 TOUCH-UP PAINT

1. Touch-up all exposed or abraded joists and metal deck after installation.

END OF SECTION

SECTION 05 40 00

COLD FORMED METAL FRAMING

Any information contained in this section that is found to be contradictory from that of the Structural Engineer shall be governed by that of the Structural Engineer.

1.0 Standards

A. The Work included in this section includes the fabrication and execution of all metal studs, runners, furring channels, and related bracing shown in the drawings and specified.

B. AWS Recommended Practices for Resistance Welding, AISI Specifications for the Design of Cold-Formed Steel Structural Members.

C. Deliver all products in their original, unopened packages. Handle to avoid damage. Store off the ground in storage building or under tarpaulins, vented to avoid condensation and moisture entrapment, until ready for installation. Remove from the site all damaged and deteriorated materials.

2.0 Materials

A.. All 16 gauge and heavier studs shall conform to ASTM A-446-76 Grade D, Galvanized, minimum yield 50,000 psi. All 18 gauge and lighter studs shall conform to ASTM A-446-76 Grade B, Galvanized minimum yield 37,000 psi. All stud gauge and size shall conform to manufacturer's published span chart.

B. All track and bridging shall be galvanized, of same grade and gauge as steel studs to which attached.

C. All furring channels shall be galvanized, of same grade and gauge as steel studs to which attached.

D. Fasteners:

1.) For attaching floor track to floor: approved power-driven fasteners.

2.) For attaching studs to track and bridging and ceiling track to runner: self-tapping, self-drilling, S-12 screws. Length as required. All dropped headwalls shall be supported per "Headwall Attachment Detail" shown on drawings.

E. Welds - Plug, butt, seam or fillet resistance welds on both sides of stud, top and bottom, conforming to AWS Specifications. Use 2.38mm (3/32") diameter AWS type 6013 rods, and heat setting of 60 to 110 amps. Welds in members subject to tension (such as bridging, diagonal bracing, etc.) shall be capable of withstanding a tension loading producing unit shearing stress of 227,535 kN/m^2 33 ksi).

3.0 Execution

A. Fabrication - Framing components may be fabricated at the project site or may be prefabricated and installed as panels.

1.) Fastening: All axially loaded members and exterior wall studs shall be attached by welding. Other components may be attached by welding or power-driven screw fasteners, at Contractor's option.

2.) Cut all members squarely or at an angle to fit squarely against abutting members. Hold members securely in place until permanently fastened.

3.) No splices will be permitted in axially loaded members.

4.) Wire-tying of main wall framing will not be permitted. Wire tying of furring channels in ceiling or soffit conditions, and in attachment to wall framing, is permitted. Wire tying of furring channels for lathing and plastering is required.

5.) Prefabricated panels shall be square and braced to prevent racking. Lift and handle members to prevent the distortion of any member.

6.) Components used to frame openings shall be of size and type capable of transferring all loads imposed on the opening into the vertical members, adjacent to the opening. Provide sufficient framing at jambs of openings to carry loads transferred.

3.1 Erection

A. Floor track: after accurately aligning floor track, attach track to concrete floor with 19 mm (3/4”) long 3/16” shank diameter power-driven concrete fasteners or expansion bolts. Fasten at 30 cm (12”) o.c. Consult Architect for method of attachment to substrates other than concrete. Grout slab surface irregularities to provide full bearing track.

B. Top track: attach to underside of concrete slabs or structural steel with power-driven 10 mm (3/4”) long 3/16” shank diameter fasteners or expansion bolts. For attaching studs to track and bridging and ceiling track to runner: Self-tapping, self-drilling, S-12 screws. Length as required.

C. Studs: Erect plumb and square, attaching to floor and ceiling track with two power-driven screws each side or with 1.6mm (1/16”) fillet weld 13mm (1/2”) long each side. Do not splice studs.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 Furnish all labor, materials, including all accessory items, railings, connections, angle frames, anchoring and fastening devices, bolts, nuts, screws, etc., enumerated below and/or as indicated on Drawings and Details for the completion of the Miscellaneous Metal Work indicated and/or specified .

1.2 Refer to Drawings for nature and extent of work.

PART 2 PRODUCT AND EXECUTION

2.1 Steel pipe guard post shall be standard weight pipe 6" diameter x 84" long outside building) galvanized. Install 48" A.F.F. and filled with concrete, domed at top.

2.2 Ladders, Stairs and railings at all locations shall meet all applicable codes including ADA, Texas Accessibility Standards and OSHA Standards, railings shall be 1 ¼" steel pipe (1 ½ " O.D.). Stair fabricator shall include with the stair shop drawings with a letter stating that all stairs and railings as detailed above comply with above codes. Nosings for concrete stairs (Section 03 30 00) shall be non-skid type, cast-in-place, OSHA approved, meeting ADA requirements.

2.3 Install a 20 gauge galvanized drip flashing above all exposed exterior doors, extend flashing 4" either side of door.

2.4 Provide galvanized steel gate posts, framing, and accessories for dumpster enclosures as indicated on drawings.

2.5 STAINLESS STEEL WORK

A. MATERIAL: AISI Type 302 or 304

B. FINISH: Satin No. 4 satin, unless shown otherwise on Drawings

C. PROTECTION: Strippable plastic covering; leave in place until clean-up is

D. DESIGN: Make connections and attachments to be concealed when possible; any exposed fasteners to be oval head ss screws

E. SAMPLES: (For approval) of each item, showing joints

F. TYPICAL ITEMS:

1. As indicated on drawings

2.6 GRADES OF STEEL WORKMANSHIP

A. CLASS 3: (Utility)

1. EXPOSED SURFACES: No improvement from mill finish required except preparation for galvanizing or priming

2. WELDS: Grinding not required

3. BOLTS: Exposed bolts permitted

4. LOCATION: Interior and exterior service areas

B. CLASS 1: (Highest Grade)

1. EXPOSED SURFACES: Ground completely smooth to uniform finish; pits, mill marks, nicks, scratches filled or ground off; no defects to show when painted

2. WELDS: Concealed by placing an interior where possible; where exposed, grind to small radius, uniform sized cove; when painted, welds to be undetectable

3. BOLTS: Only flat head countersunk in exposed to view locations

4. STRAIGHTNESS: No distortions visible to the eye

5. JOINT FIT: Hairline

6. LOCATIONS: Customer accessible areas

2.7 SHOP FINISHES ON STEEL ITEMS

A. HOT DIPPED GALVANIZE: (After fabrication) Exterior locations

B. SHOP PRIMER: Interior

END OF SECTION

SECTION 06 05 00

COMMON WORK RESULTS FOR WOOD, PLASTIC AND COMPOSITES

PART 1 - GENERAL

1.1 SUMMARY

A. Refer to drawings for nature and extent of work.

PART 2 - PRODUCT AND EXECUTION

A. Type of construction shall be as indicated except where specified otherwise by local code. Metal studs used shall be of the proper size based on manufacturer's recommendations for unsupported height or span. See structural drawings for minimum gauge framing. Studs to be spaced 16" o.c. unless noted otherwise.

B. All framing lumber, furring and plywood shall be fire retardant treated wood (AWPA C-20) bearing U.L. label. Fire retardant treated wood shall have a flame spread rating of 25 or less, a fuel contributed rating of 25 or less, and a smoke developed rating of 50 or less.

C. Any decor modifications or changes required by code must be approved by the Owner.

D. Suspended headwalls shall be diagonally braced to deck at 48" o.c. with no less than two (2) screws at any connection. Connection to deck shall be accomplished with solid framing studs, no tabs or trimmed cuts shall be allowed.

E. Wood blocking required in metal studs used to frame air conditioning units and other similar wall penetrations.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Conditions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. The work includes but is not limited to rough carpentry, and finish carpentry.

1.2 SECTION INCLUDES

A. Floor, wall, and roof sheathing.

B. Sill gaskets and flashings.

C. Preservative treatment of wood.

D. Fire retardant treatment of wood.

E. Miscellaneous framing, furring, and sheathing.

F. Miscellaneous concealed wood grounds, nailers, and blocking.

G. Plywood

1.3 RELATED SECTIONS

A. Section 04 21 00 – Clay Unit Masonry

B. Section 04 22 00 – Concrete Unit Masonry

C. Section 05 12 00 - Structural Steel Framing

D. Section 07 24 00 - Exterior Insulation and Finish System (EIFS)

1.4 REFERENCES

A. APA (American Plywood Association).

B. ASTM E84 - Test for Surface Burning Characteristics of Materials

C. AWPA (American Wood Preservers Association) C1 - All Timber Products - Preservative Treatment by Pressure Process.

D. AWPA (American Wood Preservers Association) C9 - All Plywood Products - Preservative Treatment by Pressure Process.

E. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

F. AWPA (American Wood Preservers Association) C27 - Plywood Fire Retardant Treatment by Pressure Process.

G. AWPA M4 - Care of Pressure Treated Wood Products

H. AWPB - Quality Control Standards.

I. PS 20 - American Softwood Lumber Standard

1.5 DEFINITIONS

A. Rough carpentry includes carpentry work not specified as part of other sections and generally not exposed to view, unless specified otherwise.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver all materials in undamaged condition.

B. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces.

C. Stack lumber, plywood and other panels providing air circulation within stacks in a manner to preclude moisture, mildew, rot, and contamination by soiling, chemicals, or environmental corrosives.

D. Provide for air circulation under temporary coverings including polyethylene and similar materials.

E. All treated lumber products shall be delivered in new condition and shall have the labeling clearly marked as to manufacturer's standard of grading.

2. PART 2 PRODUCTS

2.1 LUMBER MATERIALS AND TRUSSES

A. Factory-mark each piece of lumber with type, grade, mill and grading agency.

B. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

C. Provide dressed lumber, S4S, unless otherwise indicated.

D. Provide seasoned framing lumber with 19% maximum moisture content at time of dressing.

E. Provide No.2 Southern Yellow Pine grade lumber minimum for all blocking.

F. Provide treated lumber for exterior framing.

2.2 PLYWOOD

A. Minimum plywood thickness shall be 5/8", C-D grade, attached with drywall screws.

B. Plywood backing for telephone/electrical, APA C-D plugged – in with exterior glue ¾" minimum thickness.

2.3 SHEATHING MATERIALS

A. Roof Sheathing: Provide 5/8” minimum thickness plywood, APA rated for exterior use.

B. Wall Sheathing:

1) Plywood: APA rated for exterior exposure, 1/2” minimum thickness. Oriented Strand Board (OSB) is not acceptable.

2) Glass Mat Gypsum Boards: Dens-Glass Gold or Dens-Glass Gold Fireguard, 1/2” minimum thickness, by Georgia-Pacific Corp.

3) Gypsum Sheathing: Comply with FS-SS-L-30 for Type II (sheathing), Class 2 (water resistant) and with ASTM C79.

4) Gypsum Wall Sheathing: Moisture resistant, Fire resistant, ½ inch thick, 24 x 96 sized sheets, v-shaped tongue and groove long edges, water repellent paper faces. (Install with tongue up.) Gypsum sheathing board used for EIFS finishes substrate must be approved by the EIFS system manufacturer (refer to Section 07240).

2.4 ACCESSORIES

A. Fasteners and Anchors:

1) Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.

2) Drywall Screws: 1” Type 5 Bugle head, hardened steel, power driven type, [length to achieve full penetration of sheathing substrate.]

3) Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorage’s to steel.

4) Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washer’s and anchoring devices.

5) Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

2.5 FACTORY WOOD TREATMENT

A. Product Data: Submit for approval; evidence of AWPA compliance

B. Where lumber or plywood is indicated as “treated”, or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (lumber) and C9 (plywood) and of AWPB Standards. Mark each treated item with the AWPB Quality Mark Requirements.

1) Treatment: Pressure impregnated with water-borne CCA; each piece marked with AWPA data including amount of retention.

a. Retention: AWPA LP-22; 0.40 pcf; typical uses.

b. Retention: AWPA LP-2; 0.25 pcf; roofing grounds only.

2) Moisture content: Reduced by redrying to 19%.

3) Lumber Grade, Species: No. 2 southern yellow pine.

4) Locations: Roofing grounds.

5) Use two coats of Kloppers “Wolman clear” preservative treatment as specified in paragraph 2 below.

a. Wood cants, nailers, curbs, blocking, stripping, equipment platforms and similar members in connection with roofing, flashing, vapor barriers and waterproofing.

b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.

6) Fire-Retardant Treatment: All “FR-S” lumber or plywood specified or otherwise indicated, shall comply with the AWPA standards for pressure impregnation with fire-retardant chemicals to achieve a flame-spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E 84, or NFPA Test 355. Provide UL label on each piece of fire-retardant lumber or plywood. Note: All wood to be fire retardant and preservative treated, is to be supplied to the job site with Koppers “Dricon FRT” fire-retardant treatment; the Contractor shall then apply two coats of Koppers “Wolman clear” preservative treatment to the wood before installation.

a. Provide materials with Moisture content, after treatment of 15% or less.

2.6 MISCELLANEOUS

A. Building Paper: ASTM D 226, Type I, 30 LB, non-perforated asphalt saturated felt.

B. Hardboard: Opaque, grade II, tempered smooth one side, ¼” thick.

C. Cedar Fence: Western Red Cedar with band sawn textured surface.

1) Boards: Grade; Custom Knotty per WRCLA.

3. PART 3 EXECUTION

3.1 GENERAL

A. Securely and properly support and anchor all work to accurate fit, lines, level, and plumb without distortion.

B. Install fire-retardant treated materials in environments and with proper ventilation to prevent degradation of wood materials.

3.2 FRAMING

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members, crown side up.

D. Construct load bearing framing and curb members full length without splices.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists. Frame rigidly into joists.

F. Place full width continuous sill flashings under framed walls on cementitious foundations. Lap flashing joint 4 inches.

G. Place sill gasket directly on sill flashing. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

H. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

I. Coordinate curb installation with installation of decking and support of deck openings, roofing vapor retardant, and parapet construction.

3.3 SHEATHING

A. Secure roof sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing.

B. Use sheathing clips between sheets between roof framing members. Provide solid edge blocking between sheets. Fully engage tongue and groove edges.

C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing.

D. Place plywood or structural-use panel sheeting at building corners for a horizontal distance of 48 inches.

E. Place building paper horizontally over wall sheathing; weather lap edges and ends.

F. Refer to Section 07240 for requirements that all gypsum sheathing substrate for EIFS finish is to be installed in compliance with EIFS manufacturer’s specifications and requirements.

G. Apply sealant around sheathing perimeter at interface with other materials. Refer to Section 07900.

H. The gypsum sheathing board installation is to completely cover up all metal framing on the exterior of the building, with all joints tight, with no broken edges or holes; and with all metal studs completely covered, and all joints sealed watertight.

3.4 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.

B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings, and site-sawn cuts.

C. Allow preservative to dry prior to erecting members.

3.5 TOLERANCES

A. Framing Members: 1/8” from true position, maximum.

3.6 SCHEDULES

A. Above Grade Joist, Rafter, and Stud Framing: S/P/F species, 19 percent maximum moisture content.

B. Below Grade Joist and Stud Framing: Stress Group B, pressure preservative treatment.

C. Below Grade Wall Sheathing: Plywood, 3/4” thick, tongue and groove edges, pressure preservative treated.

D. Blocking and Cants: S/P/F species, pressure preservative treatment.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools and services necessary to complete the carpentry and related work in addition to layout of this work and installation of listed items of other sections of the specifications. Examine the drawings to determine the extent of the work and review the following criteria.

B. General Requirements:

1. Furnish and install all rough woodwork, rough bucks, grounds, screeds, nailing strips, etc.

2. Furnish and install all required rough hardware, such as nails, bolts, washers, anchors, etc., except as otherwise specified.

3. Take charge of and distribute hardware at the building and provide and arrange temporary shelving for the storage of all hardware.

4. Layout work described and assigned to this section of the specifications in accordance with the drawings. Carefully check dimensions.

5. Erect temporary protection for all completed or partially completed work where required to protect materials, surfaces, finishes and equipment; this includes temporary doors until hollow metal doors are delivered.

6. Examine the conditions including existing dimensions under which the work is to be performed and notify the Architect in writing of any unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected.

7. Coordinate work and cooperate with all other trades furnishing built in items to avoid delays in any work.

C. Items of work included but are not limited to the following list:

Examine the drawings and this specification section for the extent of work.

1. Wood grounds, blocking and other carpentry items as shown, for supporting and fastening millwork, carpentry, toilet partitions, grab bars and the work of the various other Sections.

2. All rough hardware including bolts, nails, screws, spikes, hangers, etc., required in connection with the installation of all materials under this Section.

3. Framing including metal studs, headers, etc.; plywood, rough wood blocking, blocking for roof curbs and other roof wood members.

4. Finish wood trim and cabinetwork.

5. Laminated plastic items as indicated.

6. All miscellaneous work shown on drawings but not furnished or installed by other trades.

1.02 TEMPORARY PROTECTION

A. Construct temporary doors, ladders, runways, barricades and railings required in and about the building.

B. The building shall be closed with temporary doors and windows as the work progresses, and during periods of inclement weather. All unglazed windows shall be closed with 4 mil polyethylene film in rough frames or old sash, plywood, or other suitable means. Temporary doors shall be storm tight with locks; do not fasten to finished frame of permanent door.

C. Protect well and in the proper manner with nonstaining sheathing paper, all materials in construction likely to be damaged by other trades or affected by the weather. The use of nails, wire, or metal likely to rust or cause discoloration, will not be permitted, shall nails be driven into masonry joints. All protection must be placed immediately after materials or work is set in place, and when directed by the various trades or Project Manager's Representative.

D. Guard rails shall be constructed around all large duct openings, etc., occurring in the floor and roof constructions. Rails shall be of height specified by Code and of substantial construction, and shall remain in place until the enclosing walls or partitions are erected and roof openings closed, at which time the guard shall be removed.

E. Comply with current OSHA regulations and standards.

PART 2 – PRODUCTS

2.01 LUMBER, GENERAL

A. Standard: For each use, comply with the "American Softwood Lumber Standard" PS 20 by the U.S. Department of Commerce. Nominal sizes are shown or specified; provide actual sizes complying with the minimum size requirements of PS 20 for the moisture content specified for each use.

B. Provide dressed lumber, S4S, unless otherwise shown or specified.

C. Provide seasoned lumber with 19% maximum moisture content at time of dressing and complying with dry size requirements of PS 20, unless otherwise specified.

2.02 FRAMING LUMBER

A. General: Where wood framing from 2" to 5" (but not including 5") in nominal thickness, and 2" or more in nominal width is shown or scheduled; provide lumber complying with grading rules which conform to the requirements of the "National Grading Rule for Dimension Lumber" of the American Lumber Standards Committee established under PS 20.

B. For light framing (2" to 4" thick and 2" to 4" wide), provide construction grade.

2.03 STRUCTURAL FRAMING

A. Structural Framing (6" and wider and from 2" to 4" thick), provide No. 2 grade lumber of any species of specified grade meeting or exceeding the following values:

1. "Fb" (minimum extreme fiber stress in bending) 1250 pounds per square inch.

2. "E" (minimum modulus of elasticity) 1,760, 000 pounds per square inch.

2.04 BOARDS

A. General: Where lumber less than 2" in nominal thickness and 2" or more in nominal width is shown or specified, provide boards complying with dry size requirements of PS 20.

B. Exposed boards: Where boards will be exposed in the finished work, provide the following:

1. Moisture content: 15% maximum.

2. For transparent finish (or natural finish), where shown or scheduled, provide the following: Select Heart Boards, Red Oak.

3. For paint finish, where shown or scheduled, provide the following: No. 2 boards, Ponderosa Pine (SPIB).
4. Provide chair rail at 32" A.F.F. in all offices and lounge. See drawings for Chair rail profile.

C. Concealed boards: Where boards will be concealed by other work, provide the following:

1. Moisture content: 15% maximum.

2. Species and grade: Southern Pine (SPIB) No. 2 boards or WWPA (any species) "Construction" boards.

2.05 PLYWOOD

A. Standard: For each use, comply with the requirements for "Softwood Plywood/Construction and Industrial" PS1 by the U.S. Department of Commerce.

B. Plywood: Provide plywood as specified for the type of exposure and finish shown or scheduled, as follows:

1. For smooth plywood exposed on the interior and to receive a paint finish, provide Interior Type, Grade A on exposed face; Grade D on concealed face.

2. Sheathing: Provide standard grade, with exterior glue.

2.06 ANCHORAGE AND FASTENING MATERIALS

A. For each use, select proper type, size, material and finish complying with the applicable Federal Specification. Use galvanized bolts, nuts and washers when fastening treated lumber.

2.07 MISCELLANEOUS ITEMS

A. Plastic laminate: Plastic laminate for counter tops/backsplash at Breakroom, Bathrooms, and sills at all Showroom windows shall be standard grade, 1/16” thick. Adhesive to be Minnesota Mining and Manufacturing Co., Neoprene based contract bond, “Fastbond 10” applied in accordance with manufacturer’s specifications.

1) Approved manufacturers:
Formica Corporation, “Formica” or Wilson Art.

2) Color shall be as indicated on the plans.

2.08 FIRE-RETARDANT TREATMENT

A. Where used in contact with or in composition of rated walls or as shown or scheduled, comply with AWPI Specification C-208 for pressure impregnation, with fire-retardant chemicals to achieve a flame-spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E84 or NFPA Test 355.

B. Where treated items are indicated to receive a transparent or paint finish use a fire-retardant treatment that will not bleed through or adversely affect bond or finish.

C. Complete fabrication of treated items prior to treatment, wherever possible. If cut after treatment, coat cut surfaces with heavy brush coat of same fire-retardant chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

D. All wood framing inside the building shall be fire-retardant treated.

2.09 WOOD PRESERVATIVE TREATMENT

A. The following items of rough framing or finish woodwork shall be treated with "Woodlife" or equal wood preservative process:

1. Where shown on drawings.

2. Roofing grounds and nailers.

2.10 GYPSUM SHEATHING

A. Gypsum Sheathing: Exterior grade conforming to ASTM C79, thickness indicated on the drawings. Provide corrosion-resistant self-drilling and self-tapping fasteners for attaching sheathing to metal studs. Fasteners spacing as indicated or as recommended by sheathing manufacturer.

NOTE: Sheathing at exterior E.I.F.S. system to be Dens Glass Gold as manufactured by Georgia Pacific Co. or approved equal.

2.11 VINYL SIDING

A. Where indicated, provide vinyl siding: Liberty Elite Double 5 by Alcoa, or Castle Ridge Double 5 by Georgia Pacific. Color to be selected by Project Manager from manufacturer's standard colors.

PART 3 – EXECUTION

3.01 WOOD FRAMING

A. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.

B. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

C. Trim shall be installed with lengths as long as practicable and closely fitted joints. Blind nail to the extent practicable; set and stop face nailing with non-staining putty to match finish. Use screws for fastening to metal; set and stop as done for nails. Stagger and conceal joints. Cap molded work at returns and interior angles and miter at exterior corners. Shoulder flat work to reduce warping.

D. For exterior canopy, fascia/soffit and other construction attached to and projecting from the building, provide fire-retardant treated blocking, framing lumber and plywood as indicated or as required by all applicable codes, regulations, ordinances and by authorities having jurisdiction. Fire-treated lumber and plywood shall conform to Paragraph 1.10 as specified in this Section.

3.02 ATTACHMENT AND ANCHORAGE

A. Use common wire nails, except as otherwise shown or specified. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.03 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Set true to line and level, plumb, with intersections true as required angle. Coordinate location with other work involved.

B. Attach to substrates securely with anchor bolts and other attachment devices as shown and as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry; anchor to form work before concrete placement.

3.04 WOOD FURRING

A. Install plumb and level with closure strips at all edges and openings. Shim with wood blocking or incombustible materials, accurately fitted to close furred spaces.

B. Furring to receive gypsum drywall: Unless otherwise shown, provide 1" x 2" furring at 16" o.c. vertically.

3.05 APPLICATION OF FINISH HARDWARE

A. Receive, store and be responsible for all finish hardware. Apply hardware in accordance with manufacturer's instructions. Fit accurately, apply securely and adjust carefully. Use care not to injure work when applying hardware.

B. The location of hardware in connection with hollow metal doors shall be as follows unless otherwise shown on the drawings:

1. Center doorknob 38" above finished floor

2. Center door pulls and push plates 42" above finished floor

3. Center cylinder deadlocks 52" above finished floor

4. Locate upper edge of top hinge 5" below head of frame

5. Center single push bars 48" above finished floor

6. Locate lower edge of bottom hinge 10" above finished floor

7. Space center hinges equal distance

3.06 INSTALLATION OF RESTROOM ACCESSORIES

A. These items to be furnished under other sections but are to be installed under this section. They shall be received, checked, installed in similar manner as noted on the drawings.

B. Installation shall be in a neat, workmanlike manner in strict accordance with the drawings, shop drawings, and the manufacturer's specifications.

END OF SECTION

SECTION 07 05 00

COMMON WORK RESULTS FOR THERMAL AND MOISTURE PROTECTION

A. Guarantee

Provide a two year written guarantee against water leakage into building's areas through work of this entire SECTION. Contractor shall, within such period, take such remedial measures as may be necessary to correct conditions of leakage and repair all construction damaged or stained by such leakage.

END OF SECTION

SECTION 07 13 00

WATERPROOFING AND DAMPPROOFING

PART 1 - GENERAL

1.1. GUARANTEE

A. Provide a two year written guarantee against water leakage into building's areas through work of this entire SECTION. Contractor shall, within such period, take such remedial measures as may be necessary to correct conditions of leakage and repair all construction damaged or stained by such leakage.

1.2. SUBMITTALS

A. Please submit the following:

1. Product data including manufacturer's specifications and application recommendations for waterproofing and dampproofing for each surface indicated.

PART 2 - PRODUCT

2.1 VAPOR BARRIER

A. Vapor barrior (Under Slab): Shall conform to ASTM E1745, Class A or better and shall have a maximum water vapor permeance of 0.012 perms when tested in accordance with ASTM E96 or F1249. Vapor barrier component no less than 15 mils thick in accordance with ACI 302.1R-96. Approved products:

1. STEGO WRAP VAPOR BARRIER (15 mil) by Stego Industries LLC (877) 464-7834 (www.stegoindustries.com).
2. Or approved Equal.

B. Vapor Barrier Installation

1. Provide vapor barrier as specified under all slabs on grade in compliance with ASTM E 1643-98.
2. Start membrane under perimeter grade beam and over subgrade. All joints and seams, both lateral and butt, shall be overlapped 6 inches and taped using vapor barrier manufacturer's recommended tape system. All penetrations must be sealed using specified vapor barrier and tape.
3. Any damaged area after installation of vapor barrier shall be repaired using manufacturer's product and tape. Cover any damage by a minimum overlap of 6 inches in all directions and tape carefully around entire perimeter of repair.
4. Electrical conduit shall be placed above membrane and encased in concrete unless otherwise noted on the drawings.

2.2 WATERPROOFING

A. When floor is below outside grade or at truck dock, waterproof exterior side of walls below grade level. Apply per manufacturer specifications with one of the following:

L.Sonneborn Sons, Inc. - "HLM 5000 T"
Tamms Industries Co. - "Chemstop CHM-100"

B. Locations: Walls and floors of elevator pit and walls of truck ramp; omit from elevator sump pit.

2.2. WATERSTOP MATERIALS

A. Synko-Flex Prod. Co. “Synko-Flex”; 1 sq. in. cross section; 713/963-9403.

B. DeNeff America, Inc. “swellseal Plus”; 713/583-7294; 517/681-5791.

C. Paramount Technical Products “Para JT”; ¼ x 2; 800/325-8715.

D. American Colloid “Water Stop RX 102”; ¾ x 3/8

2.3. WALL BASE FLASHING

A. 20 mil. thickness, sheet vinyl water barrier.

B. Manufacturer: B.F. Goodrich Company, or approved equal.

C. Flashing Adhesive: Philip Carey “Duk-Bak” No. 107, flashing adhesive, stiff-fibered mastic.

D. Extend membrane up outside face of the inner wythe of wall a minimum of 8”. Terminate membrane in bottom bed joint 1” from outside face of wall.

2.4. MASTIC DAMPPROOFING

A. Asphalt, semi-mastic, Dampproofing Mastic, brush or spray consistency.

B. Manufacturer: The Philip Carey Manufacturing Company or Sonneborn - Hydrocide.

C. Primer Coat: One (1) coat of spray applied “Duk-Bak” No. 77 Asphalt primer applied at a rate of 100 sq. ft. per gallon.

D. Damprrofing: Two (2) coats of spray applied “Duk-Bak” No. 87 Semi-mastic applied at a rate of 25-30 sq. ft. per gallon.

E. Application shall be in strict accordance with manufacturer’s application recommendations.

F. Mastic dampproofing required on all building exterior walls that have masonry veneer.

G. Apply one (1) layer of 4” wide sheet vinyl applied over horizontal and vertical joint in gypsum sheathing. Material to be same as wall base flashing. Aplpy with flashing adhesive.

H. Do Not Install mastic dampproofing in areas where E.I.F.S. on rigid foam board will adhere directly to tilt-wall or gypsum sheathing. Refer to drawings for locations. MASTIC DAMPPROOFING SHOULD NOT COME INTO CONTACT WITH ANY RIGID FOAM INSULATION.

PART 3 – EXECUTION

1.1 Install per manufacturers written instructions.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

1 PART 1 – GENERAL

1.1 DESCRIPTION

1. Insulation work includes:

   A. Insulation under slabs on grade.

   B. Foundation wall insulation.

   C. Board-type wall insulation, concealed.

   D. EIFS insulation specified in section 07 24 00.

1.2 QUALITY ASSURANCE

1. Comply with code-required fire-resistance, flammability and insurance ratings, per Comcheck forms provided on the drawings.

2. Construction assemblies shall achieve minimum aged “R” values (LTTR).

2 PART II – PRODUCTS

2.1 MATERIALS

1. Bead board insulation is not acceptable.

2. Extruded Polystyrene Board Insulation Rigid, closed – cell, extruded, expanded polystyrene, board with integral high-density skin; complying with ASTM C-578-92 Type IV, min. 20 psi compressive strength, k-value of 0.20; 0.3% maximum water absorption; 1, .1 perm-inch max. water vapor transmission; manufacture’s standard lengths and widths.

3. Glass Fiber Board Insulation: Glass fibers and water-resistant binders formed into rigid or semi-rigid boards; FS HH-I-558, Form A; k-value of 0.26; manufacture’s standard lengths and widths unless otherwise shown.

4. Mineral/Glass Fiber Blanket/Batt Insulation:

   Inorganic (nonasbestos) fiber formed into semi-rigid batts; ASTM C665, Type as indicated densities of not less than 0.5 lb. Per cu. Ft. for glass fiber units and not less than 2.5lb. per. Cu. Ft. for mineral wool units, k-value of 0.27.

   Provide Type I unfaced where indicated, semi-rigid in where self-support is required.

   Provide Type II non reflective vapor barrier faced units, barrier rating of 0.5 perms.

Provide Type III reflective vapor barrier faced where indicated, aluminum foil barrier with rating of 0.5 perms.

Flame-Spread Rating: Provide rating of 25, ASTM E 84.

Fire-Resistance Ratings: Where units are included in rated wall/ceiling/floor construction, provide mineral wool units which have been tested and rated as required for the indicated assembly.

5. Glass Fiber Board Insulation: Glass fibers and water-resistant binders formed into rigid or semi-rigid boards; FS HH-I-558, Form A; k-value of 0.26.

2.2 AUXILIARY INSULATING MATERIALS

1. Polyethylene Vapor Retarder: 4-mil film with vapor transmission ratings of 0.2 perms.

2.3 MINIMUM “R” VALUE

1. When NOT specified on the drawings or elsewhere the minimum R value shall be:

Wall: R-11 in 3 5/8” Stud cavities and R-19 in 6” stud cavities.

3 PART III – EXECUTION

3.1 INSTALLATION

1. Extend insulation full thickness over entire area to be insulated. Cut and fit tightly around obstructions.

2. Set vapor barrier faced units with vapor barrier to warm side of construction, except as otherwise shown. Do not obstruct ventilation spaces, except for firestopping.

3.2 VAPOR RETARDERS

1. Extend vapor retarders to extremities of areas to be protected. Secure in place. Extend vapor barriers to cover miscellaneous voids in insulated substrates.

2. Repair punctures and tears in vapor retarders before concealment by other work.

END OF SECTION

SECTION 07 22 00

ROOF AND DECK INSULATION

1 PART 1 – GENERAL

1.1 DESCRIPTION

1. Roof and Deck Insulation work includes

    A. Roof Deck insulation specified for energy code compliance.

1.2 QUALITY ASSURANCE

1. Comply with code-required fire-resistance, flammability and insurance ratings, per Comcheck forms provided in drawings.

2. Construction assemblies shall achieve minimum aged “R” values (LTTR).

2 PART II – PRODUCTS

2.1 MATERIALS

1. General:

    A. Provide preformed roof insulation boards that comply with requirements and referenced standards, as selected from manufacturer's standard sizes.

    B. Provide preformed saddles, crickets, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2. Polyisocyanurate Board Insulation: Complying with ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. Material as supplied by Duro-Last.

    A. Duro-Guard® ISO II (flat).

2.2 MINIMUM “R” VALUE

1. When NOT specified on the drawings or elsewhere the minimum R value shall be:

    Roof: R-30.

3 PART III – EXECUTION

3.1 INSTALLATION

1. Extend insulation full thickness over entire area to be insulated. Cut and fit tightly around obstructions.

2. Set vapor barrier faced units with vapor barrier to warm side of construction, except as otherwise shown. Do not obstruct ventilation spaces, except for firestopping.

END OF SECTION

SECTION 07 24 00

EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Materials and installation of Air/Moisture Barrier and EIF System.

1.02 DESIGN REQUIREMENTS

A. Wind Load

1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.

2. Design for wind load in conformance with code requirements.

B. Moisture Control

1. Prevent the accumulation of water behind the EIF system, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly.

a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.

b. Air Leakage Prevention-- provide continuity of air barrier system at foundation, roof, windows, doors and other penetrations through the system with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.

C. Impact Resistance

Provide ultra-high impact resistance to a minimum height of 6'-0" above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact except where hard rock plaster is indicated on drawings.

D. Joints

1. Provide minimum 3/4 inch wide expansion joints in the EIFS where they exist in the substrate or supporting construction, and where the EIFS adjoins dissimilar construction or materials

2. Provide minimum 1/2 inch wide sealant joints at all penetrations through the EIFS (windows, doors, etc.).

E. Grade Condition

1. Do not apply EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure.

1.03 QUALITY ASSURANCE

A. Manufacturer requirements

1. Member in good standing of the EIFS Industry Members Association (EIMA).

2. System manufacturer for a minimum of twenty (20) years.

B. Contractor requirements

1. Engaged in application of EIFS for a minimum of three (3) years.

2. Knowledgeable in the proper use and handling of EIFS materials and approved by Manufacturer.

3. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with manufacturers published specifications and details and the project plans and specifications.

C. Insulation board manufacturer requirements

1. Recognized by EIFS manufacturer as capable of producing insulation board to meet system requirements.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F. Store away from direct sunlight.

C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.05 COORDINATION/SCHEDULING

A. Provide site grading such that EIFS terminates above finished grade a minimum of 8 inches (203 mm) or as required by code.

B. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier.

C. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing.

D. Coordinate installation of windows and doors so air barrier components are connected to them to provide a continuous air barrier.

E. Install window and door head flashing immediately after windows and doors are installed.

F. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.

G. Attach penetrations through EIFS to structural support and provide water tight seal at penetrations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide Air/Moisture Barrier, EIF System and accessories from single source manufacturer or approved supplier.

B. The following are acceptable manufacturers:

1. Sto Corp. - Essence NexT System
2. Plastic Components, Inc.—Accessories
3. Dryvit - Outsulation Plus
4. Senergy - Senerflex - Channeled Adhesive Design

2.02 AIR/MOISTURE BARRIER

A. Sto Guard - fluid applied air/moisture barrier for exterior wall sheathing.

B. Senershield-R - fluid applied air/moisture barrier for exterior wall sheathing.

C. Dryvit Backstop - fluid applied air/moisture barrier for exterior wall sheathing.

2.03 INSULATION BOARD

A. Nominal 1.0 lb/ft^3 (16 kg/m^3) Expanded Polystyrene (EPS) Insulation Board in compliance with ASTM C 578 Type I requirements, and EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board.

2.04 REINFORCING MESHES

A. Standard Mesh

1. Nominal 4.5 $oz./yd^2$ symmetrical, interlaced open-weave glass fiber fabric made with minimum 20 percent by weight alkaline resistant coating for compatibility with materials.

B. Ultra-High Impact Mesh

1. Nominal 15 $oz./yd^2$ ultra-high impact, double strand, interwoven, open-weave glass fiber fabric with alkaline resistant coating for compatibility with

2.05 FINISH COAT

A. Sto -Stolit R1.5 acrylic based textured wall coating with graded marble aggregate.

B. Senergy - Belgian Lace

C. Dryvit - Quarzputz

2.06 JOB MIXED INGREDIENTS

A. Water--Clean and potable.

2.07 ACCESSORIES

A. Starter Track— Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc., 9051 NW 97th Terrace, Miami, Florida 33178 (800 327-7077).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install Air/Moisture Barrier and EIFS in compliance with manufacturer's published instructions.

3.02 PROTECTION

A. Provide protection of installed materials from water infiltration into or behind them.

B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

END OF SECTION

SECTION 07 42 43

COMPOSITE WALL PANELS

PART 1 – GENERAL

1.1 SECTION INCLUDES:

A. Exterior, panelized fiber cement cladding system and accessories to complete a drained and back-ventilated rainscreen.

B. Interior fiber cement panelized cladding system and accessories.

1.2 RELATED SECTIONS

A. Section 05 41 00 - Structural Metal Stud Framing

B. Section 06 10 00 - Rough Carpentry

C. Section 06 16 00 - Sheathing

D. Section 07 20 00 - Thermal Protection

E. Section 07 25 00 - Weather Barriers

F. Section 07 60 00 - Flashing and Sheet Metal

G. Section 07 90 00 - Joint Protection

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA):

1. AAMA 509-14 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems

B. ASTM International (ASTM):

1. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

2. ASTM C 1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement.

    a. ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets.

3. ASTM E-84 - Standard Test for Surface Burning Characteristics of Building Materials.

4. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

5. ASTM E 228 - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer.

6. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

7. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

C. Florida Building Code - Test Protocol HVHZ

1. Testing Application Standard (TAS) 202, 203 – HVHZ Test Procedures

D. National Fire Protection Association (NFPA):

1. NFPA 285 - Fire Test Method for Exterior Wall Assemblies Containing Combustible Material.

2. NFPA 268 – Ignition Resistance of Exterior Wall Assemblies.

E. Standards Council of Canada & Underwriters Laboratories Canada (ULC):

1. CAN/ULC S-102 – Standard Method of Test for Surface Burning Characteristics.

2. CAN/ULC S-134 – Standard Method of Fire Test of Exterior Wall Assembly.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit manufacturer's product description, storage and handling requirements, and installation instructions.

C. Product Test Reports and Code Compliance: Documents demonstrating product compliance with local building code, such as test reports or Evaluation Reports from qualified, independent testing agencies.

D. LEED Credits: Provide documentation of LEED Credits for project certification under USGBC LEED 2009 (Version 3.0) or 2012 v.4.

E. Manufacturer's Details: Submit drawings (.dwg, .rvt, and/or .pdf formats), including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/treatments, compression and control joints, corners, openings, and penetrations.

F. Samples: Submit samples of each product type proposed for use.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. All fiber cement panels specified in this section must be supplied by a manufacturer with a minimum of 10 years of experience in fabricating and supplying fiber cement cladding systems.

a. Products covered under this section are to be manufactured in an ISO 9001 certified facility.

2. Provide technical and design support as needed regarding installation requirements and warranty compliance provisions.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer trained by manufacturer or representative.

C. Mock-Up Wall: Provide a mock-up wall as evaluation tool for product and installation workmanship.

D. Pre-Installation Meetings: Prior to beginning installation, conduct conference to verify and discuss substrate conditions, manufacturer's installation instructions and warranty requirements, and project requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Panels must be stored flat and kept dry before installation. A waterproof cover over panels and accessories should be used at all times prior to installation.

B. If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing. Failure to do so may result in panel shrinkage at ship lap joints, and such action may void warranty.

C. Panels MUST be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.

D. Direct contact between the panels and the ground should be avoided at all times. It is necessary to keep panels clean during installation process.

1.7 WARRANTY

A. Provide manufacturer's 15-year warranty against manufactured defects in fiber cement panels. Additional 5-year extension available when refinished in year 14-15.

B. Provide manufacturer's 15-year warranty against manufactured defects in panel finish.

C. Warranty provides for the original purchaser. See warranty for detailed information on terms, conditions and limitations.

PART II – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Nichiha Corporation, 18-19 Nishiki 2-chome Naka-ku, Nagoya, Aichi 460-8610, Japan.

B. Acceptable Manufacturer's Representative: Nichiha USA, Inc., 6465 E. Johns Crossing, Suite 250, Johns Creek, GA 30097. Toll free: 1.866.424.4421, Office: 770.805.9466, Fax: 770.805.9467, www.nichiha.com.

1. Basis of Design Product: Nichiha VintageWood.

a. Profile colors: Cedar

b. Profiles: Wood plank texture with three, 3/8" grooves running lengthwise, spaced 5-5/8" apart.

c. Accessory/Component Options:

i. Manufactured Corners with 3-1/2" returns for each profile color.

ii. Aluminum trim options: Corner Key, Open Outside Corner, H-Mold,

J-Mold, Compression Joint, Inside Corner

1. Finish: Bark

iii. Essential Flashing System: Starter, Compression Joint, Overhang.

d. Dimensions - AWP-3030: 455mm (17-7/8”) (h) x 3,030 mm (119-5/16”) (l).

e. Panel Thickness: 16 mm (5/8").

f. Weight: 57.32 lbs. per panel.

g. Coverage: 14.81 sq. ft. per panel.

h. Factory sealed on six [6] sides.

C. Substitutions: Not permitted.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 MATERIALS

A. Fiber cement panels manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles.

B. Panel surface pre-finished and machine applied.

C. Panels profiled along 3030mm edges so that the long joints between the installed panels are ship-lapped.

D. Factory-applied sealant gasket added to top panel edge; all 3030mm edge joints contain a factory sealant.

2.3 PERFORMANCE REQUIREMENTS

A. Fiber Cement Cladding – Must comply with ASTM C-1186, Type A, Grade II requirements:

1. Wet Flexural Strength: Result: 1418 psi, Lower Limit: 1015 psi.

2. Water Tightness: No water droplets observed on any specimen.

3. Freeze-thaw: No damage or defects observed.

4. Warm Water: No evidence of cracking, delamination, swelling, or other defects observed.

5. Heat-Rain: No crazing, cracking, or other deleterious effects, surface or joint changes observed in any specimen.

B. Mean Coefficient of Linear Thermal Expansion (ASTM E-228): Max 1.0*10^-5 in./in. F.

C. Surface Burning (CAN-ULC S102/ASTM E-84): Flame Spread: 0, Smoke Developed: 0.

D. Wind Load (ASTM E-330): Contact manufacturer for ultimate test pressure data

corresponding to framing type, dimensions, fastener type, and attachment clips. Project engineer(s) must determine Zone 4 and 5 design pressures based on project specifics.

1. Minimum lateral deflection: L/120.

E. Water Penetration (ASTM E-331): No water leakage observed into wall cavity.

F. Steady-State Heat Flux and Thermal Transmission Properties Test (ASTM C-518): 16mm thick panel thermal resistance R Value of 0.95.

G. Fire Resistant (ASTM E-119): The wall assembly must successfully endure 60-minute fire exposure without developing excessive unexposed surface temperature or allowing flaming on the unexposed side of the assembly.

H. Ignition Resistance (NFPA 268): No sustained flaming of panels, assembly when subjected to a minimum radiant heat flux of 12.5 kW/m2 ± 5% in the presence of a pilot ignition source for a 20-minute period.

I. Fire Propagation (NFPA 285): Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Commercial Wrap, ½" Densglass Gold Sheathing, 16" o.c. 18 gauge steel studs, mineral wool in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of NFPA 285.

J. Fire Propagation (CAN/ULC S-134): Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Housewrap, 5/8" FRT plywood, 16" o.c. 2x wood studs, fiberglass in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of CAN/ULC S-134.

K. Drained and Back Ventilated Rainscreen (AAMA 509-14): System classifications: W1, V1.

L. Florida Building Code - Test Protocol HVHZ (TAS 202, 203): Horizontal Application Design Pressure: 95 psf, Vertical Application Design Pressure: 85 psf.

2.4 INSTALLATION COMPONENTS

A. Ultimate Clip System:

1. Starter Track:

    a. Horizontal Panel Installations - FA 700 – 3,030mm (l) galvalume coated steel.

    b. Vertical Panel Installations (AWP-3030 only) – FA 710T – 3,030mm (l) galvalume coated steel.

2. Panel Clips: JEL 778 "Ultimate Clip II" (10mm rainscreen for 16mm AWP) – Zinc-Aluminum-Magnesium alloy coated steel.

    a. Joint Tab Attachments (included) – used at all AWP-1818 panel to panel vertical joints – NOT used with AWP-3030 installations.

3. Corner Clips: JE 777C (10mm rainscreen for 5/8" AWP Manufactured Corners) -- Zinc-Aluminum-Magnesium alloy coated steel.

4. Single Flange Sealant Backer – FHK 1015 R (10mm) – 6.5’ (l) fluorine coated galvalume.

5. Double Flange Sealant Backer – FH 1015 R (10mm) – 10’ (l) fluorine coated galvalume.

6. Corrugated Spacer – FS 1005 (5mm), FS 1010 (10mm) – 4’ (l).

7. Finish Clip (optional) – JE310 (5mm)

B. Aluminum Trim (optional): Paint as specified in finish schedule.

C. Essential Flashing System (optional):

1. Starter – main segments (3,030mm), inside corners, outside corners

2. Compression Joint – main segments (3,030mm)

3. Overhang – main segments (3,030mm), inside corners, outside corners, joint clips

D. Fasteners: Corrosion resistant fasteners, such as hot-dipped galvanized screws appropriate to local building codes and practices must be used. Use Stainless Steel fasteners in high humidity and high-moisture regions. Panel manufacturer is not liable for corrosion resistance of fasteners. Do not use aluminum fasteners, staples or fasteners that are not rated or designed for intended use. See manufacturer’s instructions for appropriate fasteners for construction method used.

E. Flashing: Flash all areas specified in manufacturer’s instructions. Do not use raw aluminum flashing. Flashing must be galvanized, anodized, or PVC coated.

F. Sealant: Sealant shall comply with ASTM C920, Class 35.

PART III – EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Fiber cement panels can be installed over braced wood, steel studs and sheathing including plywood, OSB, plastic foam or fiberboard sheathing. Fiber cement panels can also be installed over Structural Insulated Panels (SIP’s), Concrete Masonry Units (CMU’s) and Concrete Block Structures (CBS’s) with furring strips, and Pre-Engineered Metal Construction. Insulated Concrete Forms (ICFs) are **NOT** an approved substrate under any condition.

2. Allowable stud spacing: 16” o.c. maximum.

3. A weather resistive barrier is required when installing fiber cement panels. Use an approved weather resistive barrier (WRB) as defined by the 2015 IBC or IRC. Refer to local building codes.

4. Appropriate metal flashing should be used to prevent moisture penetration around all doors, windows, wall bottoms, material transitions and penetrations. Refer to local building codes for best practices.

B. Examine site to ensure substrate conditions are within alignment tolerances for proper installation.

C. Do not begin installation until unacceptable conditions have been corrected.

D. Do not install panels or components that appear to be damaged or defective. Do not install wet panels**.**

3.2 TOLERANCE

A. Wall surface plane must be plumb and level within +/- ¼ inch in 20 feet in any direction.

1. One layer of Nichiha 5mm (~3/16") Spacer may be used as shim.

3.3 INSTALLATION

A. General: Install products in accordance with the latest installation guidelines of the manufacturer and all applicable building codes and other laws, rules, regulations and ordinances. Review all manufacturer installation, maintenance instructions, and other applicable documents before installation.

1. Consult with your local dealer or Nichiha Technical Department before installing any Nichiha fiber cement product on a building higher than 45 feet or three stories or for conditions not matching prescribed standard installation guide requirements and methods. Special installation conditions may be required via a **Technical Review and Special Applications Form (SAF)** process.

2. ***Vertical Control/Expansion Joints*** are required within 2-10 feet of outside corners finished with metal trim *and* approximately every 30 feet thereafter.

3. ***Horizontal/Compression Joints*** are required for multi-story installations of AWP. Locate joints at floor lines. Joints are flashed minimum ½" breaks. Do not caulk. Refer to installation guide(s).

    A. Wood framed buildings of three or more floors require a compression joint at each floor.

    B. Steel framed buildings (including reinforced concrete core with LGMF exterior walls) of more than three floors (or 45 feet) require a compression joint every 25 feet at a floor line.

B. Panel Cutting

1. Always cut fiber cement panels outside or in a well ventilated area. Do not cut the products in an enclosed area.

2. Always wear safety glasses and NIOSH/OSHA approved respirator whenever cutting, drilling, sawing, sanding or abrading the products. Refer to manufacturer SDS for more information.

3. Use a dust-reducing circular saw with a diamond-tipped or carbide-tipped blade.

    a. Recommended circular saw: Makita 7-1/4" Circular Saw with Dust Collector (#5057KB).

b. Recommended blade: Tenryu Board-Pro Plus PCD Blade (#BP-18505).

c. Shears (electric or pneumatic) or jig saw can be used for complicated cuttings, such as service openings, curves, radii and scrollwork.

4. Silica Dust Warning: Fiber cement products may contain some amounts of crystalline silica, a naturally occurring, potentially hazardous mineral when airborne in dust form. Consult product SDS or visit https://www.osha.gov/dsg/topics/silicacrystalline/.

3.4 CLEANING AND MAINTENANCE

A. Review manufacturer guidelines for detailed care instructions.

END OF SECTION

SECTION 07 51 50

SINGLE-PLY MEMBRANE ROOFING

PART 1 GENERAL

1.1 DESCRIPTION

This Roofing System incorporates maximum 12’ wide, white .060" thick scrim-reinforced Thermoplastic Polyolefin (TPO) membrane. Manufacturer Insulation is typically mechanically fastened to the roof deck with 1 fastener and plate every 2 square feet or secured to the insulation and deck with fasteners as required. Adjoining sheets of membrane are overlapped approximately 2" and joined together with a minimum 1-1/2" wide hot air weld.

1.2 QUALITY ASSURANCE

A. Installer Certification: Upon request by the Owner, obtain written certification from roofing system manufacturer that installer is approved by manufacturer to install the specified roofing system.

B. Insurance Certification: Provide completed systems which are listed for UL (Underwriter Laboratories) Class A external fire exposure and FM (Factory Mutual) Class 2 wind resistance and internal fire construction.

C. The roof shall be constructed of double layers roof insulation to achieve the specific “R-Value” provided by the insulation types and thickness specified for each roof system. Insulation components may vary by roof membrane system and shall be supplied and installed as specified to achieve or exceed *minimum* thermal value requirements of R-38.

D. Fabrication of sheet metal roofing accessories shall conform to applicable SMACNA, NRCA and membrane manufacturer’s published details and requirements.

E. Slope: Roof shall slope at ¼” /Ft. minimum, achieved in the deck structure. All saddles shall be constructed at twice the slope of the deck.

F. Final inspection of the completed roof shall be scheduled with the Owner’s Roofing Consultant and the inspection completed prior to final payment to the roofing contractor.

1.3 SUBMITTALS

A. To ensure compliance with Manufacturer's warranty requirements, the following projects should be sent to Manufacturer for review prior to installation, preferably prior to bid.

B. Projects where a wind speed warranty coverage greater than 110 mph peak gust wind speed is specified.

C. Projects where the building height exceeds 250'.

D. Air pressurized buildings, canopies and buildings with large openings where the total wall opening exceeds 10% of the total wall area where openings are located.

E. Cold storage buildings and freezer facilities.

F. Projects where the membrane is expected to come in direct contact with petroleum based products or other chemicals.

G. Along with the project submittals (shop drawings and Request for Warranty), the roofing contractor must include pullout tests when:

1. Specific fasteners are used with cementitious wood fiber, lightweight insulating concrete and

gypsum decks (See Manufacturer).

2. Specific fasteners are used into steel decks lighter than 22 gauge or oriented stand board (OSB) decks less than 5/8" thick (See Manufacturer).

H. For all projects (prior to project inspection by Manufacturer) a final shop drawing must be approved and assigned a number by Manufacturer.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.

B. Store membrane in dry ventilated area.

C. Job site storage temperatures in excess of 90° F may affect shelf life of curable materials (i.e., adhesives and sealants).

D. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60° F before use.

E. Do not store adhesive containers with opened lids due to loss of solvent which will occur from flash off.

F. Insulation and underlayment must be stored so it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

1.5 JOB CONDITIONS

A. There are no maximum slope restrictions for application of this roofing system. When the roof slope exceeds 5" per horizontal foot, use of an automatic welding machine may be more difficult. A hand held welder should be specified.

B. Existing roofing material must be investigated by the specifier and all wet material must be removed.

C. Existing phenolic insulation and sprayed-in-place urethane roofs must be removed prior to installation of this system.

D. The use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly should be investigated by the specifier. Consult the latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association).

E. Coordination between trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent subsequent damage to the membrane system.

1.6 WARRANTY

A. Before final payment, submit to the owner a warranty for a period of 2 years. The warranty shall cover all roofing, sheet metal, and related work called out in these documents. It shall cover defects in material and workmanship, as well as agreeing to make prompt repairs if notified of a leak. Provide a warranty inspection 3 months prior to the expiration. Repair defects in materials or labor discovered at this time. These defects shall include, but not limited to: voids, blisters, and vapor ridges.

B. Provide a maintenance schedule and maintenance information for the roof system installed.

C. Provide a manufacturer's warranty on the system installed for a period of ten years. The warranty shall cover material, and labor. It may not be limited by a penal sum.

PART 2 PRODUCTS

2.1 GENERAL

A. The components of this roofing system are to be products of Manufacturer or accepted by Manufacturer as compatible. The installation, performance or integrity of products by others, when selected by the specifier and accepted by Manufacturer, is not the responsibility of Manufacturer and is expressly disclaimed by the Manufacturer Warranty.

2.2 MEMBRANE

A. White reinforced .060" thick (Alternate 2: provide .080" thick) Thermoplastic Polyolefin (TPO) membrane is used for this roofing system. Membrane is available in widths of 12', 10' or 8' and lengths of 100'. For membrane physical properties, refer to Manufacturer

2.3 RELATED MATERIALS

A. Non-Reinforced or Reinforced Flashing, Cut Edge Sealant, EP-95 Splicing Cement, Water Cut-Off Mastic, PT-304 Sealant, Weathered Membrane Cleaner, Molded Pocket Sealant, Heat Weldable Walkway Pads, Pre-Molded Inside/Outside Corners, Pipe Flashings and Sealant Pockets.

B. Acceptable Manufacturers:

1. CARLISLE SynTec Incorporated
P.O. Box 7000
Carlisle, PA 17013

2. FIRESTONE BUILDING PRODUCTS COMPANY
525 Congressional Blvd.
Carmel, IN 46032-5607

3. JOHNS MANVILLE ROOFING SYSTEMS GROUP
717 17th Street
Denver, CO 80202

PART 3 EXECUTION

3.1 GENERAL

A. When feasible, begin the application at the highest point of the highest roof level and work to the lowest point to prevent moisture infiltration and to minimize construction traffic on completed sections. This will include completion of all flashings, terminations and daily seals.

B. Follow criteria outlined in the specifications to prepare the roof deck or the existing substrate prior to application of the new roofing system.

3.2 ROOF DECK CRITERIA

A. The proper substrate shall be as specified. The structure shall be sufficient to withstand normal construction loads and live loads.

B. Defects in the roof deck must be reported and documented to the specifier, general contractor and building owner for assessment. The Manufacturer Authorized Applicator shall not proceed with installation unless the defects are corrected.

C. Acceptable decks and applicable Fasteners per Manufacturer.

3.3 SUBSTRATE PREPARATION

A. On retrofit-recover projects, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation so it is relatively flush with the existing surface.

B. For all projects, substrate must be even without noticeable high spots or depressions, and must be free of accumulated water, ice or snow.

C. Clear the substrate of debris and foreign material. Fresh bitumen based roof cement must be removed or concealed.

3.4 INSTALLATION

Refer to the applicable Material Safety Data Sheets and Technical Data Bulletins for cautions and warnings.

A. Insulation Attachment

1. Manufacturer Insulation shall be mechanically fastened to the roof deck at a minimum rate of 1 every 2 square feet. Refer to Manufacturer's printed recommendations.

2. When an approved oriented strand board (OSB) is specified as the membrane underlayment, it must be mechanically fastened to the roof deck with 17 fasteners per 4' x 8' board in accordance with Manufacturer's printed recommendations.

3. When mechanical attachment of the insulation is not desired, an alternate insulation attachment method may be specified which incorporates the use adhesives or a solid mopping of hot asphalt.

B. Membrane Installation and Hot Air Welding

1. Sweep loose debris from the substrate.

2. Position Membrane over acceptable substrate and mechanically attach per manufacturer's recommendations.

3. Ensure location, number, and length of fasteners comply with applicable wind ratings.

4. Install adjoining membrane sheets in the same manner, overlapping edges a minimum as specified by manufacturer. It is recommended that all splices be shingled to avoid bucking of water.

5. Hot air weld the membrane sheets a minimum of 1-1/2" with an Automatic Hot Air Welding Machine.

6. Membrane that has been exposed to the elements for approximately 7 days must be prepared with Weathered Membrane Cleaner. Wipe the surface where Weathered Membrane Cleaner has been applied with a clean, dry Splice Wipe or other white rag to remove cleaner residue prior to hot air welding.

C. Additional Membrane Securement

1. The membrane must be secured at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, parapet, etc., at any angle change which exceeds

2" per horizontal foot and at all other penetrations in accordance with Manufacturer's details.

D. Membrane Flashing

1. Flash all walls and curbs with reinforced membrane. Non-Reinforced membrane shall be limited to inside and outside corners, field fabricated pipe seals, scuppers and Sealant Pockets where the use of pre-molded accessories are not practical. Terminate the flashing in accordance with an appropriate Manufacturer detail.

2. On vertical surfaces, such as walls, curbs and pipes, Bonding Adhesive is not required when flashing height is 12" or less and membrane is terminated under a metal counter-flashing (nailed). When a coping or termination bar is used for vertical terminations, Bonding Adhesive may be eliminated for flashing heights 18" or less.

E. Other Related Work

1. Walkways are required for all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), regardless of traffic frequency. Walkways are also required if regular maintenance (once a month or more) is necessary to service rooftop equipment. Walkways are considered a maintenance item and are excluded from the Manufacturer Warranty.

2. Heat Weldable Walkway Rolls are required when walkway pads are specified and are heat welded to the Membrane. When concrete pavers are used, they shall be loose laid and installed in conjunction with a slip sheet of reinforced membrane or two layers of HP Protective Mat. Concrete pavers are not recommended when the roof slope is greater than 2" per horizontal foot.

   A. Manufacturer Interlocking Rubber Pavers, 30" x 30" x 2", weighing approximately 6 pounds per square foot, may be interlocked and loose laid directly over the membrane. Installation instruction sheets are available from Manufacturer.

3. Copings, counter-flashing and other metal work, shall be fastened to prevent metal from pulling free or buckling and sealed to prevent moisture from entering the roofing system or building.

SECTION 07 52 00

MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Furnishing and installing new modified bitumen membrane with aggregate surface.

1.2 RELATED DOCUMENTS

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

1.3 SUBMITTALS

A. Submit product data, including manufacturer's technical product information, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage en experienced Installer (Roofer) to perform roofing work who has specialized in installing roofing systems similar to that required for this Project and who is acceptable to manufacturer of primary roofing materials.

1. Installer Certification: Obtain written certification from manufacturer of roofing system certifying that Installer is approved by manufacturer to install specified roofing system. Provide copy of certification for Architect prior to awarding roofing work.

2. Installer's Field Supervision: Require Installer to maintain a full-time supervisor/foreman who is on job site during times that roofing work is in progress and who is experienced in installing roofing systems similar to type and scope required for this Project.

B. Manufacturer Qualifications: Obtain primary products, including each type of roofing sheet (felt), bitumen, composition flashing, and any vapor retarder, from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products to use with roofing system specified.

C. Insurance Certification: Assist Owner's Representative in preparing and submitting roof installation acceptance certification as necessary in connection with fire and extended-coverage insurance on roofing and associated work.

D. UL Listing: Provide roofing system and component materials that have been tested for application and slopes indicated and that are listed by UL for Class A external fire exposure.

1. Provide roof-covering materials bearing UL Classification Marking on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-up Service.

2. Provide roofing system that can be installed to comply with UL requirements for Fire Classified and Class 90 uplift resistance requirements.

E. Fire Performance Characteristics: Provide insulation materials that are identical to materials whose fire performance characteristics, per requirements listed in Part 2 of this Section, have been determined from tests by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

F. Preliminary Roofing Conference: As soon as possible after award of roofing work, meet with Installer (Roofer), installers of substrate construction, such as decks, and other work adjoining roof system including penetrating work and rooftop units, Architect, Owner's Representative, and representatives of other entities directly concerned with roofing system performance, including Owner's insurers and test agencies.

G. Pre-application Roofing Conference: Approximately 2 weeks prior to scheduled commencement of roofing installation and associated work, meet at Project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work--including mechanical work, Architect, Owner's Representative, roofing system manufacturer's representative, and other representatives directly concerned with work performance, including Owner's insurers, test agencies, and governing authorities, where applicable.

1.5 PROJECT CONDITIONS

A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed according to manufacturers' recommendations and warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle roofing materials to ensure dryness. Store in a dry, well-ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or another raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deck deflection.

1.7 WARRANTY

A. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's standard No Dollar Limit (NDL) Warranty agreement, including flashing endorsement, signed by and authorized by representative of roofing manufacturer, on form that was published with product literature as of date of Contract Documents.

B. Manufacturer's NDL Warranty Period: 15 years from date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 ROOF INSULATION

A. Provide 1" thick thermal insulation board composed mainly of expanded perlite, to comply with ASTM C728. Fesco Board as manufactured by Johns Manville or approved equal.

Apply insulation board on metal deck with mechanical fasteners as required by manufacturers standard details. Materials shall comply with and indicate applicable UL labels.

B. Provide additional polyisocyanurate insulation boards to increase roof R-value to a minimum of 30.0. Insulation board to be E'NRGY' 2 by Johns Manville or approved equal.

2.2 ROOF MEMBRANE SYSTEM

A. Materials:

1. Ply Felts: Two plies of General Purpose, glass reinforced base sheets.

2. Roofing asphalt: Trumbull or other Johns Manville approved asphalt.

3. Approved Manufacturers: Subject to compliance with requirements, roofing systems that may be incorporated in the Work include, but are not limited to, the following: **3 FID system by Johns Manville; or Equal Systems as manufactured by Tremco, GS Roofing Products, and U.S. Intec.**

2.3 ROOFING SYSTEM EDGE/PENETRATION MATERIALS

A. Roofing Cement: Asphaltic cement, asbestos-free, complying with ASTM D 4586.

B. Glass-Fiber Fabric: Woven glass-fiber sheet impregnated with asphalt, complying with ASTM D 1668, Type I.

C. Pre-formed Edge Strips: Rigid insulation units matching roof insulation, or asphalt-impregnated organic-fiber insulation units, molded to form 3-1/2 x 3-1/2 inch (89 x 89 mm) by 45-degree cant strips and 1-5/8 x 18 inch (41 x 450 mm) tapered-edge strips to receive roofing ply-sheet courses and lift edges above main roofing surface.

2.4 SHEET METAL ACCESSORY MATERIALS

A. Sheet metal work and related materials and accessories provided under this section shall meet applicable provisions specified in Section 07600 Flashing and Sheet Metal. Coordinate roofing work with related work in that section and other related sections.

2.5 SURFACING AGGREGATE

A. Clean, water-worn, opaque gravel complying with ASTM D 1863

2.6 MISCELLANEOUS MATERIALS

A. Wood Members, Units: Comply with requirements of Division 06100 Rough Carpentry for nailers and other wood members indicated as roofing system work. Provide wood pressure treated with waterborne preservatives for above ground use (AWPB LP-2).

B. Asphaltic Primer: Comply with ASTM D 41.

C. Fasteners: Provide industry-standard types of mechanical fasteners for roofing system work, tested by manufacturer for required pull-out strength where applicable and compatible with deck type and roofing products used. Provide either 1 inch (25 mm)

diameter nail heads or 1-3/8 inch (35 mm) diameter by 0.012 inch (0.3 mm) sheet metal caps for nail used to secure base sheets, felts, or insulation boards of roofing systems.

PART 3 - EXECUTION

3.1 INSPECTING SUBSTRATE

A. Examine substrate surfaces to receive roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Protect other work from spillage of roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace/restore other work damaged when installing roofing system work.

B. Coordinate installing insulation, roofing sheets, flashing, stripping, coatings, and surfacing so that insulation and felts are not exposed to precipitation or exposed overnight. Provide cutoffs at ends of each day's work to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cutoffs immediately before resuming work.

C. Asphalt Bitumen Heating: Heat and apply bitumen according to EVT Method as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT more than 1 hour prior to application. Discard bitumen that has been held at a temperature exceeding finished blowing temperature (FBT) for more than 3 hours. Determine flash point, FBT and EVT of bitumen, either by information from bitumen producer or by suitable tests. Determine maximum fire-safe handling temperature and do not exceed that temperature in heating bitumen. In no case heat bitumen to a temperature higher than 25 degrees F (14 degrees C) below flash point. For aggregate- surfaced pour coats of bitumen, limit application temperature to minimum required for proper aggregate embedment and maximum that will permit retaining a coating of weight required (depends on slope of surface). Keep kettle lid closed except when adding bitumen.

D. Bitumen Mopping Weights: For interply mopping, and for other moppings except as otherwise indicated, apply bitumen between plies at the rate of 25 lb per square (1.2 kg/sq. m) (plus or minus 20 percent on a total-job average basis).

E. Cutoffs: At the end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary coverings of two plies of No. 15 roofing felt set in full moppings of hot bitumen; remove at beginning of the next day's work. Glaze-coat areas of completed organic ply sheets that cannot be flood-coated and aggregate-surfaced before the end of each day's work.

F. Thermal Barrier: Mechanically fasten one layer 3/4" inch thick cellulose fiber board, one face finished with mineral fiber, asphalt and kraft paper. Place on top of the Polyisocyanurate insulation. Use FM-approved fasteners specifically designed for securing insulation boards to steel roof deck, driven through metal or plastic discs. Space fasteners according to FM requirements for Windstorm Resistance Classification as required by local codes. Place end joints of insulation over deck flutes.

3.3 ROOF MEMBRANE INSTALLATION

A. Shingling Plies: Except as otherwise indicated, install membrane with ply sheets shingled uniformly to achieve required of amount membrane thickness throughout. Shingle in proper direction to shed water on each large area of roofing where slope is significant (over 1/2 inch per foot (1:25)).

B. Cant Strips/Tapered-Edge Strips: Except as otherwise shown, install pre-formed 45-degree insulation cant strips at junctures of roofing system membrane with vertical surface. Provide a pre-formed, tapered-edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

C. Interply Sheets: Install the number and type(s) of ply sheets (felts) indicated, lapped (shingled) amount specified to form a continuous, uniform membrane with continuous bitumen mopping between sheets so that ply sheet does not touch ply sheet.

a. Extend roofing membrane to 6 inches (50 mm)(nominal) above top edge of cant strip and terminate.
b. Provide a folded-back envelope at edges of penetrations of roofing protection where it is not turned up on a tapered strip to provide positive protection against flow of bitumen into building or off the edge. Extend base sheet to form envelope, or, where no base sheet is provided, install one ply of coated felt set in steep asphalt with joints sealed. Seal corners and other interruptions of envelope with large beads of roofing cement to protect against bitumen flow.
c. Nail edges of roofing membrane to wood blocking at perimeter edges of roof prior to installing metal gravel stops/fascias. Space nails not further apart than 8 inches (200 mm) o.c.

3.4 COMPOSITION FLASHING AND STRIPPING

A. Install composition flashing at cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof. Install one ply of No. 15 asphalt impregnated organic fabric and one-ply of glass-fiber-reinforced flashing, each set in continuous coating of roofing cement and extended onto deck 4 and 6 inches (100 and 150 mm), respectively. Nail or provide other forms of mechanical anchorage of composition flashing to vertical surfaces as recommended by manufacturer of primary roofing materials. Except where concealed by elastic flashing, apply a heavy coating of roofing cement over composition flashing.

B. Install composition stripping where metal flanges are set on roofing and at juncture with existing roofing. Provide 2 plies of fiberglass felt, one 9 inches wide, one 12 inches wide; set in hot asphalt, flashing cement or plastic roofing cement.

C. Roof Drains: Fill clamping ring base with a heavy coating of roofing cement. Set lead flashing sheet in a bed of roofing cement on completed roofing ply sheet courses with lead sheet clamped in roof drain ring and extended 12 inches (300 mm) onto roofing. Cover lead sheet with composition stripping, with plies extended 4 to 6 inches (100 to 150 mm) beyond edges of lead sheet. Provide composition stripping of any gravel stop rings.

D. Counter-Flashing: Counter-flashing, cap flashing, expansion joints, and similar work to be coordinated with roofing work are specified in other sections of these specifications.

E. Roof Accessories: Miscellaneous sheet metal accessory items, including insulation vents and other devices, and any major items of roof accessories to be coordinated with roofing system work are specified in other sections of these specifications.

3.5 PROTECTING ROOFING

A. Upon completing roofing, including associated work, institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. At end of construction period, or at a time when remaining construction will in no way affect or endanger roofing, inspect roofing and prepare a written report with copies to Architect and Owner's representative describing nature and extent of deterioration or damage found.

B. Repair or replace, as required, deteriorated or defective work found at time of above inspection to a condition free of damage and deterioration at time of Substantial Completion and according to requirements of specified warranty.

END OF SECTION

SECTION 07 54 00

THERMOPLASTIC MEMBRANE ROOFING
(BACK OF PARAPETS)

1 PART 1 –GENERAL

1.1 DESCRIPTION

1. Furnish and install a single ply (TPO) roofing system, at parapet walls; preparation of the roof deck, installation or roofing insulation, installation of a new membrane system, flashing, sheet metal, expansion joints, counter-flashing and other related items.

1.2 QUALITY ASSURANCE

1. Installer Certification: Upon request by the Owner, obtain written certification from roofing system manufacturer that installer is approved by manufacturer to install the specified roofing system.

2. Insurance Certification: Provide completed systems which are listed for UL (Underwriter Laboratories) Class A external fire exposure.

3. The roof shall be constructed of double layers roof insulation to achieve the specific “R-Value” provided by the insulation types and thickness specified for each roof system. Insulation components may vary by roof membrane system and shall be supplied and installed as specified to achieve or exceed minimum thermal value requirements. Comply with local codes if higher “R-Values” are required.

4. Fabrication of sheet metal roofing accessories shall conform to applicable SMACNA, NRCA and membrane manufacturer’s published details and requirements.

5. Slope: Roof shall slope at ¼” /Ft. minimum, achieved in the deck structure. All saddles shall be constructed at twice the slope of the deck.

6. Final inspection of the completed roof shall be scheduled with the Owner’s Roofing Consultant and the inspection completed prior to final payment to the roofing contractor.

1.3 SUBMITTALS

1. Furnish complete roof system submittals to the Architect of Record and Owners Roofing Consultant for review and approval, including all membrane materials, insulation’s, mechanical fasteners, bitumen types, sheet metal, accessories, related components and contractor’s Certification form the membrane manufacturer. A copy of the warranty shall also be submitted for approval. Submittals shall be received not less than two weeks prior to starting the project. No work shall commence until the General Contractor, Owner, and Roofing Contractor have received approved roofing system submittals.

1.4 JOB CONDITIONS

1. Install roofing work in strict compliance with manufacturer’s requirements.

1.5 WARRANTY

A. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's standard No Dollar Limit (NDL) Warranty agreement, including flashing endorsement, signed by and authorized by representative of built-up roofing manufacturer, on form that was published with product literature as of date of Contract Documents.

B. Manufacturer's NDL Warranty Period: 15 years from date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

2 PART II – PRODUCTS

2.1 ROOFING MEMBRANE

1. Single ply TPO roof system by Carlisle, 60 mil, white scrim reinforced, thermoplastic polyolefin, fully adhered.

2. Or approved equal.

2.2 MISCELLANEOUS MATERIALS

1. Fasteners: Gripdek plates and screws as manufactured by ITW Builder Corporation or equal as approved by roof system manufacturer. Provide fastener length sufficient to anchor base layer of insulation and penetrate through the deck ¾" minimum. Fasteners shall be Factory Mutual listed and approved for use with the insulation used.

2. Copings, gravel stops, gutters, downspouts, scuppers, etc. as per section 07600.

3. Sealant: As provided by membrane manufacturer.

4. Termination bars: 0.040" mill finished aluminum with 3 ½" vertical drop and ½" top caulk receiver.

2.3 ROOF INSULATION – Total "R" value for roof insulation to be R-30 min.

A. Base layer insulation; rigid boards, minimum density 2 lbs./cu. Ft. complying with ASTM 1622, polyisocyanurate with fiberglass perforated face sheet, 20 psi compressive strength complying with ASTM 1621. Dimensional stability shall comply with ASTM D-2126-87. Provide 3" x 48" x 96" size.

Approved insulation: "GAFTEMP Isotherm" as manufactured by GAF, E'NRG"Y 2 Isocyanurate" as manufactured by Johns Manville, Inc., or equal.

B. Top layer insulation; ¾" x 48" x 48" perlite or ½" 48" x 48" wood fiber board as approved by membrane manufacturer. R-value 2 minimum.

1. Approved perlite insulation: "GAFTEMP Permalite" as manufactured by GAF

"Fesco Board" as manufactured by Johns Manville, Inc., or equal.

2. Approved wood fiber insulation: "GAFTEMP Recover Board" as manufactured by GAF "1/2" Retro-Fit" manufactured by Johns Manville, Inc., or equal.

C. Tapered insulation for saddles and crickets; sloped ½" per ft. tapered perlite panels.

1. Approved tapered insulation: "GAFTEMP Permalite Tapered Roof System" as manufactured by GAF or "Tapered Fesco Board" as manufactured by Johns Manville, Inc.

3 PART III – EXECUTION

3.1 INSTALLATION

1. Install roof system in strict compliance with manufacturer's instructions.

2. Protect all adjoining and finish surfaces, including, but not limited to walls, glazing systems, pavements, walks and landscaping. Repair damaged areas to "as new" condition at no cost to the Owner.

3. Do not install more membrane than can be made watertight before the end of each days work.

4. Repair/replace deteriorated, defective or damaged roofing prior to final acceptance by the Owner.

5. Standing water will not be permitted on any completed roof. All areas where standing water exists shall be corrected prior to final acceptance of the installation by the Owner regardless of acceptance of standing water by the membrane manufacturer. Standing water is any amount of water remaining on the roof 48 hours after a rainfall.

END OF SECTION

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SCOPE

A. Refer to drawings and details for extent of sheet metal work.

B. Contractor to verify and ensure all exposed sheet metal cap flashing to be paint grade finish.

C. Contractor to verify and ensure all exposed trim and flashing members shall be the same material, finish and color as the existing center.

D. Contractor shall furnish complete shop drawings and product data submittals of all sheet metal flashing, caps, gutters, downspouts, etc., to Architect for review and approval.

1.2 DELIVERY, STORAGE AND HANDLING

A. Stack pre-formed materials to prevent twisting, bending, and abrasions, and to provide ventilation.

B. Prevent contact with materials which may cause discoloration or staining.

1.3 WARRANTY

A. Warrant installed system to be free of leaks and free from defects in materials and workmanship for 2 years from date of Final Completion of project.

B. Warrant factory applied fluorocarbon finish to be free of cracks, splits, crazing, chipping, peeling and color fading for 10 years from date of Final Completion of project.

PART 2 – PRODUCTS

2.1 GALVANIZED STEEL SHEETS

A. Zinc coating, hot dipped galvanized, flattened sheets, chemically treated.

B. Commerical quality: ASTM A526M, Z 275

C. Lock-forming quality: ASTM A526M, Z 275

D. Thickness: gauges unless noted otherwise on drawings.

1. Flashings and counter-flashing – 26 gauge
2. Parapet wall cap flashing – 24 gauge
3. Gutters, conductor heads and downspout – 24 gauge typical; except 20 gauge at gutters where any dimension is 8” or more.
4. Gutter support straps – 12 gauge

E. Finish:

1. Paint grade, Color: Paint to match existing (see 09 91 00).
2. Pre-finished as indicated on drawings, Color: See drawings.

F. Texture: Smooth finish to match existing.

2.2 ACCESSORIES

A. Fasteners:

1. Materials: AISI Series 300 for stainless and galvanized steel; aluminum for aluminum sheets.
2. Nails: Use annular ring shank type, 2.7 mm (No. 12 gage) or larger to suit application, of sufficient length to penetrate backing material at least 22 mm (7/8 inch).
3. Screws and Bolts: Sufficient size and length to sustain imposed stresses.

B. Solder Materials:

1. Flux: Type as recommended by sheet material manufacturer; not detrimental to base material.
2. Solder: ASTM B32, 50 percent tin/ 50 percent lead for plain copper, galvanized steel.

C. Asphatic Mastic: SSPC-Paint 12, solvent-type asphaltic mastic, containing no asbestos fibers, compounded for 0.4 mm (15 mil) dry film thickness per coat.

D. Sealants:

1. Silicone – General Purpose sealant specified in Section 07 92 00.
2. Color to match existing center and as selected by Architect from full range of manufacturer’s standard colors.

2.3 FABRICATION

A. General:

1. Shop fabricate components to maximum extent possible to minimize site fabrication.
2. Fabricate to allow for adjustments in field for proper anchoring and joining.
3. Form sections true to shape, accurate in size, square, free from distortion and defects.
4. Fabricate cleats and starter strips of same material as sheets, interlockable with sheet.
5. Fabricate corners from one piece with minimum 450 mm (18 inch) long legs; solder for rigidity; seal with sealant.
6. Solder:
   a. Solder and seal metals joints except those indicated or required to be expansive type joints.
   b. After soldering, remove flux. Wipe and wash solder joints clean.

B. Seams:

1. Provide following seam types unless noted or detailed otherwise.
2. Flat: Drive cleat.
3. Corner: Double corner.
4. Standing: Double lock standing.

C. Sheet Meat Thickness / Mass:

1. Flashing: In accordance with SMACNA Chapter 4.

3. Coping, fascia/gravel stop, scupper: In accordance with SMACNA Table 3-1

D. Flashing and Counter Flashing:

1. Fabricate as indicated on drawings and in accordance with SMACNA Architectural Sheet Metal Manual, Chapter 4.
2. Hem exposed flashings on underside 15 mm (1/2 inch); miter and seam corners.
3. Fabricate vertical faces with bottom edge formed outward 6 mm (1/4 inch) and hemmed to form drip.
4. Fabricate flashings to allow toe to extend minimum 50 mm (2 inches) over wall surfaces.

E. Coping: As indicated on drawings and in accordance with SMACNA Figure 3-4A.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts and vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed and secure.

3.2 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Install edge strips and cleats before starting installation.

C. Install surfaced mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.3 INSTALLATION

A. General:

1. Install metal work in accordance with SMACNA.
2. Install units plumb, level, square and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
3. Apply asphaltic mastic on metal surfaces of units in contact with cementitious materials and dissimilar metals.
4. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
5. Miter, lap seam and close corner joints with solder. Seal seams and joints watertight.
6. Install expansion joints at frequency recommended by SMACNA. Do not fasten seams such that movement is restricted.
7. Coordinate with installation of roofing system and roof accessories.

B. Flashing:

1. Insert flashings into reglets to form watertight fit. Secure in place with wedges at maximum 300 mm (12 inches) on center. Seal flashings into reglets with sealant.
2. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect.

C. Counter flashing and Reglets:

1. Fabricate counter flashings and reglets as 2 piece assemblies to permit installation of counter flashing after base flashings are in place
2. Fabricate reglets of same metal and gage as counter flashings.
3. Overlap composition base flashing 100 mm (4 inches) minimum.
4. Install bottom edge tight against base flashing.
5. Lap seal vertical joints 75 mm (3 inches) minimum and apply sealant.

D. Coping, Fascia/Gravel Stops and Scuppers:

1. Space seams: 2400 mm (8’- 0”) apart maximum.
2. Lock exterior edges over continuous cleats to secure to substrate.
3. Slope toward inside of parapet, 13 mm (1/2 inch) minimum, unless indicated otherwise.
4. Lock interior edges to substrate with cleats spaced at 305 mm (12 inch) centers.
5. Provide integral drainage system at seams to prevent water infiltration.

3.4 CLEANING

A. Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with washing soda solution, and then flushing clear water rinse. Use special care to neutralize and clean crevices.

END OF SECTION

SECTION 07 61 00

SHEET METAL ROOFING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pre-finished galvanized sheet steel roofing, associated flashings, and underlayment.

B. Counterflashings.

1.2 RELATED SECTIONS

A. Section 05 31 00 - Steel Decking

B. Section 07 60 00 - Flashing and Sheet Metal

C. Section 07 92 00 - Joint Sealants

D. Section 09 91 00 - Painting

1.3 REFERENCES

A. AAMA 605.2 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.

B. ASTM A361/A361M - Standard Specification for Steel Sheet, Zinc-Coated Galvanized by the Hot-Dip Process for Roofing and Siding.

C. ASTM B32 - Standard Specification for Solder Metal.

D. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

E. SMACNA (Sheet Metal and Air Conditioning Contractors National Association) - Architectural Sheet Metal Manual.

1.4 SUBMITTALS FOR REVIEW

A. Refer to Section 01 30 00 – Administrative Requirements.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Provide data on metal types, finishes, characteristics.

D. Submit two samples in sizes illustrating metal roofing material, and finish.

E. Submit two samples illustrating metal finish color.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise noted.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal roof installations with minimum 5 years experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Transport, handle, store, and protect without damage.

B. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

1.7 COORDINATION

A. Coordinate with the work of Section 07600 for flashing.

1.8 WARRANTY

A. Correct defective work within a two year period after Date of Substantial Completion. Defective work includes degradation of metal finish, failure of water tightness or seals.

2. PART 2 PRODUCTS

2.1 DESCRIPTION:

A. Berridge Double-Lock Zee-Lock (180º Seam) Panel Roof Panel System - galvanized pre-finished metal roof with integral snap-lock seam w/ patented vinyl weather-seal, and continuous panels.

B. Color to be Charcoal Grey.

C. Architect approved product substitutions permitted.

2.2 SHEET MATERIALS

A. Pre-finished hot dipped galvanized 24 gauge Steel Sheet: ASTM A446-85 Grade C/G-90 coating ASTM A 653-94 & A 924-94 Kynar 500 coating; color as selected from manufacturer's standard color.

2.3 ACCESSORIES

A. Fasteners: Same material and finish as roofing metal, with soft neoprene washers.

B. Underlayment: ASTM [D226, organic roofing felt, one layer 30 lb.

C. Sealant: Type specified in Section 07900.

D. Eave Protection Sheet: ASTM D226, 30 lb. Un-perforated asphalt saturated organic felts.

2.4 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet per manufacturer’s recommendations, interlockable with sheet.

C. Fabricate starter strips of same material as sheet, continuous, interlockable with sheet.

D. Form pieces in longest practical lengths.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections.

B. Verify deck is dry.

C. Verify correct placement of wood nailers.

D. Verify reglets are in place, and nailing strips located.

E. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

C. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.3 INSTALLATION - EAVE PROTECTION

A. Apply eave protection sheet in accordance with manufacturer's instructions.

B. Extend eave protection sheet minimum 2 feet upslope beyond interior face of exterior wall.

3.4 INSTALLATION - ROOFING

A. Apply underlayment over entire roof area in single layer laid perpendicular to slope; weather lap edges 2 inches and nail in place. Minimize nail quantity.

B. Cleat and seam all joints.

C. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.

3.5 INSTALLATION - STANDING SEAM ROOFING

A. Conform to SMACNA and details.

B. Lay sheets with long dimension perpendicular to eaves. Apply pans beginning at eaves.

C. Lock cleats into seams.

D. Align transverse joints of roofing sheets.

E. At eaves and gable ends, terminate roofing by hooking over edge strip.

F. Finish standing seams 2 inch high on flat surfaces.

3.6 INSTALLATION - FLASHINGS

A. Conform to SMACNA and details.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 76 00 – Protecting installed construction.

B. Do not permit traffic over unprotected roof surface.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 - GENERAL

1.1. Furnish all labor, material and incidentals for the complete installation of all roof accessories indicated on the drawings and/or specified herein.

1.2. SUBMITTALS

A. Submit Manufacturer's Acknowledgment Letter in accordance with Section 01 30 00.

B. Product Data: Submit manufacturer's technical product data, installation instructions, and recommendations for each product. Include data substantiating that materials comply with specified requirements.

C. Sample: Submit 2 samples of pipe support showing the actual size, shape, and material.

PART 2 - PRODUCTS

2.1. Refer to the Drawings for specific accessories to provide, some of the items listed below may NOT be required by the drawings.

2.2. PREFABRICATES ROOF CURBS

A. Prefabricated roof curbs shall be furnished by mechanical Contractor and installed by roofing Contractor.

2.3. ROOF HATCH

A. Furnish and install where indicated on plans metal roof hatch Type "E" (3'-0" x 3'-0"), or as indicated on drawing) as manufactured by the Bilco Company, New Haven, Connecticut, or equal. Cover shall be 14 gauge galvanized with 3" beaded flange, neatly welded. Insulation shall be glass fiber 1" thickness, fully covered and protected by a metal liner, 22 gauge, galvanized.

B. Curb shall be 12" in height and of 14 gauge. It shall be formed with a 3-1/2" flange with holes provided for securing to the roof deck. Curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, full welded at the corners for weathertightness. Insulation on the exterior of the curb shall be rigid fiber board 1" in thickness.

C. Scuttle shall be completely assembled with heavy pintle hinges, compression spring operators enclosed in telescopic hasps, positive snap latch with turn handles and padlock hasps inside and outside, and neoprene draft seal. Cover shall be equipped with an automatic hold-open arm complete with red vinyl grip handle to permit easy, one hand release. All hardware shall be cadmium plated, and factory finish.

D. Hinge pins to be non-removable from exterior.

E. Exterior Finish: Galvanized

2.4. PIPE SUPPORT

A. Acceptable pipe support manufacturer:

1. E-Z Mount Manufacturing, Inc.
   190 River Wood Drive, Huntsville, Texas 77320
   Phone (936) 891-7879
   Fax (936) 891-1440

2.5 Or approved equal

A. Material: Non-Ferrous Cast Aluminum

B. Provide manufacturer written warranty stating pipe support will be free from defective materials and workmanship, and agreeing to replace components which fail at no charge within 25 years from date of Final Completion. Failed materials and workmanship includes, but not limited to, corrode, rust, deformation, and rupture.

PART 3 - EXECUTION

3.1. Install in accordance with manufacturers' written instructions and as detailed on drawings.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

1 PART I – GENERAL

1.1 QUALITY ASSURANCE

1. Applicator Qualifications: Applicator shall have a minimum of 5 years experience successfully installing sealants.

2. Compatibility; Applicator shall be responsible for verifying that sealants used are compatible with joint substrates.

3. Guarantee; Sealant joints shall be guaranteed against adhesives and cohesive failure and water penetration through the sealed joint for 5 years.

4. Apply sealants in strict compliance with manufacturers instructions.

5. Contractor shall prepare samples on site for architect to review and select color to match adjacent material.

6. Refer to Section 07 24 00 for caulk at EIFS joints.

2 PART II PRODUCTS

2.1 MANUFACTURERS

1. Type “A” shall be used at all exterior and interior expansion and control joints in masonry and aluminum or steel to masonry - Federal Specification TT-S-230. Acceptable manufacturers:

   Dow - “790 Sealant”
   General Electric - “Silicone 1200”
   Pecora - “60+ Unicrylic”
   Tremco - “Dymeric 511”

2. Type “B” shall be used at all other building areas requiring caulking - Federal Specification TT-C-598. Acceptable manufacturers:

   Dap - “Architectural Guide”
   Pecora - “AC-20”
   Tremco - “Acrylic Latex 834”

3. Type “C” shall be used at all exterior paving, and sidewalk joints between building foundation or exterior concrete masonry wall and paving. Acceptable Manufacturers:

   Burke – “U-Seal 3204 Hand Mix (Gray)
   Tremco – 900 (Gray)

2.2 SEALANTS

1. Extreme Movement Sealants (+100% or -50% movement capability)

   A. Vertical/horizontal joint, such as expansion joints; use reference #S-6.

2. Significant Movement Sealants

   (.25% or –25% movement capability)

   A. Vertical or inclined joints such as panel, coping, expansion, and sloped pavement; use reference #S-1, 3 or 6.

   B. Horizontal joints not exposed to fuel or gas spillage; use reference #S-1, 2,3,4,6 or 7.

3. Minimal Movement Sealants (+25% or –25% movement capability)

   A. Vertical or inclined joints such as perimeters of doors, windows, wall penetrations; use reference #S-1, 3,4, or 6.

   B. Horizontal joints not exposed to fuel or gas spillage; use reference #S-2, or 5.

4. Interior Sealants and Caulking

   A. General; use reference #C-1.

   B. Special

      a. Toilet rooms; use reference #S-8.

2.3 REFERENCE NUMBERS

REF#	ASTM SPEC	FED. SPEC	PRODUCT DESCRIPTION
S = Sealant			
S-1	C-920-79 Type M Class 25 Grade NS	TT-S-227(e) Class A Type II	-Two component, non-sag, -Polyurethane or Polysulfide sealant -Shore A hardness of 20-40 -Joint movement range of +/-25%
S-2	C-920-79 Type M Class 25 Grade P	TT-S-227(e) Class A Type I	- Two component, self leveling, polyurethane or polysulfide sealant -Shore A hardness of 25-40 - Joint movement range or +/25%
S-3	C-920-79 Type S Class A Grade 25 Type II Grade NS	TT-2-230(c)	-Low modulus, one component, non-sag, Polyurethane or polysulfide sealant -Shore A hardness of 15-25 -Joint movement range of +/-50% -Minimum elongation of 700%
S-4	C-920-79 Type S Class 25 Grade NS	TT-S-230(c) Class A Type II	-One component, non-sag, polyurethane or polysulfide sealant -Shore A hardness of 25-40 -Joint movement range of +/-25%
S-5	C-920-79 Type S Class 25 Grade P	TT-S-230 (c) Class A Type I	-One component, self leveling, polyurethane or polysulfide sealant -Shore A hardness of 15-45 -Joint movement range or +/-25%
S-6	C-920-79 Type S Class 25 Grade NS	TT-S-1543 (a) Class A	-Low modulus, one component, non-sag, neutral cure, silicone sealant -Shore A hardness of 15-20 -Joint movement range of +100% to –50% -Joint size may be as little as 2 times joint movement -Minimum elongation of 1200%
S-7	C-920-79 Type S Class 25 Grade NS	TT-S-1543 (a) Class A	-One component, neutral cur, non-sag, silicone sealant -Shore A hardness of 25-30 - Joint movement range of +/-25%
S-8	C-920-79 Type S Class 25 Grade NS	TT-S-1543 (a) Class A	-One component, non-sag, mildew resistant silicone sealant -Shore A hardness of 25-30
C = Caulking			
C-1	C-834-76	N/A	-One component acrylic latex caulking minimum 75% recovery per ASTM C-736-82 -Maximum joint movement of +/-7.5%

2.4 PRIMER

1. Provide type recommended by sealant manufacturer for project conditions.

2.5 BACKER ROD

1. Open or closed cell (non-gassing) polyethylene or polyurethane as recommended by sealant manufacturer.

    A. Closed cell or closed skin open cell backer rods shall be used within EIFS joints.

3 PART III EXECUTION

3.1 INSTALLATION

1. Clean joints to eliminate all detrimental substances.

2. Install joint filler and backing without gaps between ends.

3. Prevent 3-sided bonding within the joint. Use bond breaker tape as recommended by sealant manufacturer as needed.

3.2 CLEANING

1. Clean off excess sealant or smears adjacent to joints without damaging adjacent surface or finishes.

END OF SECTION

SECTION 08 11 00

METAL DOORS AND FRAMES

PART 1 – GENERAL

1.0 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute “Recommended Specifications Standard Steel Doors and Frames” SDI-100.

B. Fire Rated Door Assemblies: Provide assemblies complying with NFPA 80 and labeled in accordance with ASTM E-152.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide steel doors and frames by one of the following:

-Amweld/Div. American Welding & Mfg. Co.
-Ceco Corp.
-Curries
-Mesker Industries, Inc.
-Pioneer Bldrs. Products Corp./Div. CORE Industries, Inc.
-Steelcraft/Div. American Standard Co

B. Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569.

C. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366.

D. Galvanized Steel Sheets: Zinc-coated carbon steel sheets, complying with ASTM A 525, G60 zinc coating, mill phosphatized.

E. Supports and Anchors: Fabricate of not less than 18-gage galvanized sheet steel.

F. Inserts, Bolts, and Fasteners: Manufacturer’s standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

2.1 SHOP APPLIED PAINT

A. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.2 FABRICATION

A. Comply with SDI-100 requirements as follows:

B. Interior Doors: SDI-100, Grade II, heavy-duty, Model 1, minimum 18-gage faces, 1 ¾” thick.

C. Exterior Doors: SDI-100, Grade III, extra heavy-duty Model 2, minimum 16-gage faces, 1 ¾” thick.

D. Fabricate exposed faces of doors from only cold-rolled steel.

E. Fabricate frames with 12ga; concealed stiffeners, reinforcement, edge channels, louvers, and molding from either cold-rolled or hot-rolled steel (at fabricator's option).

F. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.

G. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

H. At exterior locations provide thermal insulation door and frame assemblies, tested in accordance with ASTM C 236.

I. Provide assemblies with U factor of 0.41 BTU/Hr. Ft.square/deg.F or better.

J. Finish Hardware Preparation: Doors and frames to receive mortised and concealed finish hardware.

K. Comply with applicable requirements of ANSI A115 series specifications.

2.3 STANDARD STEEL FRAMES

A. Provide metal frames for doors, of types and styles as shown on drawings. Conceal fastenings, unless otherwise indicated.

1. Exterior door frames shall be minimum 16-gage cold-rolled furniture steel.

2. Interior door frames shall be minimum 18-gage cold-rolled furniture steel.

B. Fabricate frames with mitered and welded corner. K-D Frames are prohibited.

C. Form exterior frames of hot-dip galvanized steel.

D. Door Silencers: Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs.

PART III – EXECUTION

3.0 INSTALLATION

A. Comply with SDI-105 "Recommended Erection Instructions For Steel Frames", SDI-100 and NFPA 80.

B. Frames: In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.

C. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screw and masonry anchorage devices.

D. Install fire-rated frames in accordance with NFPA Std. No. 80.

E. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

F. Final adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SCOPE

A. Provide wall and ceiling access doors of size and quantity shown on the Drawings. Type of door should match application for wall or ceiling type construction.

1.2 WARRANTY

A. The work of this Section shall be warranted for one year after erection against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming. Warrant against defective material and workmanship.

1.3 SUBMITTALS:

A. Submit Manufacturer's Acknowledgment Letter in accordance with Section 01300.

B. Product Data: Submit manufacturer's technical product data, installation instructions, and recommendations for each product. Include data substantiating that materials comply with specified requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Bar-Co., Enterprise, AL.
B. Cesco Products, Minneapolis, MN.
C. Elmdor Manufacturing Co., City of Industry, CA.
D. J.L. Industries, Bloomington, MN.
E. Karp Associates, Inc., Maspeth, NY.
F. Milcor Incorporated, Lima, OH.
G. Nystrom, Inc., Minneapolis, MN.
H. Or approved equal.

2.2 ACCESS DOORS

A. STYLE: Flush mount type for specific construction application (i.e. metal soffit, plaster soffit, gyp. bd. wall., etc.)
B. MATERIAL: Steel, frame 16 gauge, panel 14 gauge.
C. PAINT: Chemically bonded prime coat of baked enamel.
D. HINGES: Concealed continuous piano hinge allow opening to 175 degrees.
E. LOCKS: Flush, screwdriver operated with case-hardened steel cam.
F. SIZE: 30" x 30"

PART 3 – EXECUTION

3.1 Installation to conform with details and Manufacturer's written instructions.

3.2 Paint access door to match color of adjacent surface.

END OF SECTION

SECTION 08 41 00

ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. Aluminum entrance and storefront systems complete with reinforcing, fasteners, anchors, and attachment devices.

B. Accessories necessary to complete work.

1.2. RELATED SECTIONS

A. Section 07 92 00 – Joint Sealants

B. Section 08 81 00 – Glass Glazing.

1.3. REFERENCES

A. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. AAMA 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.

C. AAMA FC-1 - Field Check of Metal Curtain Walls for Water Leakage.

D. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.

E. ANSI A117.1 - Safety Standards for the Handicapped.

1.4. SYSTEM DESCRIPTION

A. Design Requirements:

1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.

2. Employ registered professional engineer, licensed to practice structural engineering in jurisdiction where Project is located, to engineer each component of storefront system.

3. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.

4. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.

5. Provide concealed fastening wherever possible.

6. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.

7. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.

8. Anchors, fasteners and braces shall be structurally stressed not more than 50 percent of allowable stress when maximum loads are applied.

9. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.

10. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and win pressure.

B. Thermal Requirements:

1. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.

2. Ensure doors function normally within limits of specified temperature range.

3. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures shall not exceed 1/175 of its clear span or 19 mm (3/4 inch), whichever is less, except that maximum deflections of members supporting plaster surfaces shall not exceed 1/360 or its span.

C. Interface With Adjacent Systems:

1. Integrate design and connections with adjacent construction.

2. Accommodate allowable tolerances and deflections for structural members in installation.

1.5. SUBMITTALS

A. Submit Manufacturer’s Acknowledgment Letter in accordance with Section 01 33 00 – Submittal Procedures.

B. Product Data: Submit manufacturer’s technical product data, installation instructions, and recommendations for each product. Include data substantiating that materials comply with specified requirements.

C. Shop Drawing: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.

D. Submit two samples 12”x12” in size illustrating finished aluminum surface, glass units, glazing materials.

1.6. QUALITY ASSURANCE

A. Single Source Responsibility:

1. To ensure quality of appearance and performance, obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.

B. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering in jurisdiction where Project is located, with minimum of 5 years experience in design of storefront systems.

C. Installer Qualifications: Certified in writing by system manufacturer as qualified for installation of specified systems.

D. Certifications:

1. Submit manufacturer’s certification that products furnished for Project meet or exceed specified requirements.

2. Submit manufacturer’s certification stating that sealed insulating glass meet or exceed specified requirements.

3. Engineering certifications.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 60 00 – Product Requirements

B. Protect finished surfaces as necessary to prevent damage.

C. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.

D. Do no leave coating residue on any surfaces.

E. Replace damaged units.

1.8. WARRANTY

A. Provide warranties in accordance with Section 01 78 36 - Warranties.

B. Provide written warranty jointly signed by manufacturer, installed and Contractor agreeing to repair and/or replace assemblies which fail in material or workmanship during warranty period of 5 years from date of Final Completion.

C. Provide written warranty stating organic coating finish will be free from fading more than 10 percent, chalking, yellowing, peeling, cracking, pitting, corroding or non-uniformity of color, or gloss deterioration beyond manufacturer’s descriptive standards for 10 years from date of Final Completion.

PART 2 - PRODUCTS

A.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Entrance and Storefront Manufacturers:

1. Kawneer Company, Inc. Norcross, GA.

2. Oldcastle Building Envelope –
803 Airport Rd., Terrell, TX, 75160, Ph. (972) 551-6100

B. Acceptable Entrance and Storefront Products:

1. Storefront and entrance framing systems:

a. Series: Trifab VG 450 Framing system, by Kawneer

1. Framing Member Profile: 1-3/4”x4-1/2”;Front, Center, Back, Multi-Plane Structural Silicone or Weatherseal (Type B) Glazed

2. Series 3000 Thermal Multi-Plane (2”x4-1/2”)

C. Entrance doors:

1. Series 500 swing doors, by Kawneer

2. Oldcastle Building Envelope – Standard Door & Frame WS-500

D. Spandrel Storefront framing system:

1. Series: ENCORE thermal storefront, by Kawneer

2. Framing Member Profile: 1-3/4”x4-1/2”;Front, Center, Back, Multi-Plane Structural Silicone or Weatherseal (Type B) Glazed

A.2 MATERIALS

A. Aluminum (Entrance and components):

1. Material Standard: ASTM B 221; 6063-T5 alloy and temper

2. The door stile and rail face dimensions of the 500 entrance door will be as follow:

Door	Vertical Stile	Top Rail	Bottom Rail
500	5”	5”	10”

Finish as selected by architect.

B. FRAMING MATERIALS AND ACCESSORIES

1. Aluminum:

a. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.

b. Minimum thickness of 3mm

c. Internal Reinforcing:

1. ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.

2. Shapes and sizes to suit installation.

3. Steel components factory coated with alkyd type zinc chromate primer complying with FS TT-P-645, applied after fabrication.

d. Anchorage Devices:

1. Manufacturer’s standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.

2. Hot-dip galvanize steel assemblies after fabrication, comply with ASTM A123, 0.05 kg (2.0 ounce) minimum coating.

e. Fasteners:

1. Aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with items being fastened.

2. Provide concealed fasteners wherever possible.

3. For exposed locations, provide Phillips flathead screw with finish matching item fastened.

4. For concealed locations, provide manufacturer's standard fasteners.

f. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.

g. Protective Coatings: Cold-applied asphalt mastic complying with SSPC-Paint 12, compounded for 0.76 mm (30 mil) thickness for each coat; or alkyd type zinc chromate primer complying with FS TT-P-645.

h. Touch-Up Primer for Galvanized Components: Zinc oxide conforming with FS TT-P-641.

i. Glazing Gaskets:

1. Compression type design, replaceable, molded or extruded, of neoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).

2. Conform to ASTM C509 or C864.

3. Profile and hardness as required to maintain uniform pressure for watertight seal.

j. Weatherstripping:

1. Wool pile conforming to AAMA 701.2; or extruded elastomeric conforming to ASTM C509 or C864.

2. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

k. Internal Sealants and Baffles: Types recommended by systems manufacturer.

C. FABRICATION

1. Coordination of Fabrication:

a. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.

b. Fabricate units to with stand loads, which will be applied when system is in place.

l. General:

1. Provide each unit of framework continuous.

2. Disassemble only to extent necessary for shipment and installation.

3. Conceal fasteners wherever possible.

4. Reinforce work as necessary for performance requirements, and for support to structure.

5. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or preformed separators, which will prevent contact and corrosion.

6. Comply with Section 08 80 00 for glazing requirements.

m. Aluminum Framing:

1. Provide members of size, shape and profile indicated, designed to provide for glazing from exterior.

2. Fabricate frame assemblies with mitered or coped joints.

3. Reinforce to develop full strength and maximum rigidity in framework.

4. Reinforce internally with structural members as necessary to support design loads.

5. Maintain accurate relation of planes and angles, with hairline fit of contacting members.

6. Seal horizontals and direct moisture accumulation to exterior.

7. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.

8. Fabricate framing for expansion and contraction due to temperature changes without detrimental to appearance or performance.

9. Make provisions in framing for minimum edge clearance, nominal edge cover and nominal pocket width for thickness and type of glazing or infill used in accordance with recommendations of manufacturer and FGMA Manual.

n. Entrance Doors:

1. Provide welded joint connections. Weld and grind smooth prior to finishing operations.

o. Hardware:

1. Receive hardware supplied in accordance with Section 08 71 00 and install in accordance with requirements of this Section.

2. Cut, reinforce, drill and tap frames and doors as required to receive hardware.

3. Comply with hardware manufacturer's templates and instructions.

4. Use concealed fasteners wherever possible.

p. Welding:

1. Comply with recommendations of the American Welding Society.

2. Use recommended electrodes and methods to avoid distortion and discoloration.

3. Grind exposed weld smooth and flush with adjacent surfaces; restore mechanical finish.

3. FINISHES

a. Factory Finishing - Kawneer Permanodic® AA-M12C22A44, AAMA 611, Architectural Class I Color Anodic Coating. Color to be CLEAR ANODIZED.

E. EXECUTION

1. EXAMINATION

a. Examine conditions and proceed with Work in accordance with Section 01 40 00 – Quality Requirements.

2. INSTALLATION

a. Erection Tolerances:

1. Limit variations form plumb and level:

a. 3mm in 3000 mm (1/8 inch in 10'-0") vertically.

b. 3mm in 6000 mm (1/8 inch in 20'-0") horizontally.

2. Limit variations in theoretical end-to-end and edge-to-edge alignment: 1.6 mm (1/16 inch) from flush surfaces not more than 50 mm (2 inches) apart or out-of-flush by more than 6 mm (1/4 inch).

b. Install doors and hardware in accordance with manufacturer's printed instructions.

c. Set units plumb, level and true to line, without warp or rack of frame.

d. Anchor securely in place, allowing for required movement, including expansion and contraction.

e. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with bituminous paint or preformed separators to prevent contact and corrosion.

f. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.

3. FIELD QUALITY CONTROL

   a. Site Tests: Comply with requirements of Section 01 40 00 – Quality Requirements.

   b. Perform Hose Test in accordance with Division 01.

4. ADJUSTING

   a. Test door operation functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

5. CLEANING

   a. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials, and other unsightly marks.

   b. Clean metal surfaces exercising care to avoid damage.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1. SUMMARY

A. Related Documents: Conditions of the Contract, Division 1 – General Requirements, and Drawings apply to Work of this Section.

B. Related Sections:

1. Section 08 41 00 – Entrances and Storefronts

1.1 SUBMITTALS

A. General: Submit in accordance with Section 01 30 00 – Administrative Requirements.

B. Hardware Schedules:

1. Submit schedule indicating hardware required for each opening.

2. Use same reference numbers for openings as Drawings.

3. Include glossary of abbreviations, symbols and codes contained in schedule.

4. Include name and manufacturer of each item.

5. Include type, style, model number, function, size, fastenings, finish and other pertinent data for each item.

6. Indicated degree of opening for closers, overhead stops, overhead holders, and other similar hardware items.

C. Templates:

1. Furnish templates and approved Hardware Schedule to door and frame fabricators. Where a fabricator cannot work to paper templates, furnish physical hardware.

2. Ship templates and physical hardware to factories of respective manufacturers; pre-pay costs for shipping and delivery.

D. Submit following Informational Submittals:

1. Certifications specified in Quality Assurance article.

2. Qualification Data: Hardware Supplier’s qualification data.

E. Closeout Submittals:

1. Submit under provisions of Section 01 70 0 - Warranties.

2. Warranty: Submit specified warranty.

1.2. QUALITY ASSURANCE

A. General Requirements:

1. Hardware has been specified by manufacturer's name, brand and catalog numbers for purpose of establishing basis for quality, design and operational function.

2. Except where specifically indicated otherwise, equivalent products from other listed manufacturers are also acceptable.

3. Provide designated product, or where more than one product or manufacturer is listed, provide equivalent product of one of other listed manufacturers.

4. Obtain each type of hardware from single manufacturer.

5. Hardware Sets shown in the drawings are not complete with respect to the thickness of doors, hand, backset, method of fastening, and other detail requirements.

6. Review Drawings and Door Schedules thoroughly and provide required hardware for all openings, including openings which may have been inadvertently omitted from Door Schedules.

7. Should an opening be omitted or an opening not indicated with hardware set, provide hardware of same quality, design and function as specified for similar openings.

8. Furnish hardware complete with brackets, plates, fittings, fastenings and other accessories required for installation.

9. Provide screws, nuts, bolts, through-bolts, washers, grommets and other fastening devices necessary for proper installation of hardware, match finish of hardware being attached. Non-ferrous or corrosion resistant type required where exposed to exterior atmosphere.

10. Provide concealed fastening wherever possible. Where exposed, use countersunk Phillips oval-head type screws, except flat head for hinges.

11. Do not attach hardware to metal frames and metal doors with self-tapping or sheet metal screws.

12. Wood screws shall have full thread.

13. Machine screws shall have undercut head and full thread.

14. Hardware items affixed to concrete, masonry, or stone shall have machine screws and threaded expansion shields.

B. Regulatory Requirements:

1. Comply with provisions of Americans with Disabilities Act (ADA) including ADA Accessibility Guidelines and local accessibility standards to accommodate barrier-free design.

2. Provide abrasive coating or knurled tactile warning on door hardware to hazardous areas.

3. Comply with provisions of NFPA 80 for hardware at fire-rated assemblies.

4. Provide hardware which has been tested and listed by UL or FM for fire-rated assemblies of types which comply with requirements of door and frame labels.

C. Hardware Supplier Qualifications: Builders hardware supplier who has been furnishing hardware in Project's vicinity for period of not less than 2 years, and who is, or who employs and Architectural Hardware Consultant (AHC) who will be available at reasonable times during course of Work for consultation about Project's hardware requirements.

D. Certification: After completion of hardware installation, submit written certification attesting that hardware has been installed in accordance with manufacturer's templates and instruction.

1.3. DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01 60 00 – Product Requirements.

B. Pack each hardware item separately. Include manufacturer's printed installation instructions, trim, fasteners, accessories, and special tools necessary for installation.

C. Legibly mark and adequately label each package indicating opening for which intended. Provide markings corresponding with approved Hardware Schedule.

1.4. WARRANTY

A. Submit manufacturer's warranty stating closers will be free from defects in materials and workmanship for period of 5 years from date of Final Completion.

PART 2 - PRODUCTS

2.1. MANUFACTURER & SCOPE

A. Door hardware manufacturer, type, finish are as indicated on the drawings

2.2. MANUFACTURER & SCOPE

A. Hinges

1. Except for hinges and pivots to be installed entirely (both leaves) into doors and frames, provide only template hinges which conform to ANSI whenever possible.

2. Use ball bearing hinges on heavy doors, doors where high frequency service is expected and doors equipped with door closers.

3. All hinges to be used on exterior doors or doors subject to special atmospheric conditions (pool areas, chemical labs, sewage disposal plants, etc.) shall be of non-ferrous material: brass, bronze or stainless steel.

4. Hinge pins, except as otherwise noted, shall be as follows:

a. Steel hinges: steel pins.

b. Non-ferrous hinges: stainless steel pins.

c. Exterior doors: non-removable steel pins (NRP) or security stud.

d. Out-swing corridor doors: non-removable pins (NRP).

e. Interior doors: non-rising pins.

f. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip is indicated.

Size of pins shall be as follows:

Door Thickness/Width	Hinge Height	Hinge Width
1 3/8" to 32"	3 ½"	3 ½"
1 3/8" over 32"	4"	3 ½"
1 ¾ to 36"	4 ½"	4" or 4 ½"
1 ¾" over 36"	5"	4 ½" Extra Heavy Ball Bearings

5. Numbers of hinges per door, provide quantities as follows:

a. For doors less than 5' high - 1 pair.

b. For doors 5' to 7'6" high: 1 ½ pair, and one additional hinge for each additional 2'6" or fraction thereof.

6. When protection of door trim is such as to prevent desired degree of opening, the proper hinge width shall be provided to all door to clear the trim.

B. Removable Core Keying Systems

1. All cylinders and locksets shall be by "BEST", or equal.

2. A construction key feature shall be available within this key system through use of a unique Construction Master Key. This key will operate all removable core cylinders while building is under construction.

C. Heavy Duty Cylindrical Locksets

1. All locks and latches shall be heavy duty cylindrical locksets.

2. To provide proper interface of components and consistency of insurability, all locks, trim and cylinders shall be of one manufacturer.

a. Locksets for this project shall be heavy duty cylindrical key in lever handle type locksets.

b. Locksets shall be 2 ¾" backset with ½" throw latchbolt, with deadlocking latch, and a cylindrical housing of steel with a zinc dichromate finish.

c. Cylinders for lever handle cylindrical locks shall be 7 pin tumbler, solid brass, with nickel silver keys. Two keys shall be supplied with each lock cylinder.

d. The ½" throw latchbolt shall be listed and approved for use by Underwriters Laboratories.

e. Strikes shall be curved lip ANSI A - 115.2 4 7/8" x 1 1/2" wrought brass or bronze.

3. Keying: (Interchangeable Core)

a. All locks and cylinders shall be 7 pin tumbler key removable and interchangeable core cylinders keyed as required by the owners instruction.

b. Provide each key removable core cylinder with a construction master key core of brass. The construction cores shall be used by the General Contractor throughout the construction period.

c. Provide a total of five (5) space cores to be turned over to the Owner for his use.

4. Door Closers:

a. All door closers for this project shall be the product of one manufacturer, and shall have aluminum alloy shell with full cover. Door closers shall be full rack and pinion type construction, non-handed and non-seized with adjustable back-check.

b. The hardware contractor shall insert the hardware schedule, beside each door listing, the required degree of opening for each door. If the door swing is over 140^{o}, parallel arm type closers shall be used. Door closers mounted on corner brackets, or top jamb application, shall not be permitted.

c. Provide hold open arms, where specified, in accordance with the hardware set numbers.

d. The installing contractor shall be responsible for proper installation of opening indicated on hardware schedule. The installing contractor shall be responsible for adjustment of the three individual valves, for proper control as follows:

1 - closing speed
2 - latching speed
3 - delayed action, or backcheck

Spring power adjustments shall also be the responsibility of the installing contractor.

e. Where top rail of door is insufficient in width to mount the closer directly to the rail, drop brackets shall be provided by the installing contractor.

e. All door closers shall be listed by Underwrites Laboratories for use on self closing fire rated doors.

PART 3 - EXECUTION

3.1. EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 01 30 00 – Administrative Requirements

3.2. INSTALLATION

A. Install hardware plumb, level, and true to line in accordance with manufacturer's templates, Section 01 60 00 – Product Requirements

B. Install fire rated hardware in accordance with NFPA 80

C. Where cutting and fitting is required on substrates to be field painted or similarly finished, install, fit, remove and store hardware prior to finishing. Reinstall hardware after finishing operations are completed.

D. Do not install surface mounted items until finishes have been completed on the substrate.

E. Reinforce attachment substrates as necessary for installation and operation.

F. For substrates which are not factory prepared for hardware:

1. Mortise work to correct size and location without gouging, splintering or causing irregularities in exposed finish work.

2. Fit faces of mortised components snug and flush without excessive clearance.

G. Set Thresholds at exterior doors in bed of sealant. Remove excess sealant.

3.3. ADJUSTING

A. Check and adjust each operating hardware item to ensure correct operation and function.

B. Ensure weatherstripping and seals do not inhibit closing and positive latching of door.

C. Lubricate moving or operating components as recommended by hardware manufacturer. Use graphite type lubrication if none other is recommended.

D. Replace defective materials or nits which cannot be adjusted to operate as intended. Reinstall items found improperly installed.

E. Prior to date of Substantial Completion, Readjust and relubricate hardware items as necessary.

3.4. HARDWARE LOCATIONS

A. Butt Hinges:

1. Top: 5 inches from inside head of frame down to top of hinge.

2. Bottom: 10 inches from finish floor to bottom of hinge.

3. Intermediate: Equally spaced between top and bottom hinges.

B. Butt Hinge Backset:

1. 5/16 inch on frame from stop to edge of hinge mortise.

2. ¼ inch on door from backface to edge of hinge mortise.

C. Locksets and Latchsets: 38 inches from finish floor to centerline of knob or lever.

D. Deadlocks and Deadlatches: 48 inches from finish floor to centerline of cylinder.

E. Push/Pull Latches: 45 inches from finish floor to centerline of latchbolt.

F. Exit Devices: 38 inches from finish floor to centerline of cross bar or touch bar.

G. Door Closers:

1. Degree of door swing as indicated in Hardware Schedule approved by Architect, or if not indicated, locate to permit maximum door swing.

2. Locate on interior side of exterior doors.

3. Locate on stair side of doors at stairways.

4. Locate on room side for doors in public areas, corridors and other similar areas.

H. Push/Pull Bar Sets:

1. Horizontal push bar centered at 42 inches above finish floor, extending full width from centerline to centerline of door sites.

2. Vertical pull bar centered on door stile with top mounting at 42 inches above finish floor and equipped with stud to pass through door for concealed set screw mounting of push bar on opposite side.

I. Wall Stops: Place on adjacent wall at height to contact knob, lever or pull.

J. Stretcher Plates: Mount on push side, top edge 914 mm (36 inches) above finish floor, and centered.

K. Mop Plates: Mount on pull side, 1/8 inch above bottom edge, and centered.

END OF SECTION

SECTION 08 81 00

GLASS GLAZING

PART 1 - GENERAL

1.1. SUMMARY

A. Section Includes

1. Glass of aluminum entrances and storefronts

2. Associated glazing sealants and accessories

B. Related Sections:

1. Section 08 41 00 – Entrances and Storefronts

1.2. SYSTEM REQUIREMENTS

A. Design Requirements

1. Provide continuity of building enclosure to maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of sealant.

2. Employ registered professional engineer, licensed to practice structural engineering, to engineer each component of glass and glazing system.

B. Performance Requirements:

1. Provide thickness of glass units to withstand specified wind loads

2. Limit glass deflection to flexure limit of glass with full recovery of glazing materials, whichever is less.

C. Glazing Requirements:

1. Comply with CPSC 16 CFR 1201 and ANSI Z97.1 for safety requirements of glazing materials.

2. Glass thickness, where indicated, are minimum requirements and are to be confirmed by glass manufacturer.

3. Provide glass of thickness and heat treatment (annealed, heat strengthened or fully tempered) as necessary to prevent temperature stress breakage.

4. Use 2.5 safety factor of glass to statistical probability of failure (8 lites/1000).

5. Bekaert, 7-mil “Graffiti Guard” security film.

Phone: (213) 210-6022 Website: www.graffitiguards.com

1.3. SUBMITTALS

A. General: Submit in accordance with Section 01 30 00.

B. Product Data: Manufacturer’s product data for each type of glass and glazing material specified, including glazing accessories and glazing sealants.

C. Shop Drawings:

1. Sections and details of glass and glazing materials installation at framing members including head, mullions, transoms, jambs and sills.

2. Stamp shop drawings with seal and signature of professional engineer responsible for design.

D. Samples:

1. 12 by 12 inches in size illustrating color and reflective value of glass

2. 12 inches long bead of glazing sealant, in full range of manufacturer's standard colors for selection by Architect.

E. Submit following Informational Submittals:

1. Test Reports:

a) Glazing sealant indicating substrate adhesion.

b) Glazing sealant compatibility.

c) Glazing sealant manufacturer's recommendations.

2. Certifications specified in Quality Assurance article.

3. Qualification Data: Engineer's and Installer's qualification data.

4. Manufacturer's instructions.

F. Closeout Submittals:

1. Submit under provisions of Section 01 77 00.

2. Warranty: Submit specified warranty.

1.4. QUALITY ASSURANCE

A. Single Source Responsibility: Glass of each type to be produced by same manufacturer.

B. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering with minimum of 5 years experience in design of glass and glazing.

C. Installer Qualifications: Acceptable to manufacturer with documented experience on at least 5 projects of similar nature in past 5 years.

D. Regulatory Requirements:

1. Fabricate glass to comply with ASTM C 1036, ASTM C1048 and ANSI Z97.1.

2. Perform work in accordance with FGMA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

E. Certifications:

1. Manufacturer's letter certifying glass and glazing materials compatibility.

2. Manufacturer's letter certifying that sealed insulating glass units meet or exceed specification.

3. Engineering certifications.

1.5. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with Section 01 60 00.

1.6. PROJECT CONDITIONS

A. Environmental Requirements:

1. Perform glazing when ambient temperature is above 40 degrees F.

2. Perform glazing on dry surfaces only.

1.7. WARRANTY

A. Manufacturer’s standard 10 year warranty on hermetically sealed insulating glass units.

PART 2 - PRODUCTS

2.1. Acceptable Manufacturers

A. Visteon

B. PPG Industries

C. Libby – Owens – Ford Co.

D. Guardian Industries

E. Associated Glass

2.2. Material

A. FLAT GLASS MATERIALS

1. Float Glass (Type FG-A): ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; 1/4 inch (6 mm) minimum thick.

2. Safety Glass (Type FG-B): ASTM C1048, fully tempered, Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; conforming to ANSI Z97.1; 1/4 inch (6 mm) minimum thick.

3. Wired Glass (Type FG-H): ASTM C1036, Type II patterned and wired flat, Class 1 translucent, Quality q8 glazing; 1/2” square mesh, 1/4 inch (6 mm) minimum thick.

B. INSULATING GLASS PRODUCTS

1. Sealed Insulating Glass Units: Pre-assembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated, including those in Insulating Glass Product Data Sheet at the end of this Section.

2. For properties of individual glass lites making up units, refer to requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products comprising lites of insulating glass units.

3. Provide heat-treated, where recommended by manufacturer to comply with system performance requirements specified and Kind FT (fully tempered) where safety glass is designated or required.

4. Performance characteristics designated for insulating glass are nominal values based on manufacturer's published test data for units with lites 6.0 mm (0.23 inch) thick and nominal 1/2-inch dehydrated space between lites, unless otherwise indicated.

   a. U-values are expressed as Btu/hour x sq. ft. x °F.
   b. Insulated Glass Units: ASTM E774 and E773; double pane with glass elastomer edge seal; outer pane of 1/4 inch clear glass, inner pane of 1/4 inch clear low-e glass, purge interpane space and fill with argon; total unit thickness of 1 inch (25 mm).

5. Edge Seal Material: Black color.

PART 3 - EXECUTION

3.1. EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 01400.

B. Verify that openings for glazing are correctly sized and within tolerances.

C. Verify that glazing channel surfaces or recesses are clear, free of burrs, obstructions, irregularities, and glass is free of edge damage or imperfections.

3.2. 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, if required by sealant manufacturer.

D. Verify that materials used for cleaning edges of sealed insulating units are compatible with sealants and components and will not damage or cause deterioration of the integrity of the sealed insulating unit.

3.3. INSTALLATION

A. Install glass units in accordance with manufacturer recommendations. Ensure weep and drainage holes are not blocked by sealants or setting blocks.

B. Performed Glazing Gaskets (Dry Method):

1. Cut gasket to proper length.

2. Weld joints by butting gasket and sealing junctions with sealant.

3. Place setting blocks at quarter points, with edge blocks no more than 6 inches from corner.

4. Rest glass on setting blocks and push against stop with sufficient pressure to ensure full contact and adhesion at perimeter.

5. Install removable stops, avoiding displacement of gasket and exert pressure for full continuous contact.

6. Install storefront glass in gaskets as specified in Section 08 41 00.

C. Interior Dry Method (Tape and Tape):

1. Cut glazing tape to length and install against permanent stop, projecting 1.6 mm (1/16 inch) above sight line.

2. Place setting blocks and ¼ points with edge blocks no more than 1150 mm (6 inches) from corners.

3. Rest glass on setting blocks and push against stop for full contact and adhesion at perimeter.

4. Place glazing tape on free perimeter of glass in same manner described above.

3.4. GLAZING ACCESSORIES

A. Setting Blocks:

1. Material: Preformed neoprene, compatible with sealant.

2. Hardness: 80-90 Shore A durometer.

3. Size: 30 mm/m2 (0.10 inch) for each square foot of glazing, not less than 100mm (4 inch) length by width of channel minus 1.6mm (1/16 inch) by 100 mm (1/4 inch) high (sufficient height to provide minimum edge clearance.

4. Location: Sill quarter points, centered minimum 100 mm (4 inches) from each edge.

5. Requirement: Resistant to sunlight, weathering oxidation and permanent deformation under load.

B. Spacer Shims:

1. Material: Preformed neoprene, compatible with sealant.

2. Hardness: 50-60 Shore A durometer.

3. Size: Minimum 75mm (3 inch) length by ½ height of glazing stop by thickness to suit application.

4. Requirement: Self-adhesive one face.

C. Edge Blocks:

1. Material: Preformed neoprene, compatible with sealant.

2. Hardness: 60-70 Shore A durometer.

3. Size: Minimum 100 mm (4 inch) length by width to support thickness of glass, allow nominal 3 mm (1/8 inch) clearance between edge of glass and edge bumper.

4. Location: Place in vertical channel.

5. Requirement: Resistant to sunlight, weathering, oxidation and permanent deformation under load.

D. Glazing Tapes:

1. Material: Preformed butyl or closed cell PVC foam with integral spacing device and containing paper release.

2. Hardness: 10-15 Shore A durometer.

3. Size: Continuous corner to corner.

4. Acceptable products:

a) Pre-Shimmed 440 Tape, Tremco, Cleveland, OH.

b) Norseal V-980, Norton, Granville, NY.

c) 330 Glazing Tape, PTI, Dayton, OH.

3.5. GLAZING SEALANTS

A. Silicone Sealant:

1. One-part, primerless, complying with FSTT-S001543A, Class A FSTT-S-00230C, Class A, and ASTM C920, Type S, Grade NS, Class 25, Use NT, G.A.M. and O.

2. Hardness: 15-25 Shore A durometer.

3. Non-sagging, non bleeding, non-staining. Tested for compatibility.

4. Color: Black.

5. Acceptable products:

a) 795, DOW Corning Corp., Midland, MI.

b) Silfruf, General Electric, Waterford, NY.

c) Rhodorsil 5C, Rhone-Poulenc, Inc. Monmouth Junction, NJ.

6. Install removable stop, avoid displacement of tape, exert pressure on tape for full, continuous contact.

7. Knife-trim excess or protruding tape.

B. Tempered Glass:

1. Do not cut, seam, nip or abrade tempered glass.

2. Install in windows and sidelights where required by code.

3.6. PROTECTION

A. Protect finished Work under provision of Section 01500.

3.7. CLEANING

A. Clean work under provision of Section 01710.

B. Remove excess glazing materials from finished surfaces.

C. Remove labels after work is completed.

D. Wash and polish both faces not more than 7 days prior to Owner’s acceptance of work.

E. Comply with glass manufacturer’s recommendations for final cleaning.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

PART 2 - PRODUCTS

2.1 EXTERIOR GYPSUM SHEATHING

A. All sheathing shall be Dens Glass Gold or Approved Equal.

2.2 DRYWALL

A. Thickness: 5/8”, unless noted otherwise.

1. Where required to be rated material per building codes or drawings, thickness shall be 5/8” unless noted otherwise.

2.4 TRIM ACCESSORIES

A. Corner Angles: Install metal angles, 2 1/2” x 2 1/2” x 24 gauge corrosion resistant steel in lengths as required.

B. Control Joints: Standard “V” molding

1. Joint No. 093 by USG or approved equal

PART 3 - EXECUTION

3.1 DELIVERY, HANDLING AND STORAGE

A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements.

B. Damaged or deteriorated materials shall be removed from the premises.

C. Store all Gypsum panels flat for safety and to keep the material in good condition.

3.2 ENVIRONMENTAL CONDITIONS

A. In cold weather conditions (during panel joint finishing), temperatures within the building shall be maintained within the range of 55 to 70 degrees Fahrenheit.

B. Adequate ventilation shall be provided to carry off excess moisture.

3.3 GYPSUM PANEL INSTALLATION

A. Positions all ends and edges of all gypsum panels over framing members, except where joints are at right angles to framing members as in perpendicular application or when end joints are back-blocked.

B. Apply gypsum panels first to the ceiling (where applicable) and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints,

use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

C. Attach panels to framing members by power driven screws. Space fasteners no farther that 3/8" from edges and ends of panels. Drive fasteners in field of panels first, working towards ends and edges. Hold panel in firm contact with framing while driving with fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

D. Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner. Gypsum board should be cut to size using a knife and a straight edge.

E. Install trim at all internal and external angles formed by the intersection of either panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions.

3.4 CONTROL JOINT APPLICATION

A. Attach Zinc Control Joint with 9/16" "G" staples spaced no more than 6" o.c. or drywall screws. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is complete.

B. Place control joints at maximum 30' o.c. and at all angles not equal to 90 degrees.

3.5 JOINT TREATMENT APPLICATION

A. Mix joint compound in strict accordance with manufacturer's recommendations.

B. Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply Joint tape centered over joint and seated to compound. Sufficient compound (approximately 1/32" to 1/64") must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape and embedding coat must be thoroughly dry prior to application of second coat.

C. Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out at least 2" beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat.

D. Spread finish coat evenly over and extend out 2" beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Where necessary, sand lightly between coats and following final application of compound to provide a smooth surface ready for finish or decoration. When sanding, take care not to roughen paper face.

3.6 FINISHING FASTENERS

A. Apply an all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound; leaving all depressions level with surface.

3.7 FINISHING BEADS AND TRIMS

A. Apply compound to both sides of corner, extending 2” on each side for outer corners and 1 1/2” for inside corners. Cut bead to desired length; align tight to ceiling and press firmly with fingers along length of corner to set. Do not bend bead. Run taping knife over corner at a 45 degree angle with even pressure. Remove excess compound using knife to eliminate air bubbles under paper. Allow joint time to dry.

B. For outer corners, apply another coat of compound to both sides, feathering out 5” to 6” on each side. Let dry; sand lightly as necessary. For inner corners, apply fill coat to one side, feathering out 1” past previous coat. Let coat dry. Apply fill coat to other side using same procedure. Let coat dry. Sand lightly where necessary.

C. For outer corners, apply finishing coat, feathering out 8” from nose of bead. Draw knife along one side of bead with one edge resting on nose of bead and other surface on wallboard. Repeat for other side. Let coat dry. Sand and prime area. For inner corners, apply finishing coat to one side, feathering 1” past previous coat. Let coat dry. Apply finishing coat to other side. Let coat dry. Sand and Prime area.

3.8 FINISHING EXTERIOR JOINTS (AT SOFFITS AND CEILINGS)

A. Mix Setting Type (Durabond or equal) Joint Compound according to directions on the bag. Do not over-mix or use in temperatures under 45 degrees Fahrenheit.

B. Pre-fill joints of gypsum panels with compound. After pre-fill has hardened, embed joint tape centered over joint. When compound has hardened, immediately apply finish coat.

C. Apply setting type Joint Compound over flanges of Zinc control joints, metal beads and trim. Spot fastener heads.

D. After filling coat has hardened, apply finishing coat of compound. Completely cover all joints, angles, beads and fasteners. Remove protective tape from all control joints.

END OF SECTION

SECTION 09 91 00

PAINTING

Part 1 – GENERAL PAINTING NOTES

A. See Schedule in this section for areas to receive paint and type of paints to use. Types of paints are listed by code numbers which refer to matching code numbers in Section I, Acceptable Manufacturers.

B. Only those brands and qualities of paint listed under Approved Colors and Manufacturers shall be used. Materials must be to line as specified. “Professional” or “economy” lines will not be acceptable.

C. Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and applications, as demonstrated by the manufacturer based on testing and field experience.

D. The same manufacturer shall be used for the finish coat as is used for the prime coat for any one area. Prime coat shall be tinted to the approximate shade of the finish coat. All coats must be thoroughly dry before applying succeeding coats. When items to be painted have received a shop coat of paint, the prime coat and finish coat called for are in addition to the shop coat.

E. Use materials only in accordance with the manufacturers’ directions with quality workmanship on surfaces properly prepared according to its type.

F. All finishing materials must be delivered to the project site in the original containers, with the seals unbroken and label intact.

G. Paints or coats are to be applied under conditions conducive to good result within approved limits for temperature, humidity, ventilation and room condition.

H. Approved Color and Manufacturers

I.C.I. Dulux Paints (I.C.I.)
Benjamin Moore and Co. (Moore)
PPG Industries, Pittsburgh Paints (PPG)
The Sherwin Williams Company (S-W)

I. Acceptable Manufacturer Brands by Type:

1. (P-1) Exterior and Interior Steel and Aluminum Primer

   a. I.C.I - Devguard 4160 Multi-Purpose Tank & Structural Primer
   b. Moore - Ironclad Retardo Rust Inhibitive Paint #163
   c. PPG - #6-204 Zinc Chromate Primer
   d. S-W - Zinc Chromate Primer #B50Y1 for aluminum
      - Kromik Metal Primer for ferrous metals

2. (P-2) Exterior and Interior Galvanized Metal Primer

   a. I.C.I - Devguard 4120 All Purpose Metal & Galvanized Primer
   b. Moore - IronClad Galvanized Metal Latex Primer #155
   c. PPG - Speedhide Galvanized Steel Primer #6209
   d. S-W - #B50W3 Galvite Primer

3. (P-3) Exterior and Interior Masonry Block Filler

   a. I.C.I - Bloxfil 4000 Interior/Exterior Heavy Duty Acrylic Block Filler
   b. Moore - Moorcraft Interior & Exterior Block Filler #173
   c. PPG - #6 - 7 Masonry Block Filler
   d. S-W - Heavy Duty Block Filler #B42W46

4. (P-4) Exterior Concrete Wall Panel Coating

   a. Proko - Trico-Plex weatherproof coatings, coarse finish.
   b. Thoro -ThoroCoat heavy texture paint or approved equal.
   c. S-W -

5. (P-5) Interior Flat Latex

   a. I.C.I - 1200 Dulux Prof. Velvet Matte Interior Flat Latex Wall & Trim Finish
   b. Moore - Regal Wall Satin #215
   c. PPG - Wallhide Latex Flat
   d. S-W - Classic 99 Wall & Trim Paint #A27W10

6. (P-6) Interior Steel and Aluminum Enamel Undercoat

   a. I.C.I - Devflex 4020 DTM Flat Interior/Exterior Waterborne Primer & Finish
   b. Moore - Moore's Alkyd Enamel Underbody #217
   c. PPG - #6-6 Speedhide Enamel Undercoat
   d. S-W - DTM Acrylic Primer / Finish #B66W1

7. (P-7) Exterior and Interior Traffic Paint

   a. I.C.I -
   b. Moore - M58 Safety and Zone Marking Latex
   c. PPG - Zone & Traffic Marking Paint
   d. S-W - Pro-mar Traffic Marking Paint B29 Series

8. (P-8) Exterior Gloss Enamel

   a. I.C.I - Devshield 4328 Interior/ Exterior Alkyd Urethane Gloss Enamel
   b. Moore - Impervo Enamel #133
   c. PPG - #6-252 Series
   d. S-W - Industrial Enamel B54 Series

9. (P-9) Interior Semi-Gloss Enamel

   a. I.C.I - 1416 Ultra-Hide Latex Semi-Gloss Interior Wall & Trim Enamel
   b. Moore - Regal AquaGlo #333
   c. PPG - Latex Lo-Luster Enamel #6-510 Speedhide
   d. S-W - Classic 99 Latex Semi-Gloss

10. (P-10) Exterior and Interior Wood Finish

    Finish to be as noted for individual areas on Interior Elevations. Wood finish samples, 16" x 16" to be provided for each wood and for each finish specified. All finishes must be approved by the Owner prior to application.

11. (P-11) Exterior Primer and Finish, Semi-Gloss

    a. I.C.I - Devflex 4206 Interior/ Exterior Waterborne Acrylic Semi-Gloss Enamel
    b. Moore - Primer: Moore's Latex Exterior Primer #102
       - Finish: MoorGlo Latex House & Trim Paint #096
    c. PPG - #78-45 Sun-Proof Acrylic Semi-Gloss Trim
    d. S-W - Metalatex Semi-Gloss Enamel B42 Series

12. (P-12) Exterior Pipe Insulation Paint - Insulation paint and pipe insulation shall be of the same manufacturer, one of those listed below.

    a. Armaflex Finish
    b. Halstead Protective Coating
    c. Rubatex #374 Finish

13. (P-13) Epoxy glazing

    a. I.C.I - Tru-Glaze-WB 4408 Waterborne Epoxy Gloss Coating
    b. Moore - M43/M44 Acrylic Epoxy Gloss Coating
    c. PPG - #16-800/900 Series Water Based Epoxy
    d. S-W - Water-Based Catalyzed Epoxy

COATINGS FOR STEEL

15. (W-1) Special Washing

    Galvanized metal, including Zincgrip-Paintgrip to be washed with any fast evaporating solvent such as V.M.P., Naptha, or Xylol. After washing, let dry thoroughly.

16. (E-1) Special Etching

    Galvanized metal (except Zincgrip-Paintgrip) shall be etched after washing and before painting with a solution of one (1) lb. copper sulphate to one (1) gallon of water.

    Solution to be thoroughly rinsed with clear water after etching action is completed and then allowed to dry completely before applying prime coat.

J. Schedule of Colors and Types

Area	Color	Prime Coat (1 coat)	Finish Coat (1 coat)
1. Exterior - Parking Lot			
Sidewalk edges used as curbs, stair risers, concrete sign bases, light pole bases, highway type guard rails and bumper posts.	White	P-7	P-7
Parking stripes.	White	P-7	P-7
2. Exterior Building			
Aluminum storefront including doors, structure and flashing, stainless steel, anodized aluminum and face brick.	DO NOT PAINT		

CMU Block walls, see exterior elevations.	As selected by owner	P-3	P-3
All exposed steel members, doors, door frames, railings, lintels, louvers, structural steel equipment and any other exterior metal except galvanized steel	As selected by owner	P-1	P-8
Galvanized metal: Flashing, Sheet metal vents, flues & duct and other work above roof	Match Adjacent Material (Verify)	W-1 E-1 P-2	P-8
Emergency exit doors on exterior face and edges and door frames, and grilles on wall.	Match Adjacent Material (Verify)	P-1	P-8
Exterior EIFS soffit	As selected	P-11	P-11 (2 coats)
Exterior pipe insulation	As selected	P-12	P-12

3. Interior - General

Aluminum storefront including doors, structure and flashing, stainless steel, anodized aluminum, double-acting vinyl-clad aluminum.	DO NOT PAINT
All exposed steel members on store front	Match storefront P-1
Structural steel and metal deck exposed or above ceiling, supply grilles, exposed duct work, sprinkler piping	DO NOT PAINT (unless noted)

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

1 PART 1 – GENERAL

1.1 DESCRIPTION

A. Wall mounted fire extinguishers and accessories

B. Recessed Knox Boxes (provide only when required by local code officials).

1.2 QUALITY ASSURANCE

A. Comply with NFPA 10 and Accessibility Guidelines.

B. Provide UL listed and FM approved fire extinguishers which bear the UL listing mark for the type, rating and class of fire extinguisher indicated.

C. Obtain products from one manufacturer.

2 PART II – PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Multi-Purpose Dry Chemical Type: UL rated 4A:60B:C or as required by local authority.

B. Finish: Manufactures standard factory applied RED.

C. Provide not less than six (6) fire extinguishers (more if required by local authorities).

D. Manufacturers: JL Industries Inc., Larsen’s Manufacturing Co., Potter-Roemer.

2.2 ACCESSORIES

A. Mounting Brackets: manufacturer’s standard for the fire extinguisher furnished.

B. Signs: provide signs identifying the locations of fire extinguishers as required by local authorities.

2.3 KEY KNOX BOX (provide only when required by local codes/officials)

1. Recessed unit with dark bronze finish; Knox Box #3200-R, or approved equal.

3 PART III – EXECUTION

3.1 INSPECTION

A. Verify servicing, charging and tagging of all fire extinguishers.

3.2 INSTALLATION

A. Install fire extinguishers and identifying signs in compliance with local authorities and ADA guidelines.

B. Provide blocking and anchoring devise capable of supporting specified fire extinguishers.

C. Install Recessed Key Lock Box, if required as directed by local fire officials.

END OF SECTION

SECTION 10 73 10

PROTECTIVE COVERS

The following is a generic specification of our products. For more specific information please contact Architectural Fabrication Inc. direct.

PART 1- GENERAL

1.01 SECTION INCLUDES

A. Design, Fabrication, and Installation of screens and extruded aluminum canopies.

1.02 RELATED WORK

A. Sealants

1.03 REFERENCES

A. The Aluminum Association- Aluminum Design Manual 2010

B. The American Welding Society-AWS D1.2/D1.2M: 2008

1.04 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 and screen locations. Include installation procedures, details of joints, attachments and clearances. Provide lead time for product and not possible conflicts with standard line. Include site specific drawings bearing the seal of a licensed engineer.

C. Samples of canopy finishes and specified perforated screen material

1.05 QUALITY ASSURANCE

A. Canopy & screen shall be designed to comply with local building codes.

B. Canopy & screen manufacturer shall have a minimum of 10 years' experience in designing and installing the specified system.

C. The installation of the canopy & screen shall be performed by the manufacturer to assure single source responsibility.

PART 2- PRODUCTS

2.01 MANUFACTURER

B. Architectural Fabrication Inc.
2100 E. Richmond Ave., Ft. Worth, TX 76104
Phone: (817) 926-7270 (800) 962-8027
www.arch-fab.com

2.02 MATERIALS

A. All components shall be 6063-T5 alloy extruded aluminum.

B. Components shall be sized to comply with live load and wind load requirements of the project and shall not be less than the dimensions shown on the plan.

C. Framing: Gutter fascia, tube, angles: 6063-T5 alloy extruded aluminum

D. Decking: 6063-T3 or 6063 T5 alloy extruded aluminum (roll form is NOT acceptable)

E. Beams are open at top to drain canopy system internally into columns and/ or scuppers.

F. Flashing shall be .040" thick, fabricated to prevent leakage and sealed with Novaflex metal roof sealant in clear of color match. Another equivalent sealant is acceptable.

G. All bolts and fasteners shall be stainless steel or finished to match adjacent components and sized by canopy engineer.

2.03 FINISHES

A. The finish and color selection of each component shall be chosen from the manufacturer's standard color selections and shall include:

1. Powder Coat Standard RAL Colors

2. Fluoropolymer

3. Anodized-Clear, Bronze & Champagne

PART 3-EXECUTION

3.1 FABRICATION

A. Fabricate and preassemble canopies in the shop to the greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

B. All welding shall be in compliance with AWS 1.2. The certification of each welder shall be available to verify compliance.

C. Canopy shall be designed to drain through downspouts or scuppers

3.2. INSTALLATION

A. Install the canopy in strict accordance with the manufacturer's recommendations.

B. Erect canopy after blocking is verified, exterior finishes are completed and washed down.

C. Use concealed anchors where possible.

D. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a coating of bituminous paint or elastomeric coating on surfaces that will be in contact with concrete, masonry or dissimilar metals.

D. Install flashing and sealant as required.

E. Care shall be taken to prevent damage or scratching during installation. Repair of damaged finishes so no visible evidence remains of corrective work. Return items to the factory that cannot be refinished in the field. Make required alterations and refinish entire unit or provide new units.

F. Thoroughly clean canopy after installation.

END OF SECTION

SECTION 31 23 00

EXCAVATION AND FILL

1. GENERAL

A. The structural fill for the building pad shall be brought up to within 6" of finished floor elevation. Said structural fill shall conform to the requirements of the Soil Report or as specified by Structural Engineer. The General Contractor shall verify the pad height elevations, compaction and the building corners and shall issue a letter of acceptance of same. Any area that does not meet the Soils Report or proper elevations shall be immediately reported to the Architect/Engineer for correction.

B. A copy of the Soils Investigation Report is included in this bound project manual. The report and log of borings is available for the Contractor's information but is not a warranty of the subsurface conditions. Make no deviations from the Contract Documents without specific and written approval of the Owner.

1.1 SECTION INCLUDES

A. Excavating for building foundations down to pile caps, for slabs-on-grade, for paving, and for site structures.

B. Disposal of cleared materials

C. Stockpiling acceptable soil

D. Site Filling and backfilling.

E. Building Perimeter and site structure fill and backfilling to subgrade elevations.

F. Fill under paving, for over-excavation.

G. Consolidation and Compacting.

H. Finish Grading.

1.2 RELATED SECTIONS

A. Section 00 31 32 – Geotechnical Data

B. Section 00 31 32.16 – Material Testing Information

C. Verify that survey bench mark and intended elevations for the Work are as indicated.

1.3 REFERENCES

A. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures.

B. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures.

C. ASTM 2049 - Test Method for Density and Unit Weight of Cohesionless Soils.

2.PRODUCTS

2.1 FILL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW and SP.

B. Sub-base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.

C. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed/uncrushed gravel, with 100% passing a No.4 sieve.

D. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2” in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter with a plasticity index of less than 50, unless otherwise noted.

E. General fill material from site borrow areas shall be used for fill in all areas except immediately under slab on grade structures.

F. Where called for by the plans or by the landscape specifications, the fill shall be kept sufficiently low to accommodate the proper depth of topsoil.

G. Topsoil material shall be native earthen material suitable for growth of vegetation such as silty and sandy soils. The site strippings may be used as topsoil unless otherwise dictated by the Owner.

H. Select fill shall be used beneath all structures where fill material is required to achieve the grades and elevations on the plans.

I. Select fill for the building pad will be brought up to within 8” of finished floor elevation.

J. The General Contractor shall verify the pad height elevations, compaction and the building corners and shall issue a letter of acceptance of same. Any area that does not meet the Geotechnical Report or proper elevations shall be immediately reported to the Owner for correction.

K. Select fill material used shall be a sandy clay type soil with a maximum plastic index and a liquid limit as indicated in the Geotechnical Report.

3. EXECUTION

3.1 EXAMINATION – For Fill Work

A. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

B. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

C. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION – For Excavation

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain from damage.

C. Notify utility company to remove and relocate utilities.

D. Protect plant life, lawns, rock outcroppings and other features remaining as a portion of final landscaping.

E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 PREPARATION – For Fill Work

A. Verify areas to be backfilled are free of debris, snow, ice or water, and ground surfaces are not frozen.

B. Compact subgrade to density requirements for subsequent backfill materials.

C. Maintain optimum moisture content of backfill materials to attain required compaction density.

D. Cut out soft areas of subgrade not capable of compaction in place. Backfill and compact to density equal to or greater than requirements for subsequent fill material.

E. Scarify and proof roll subgrade to identify unsuitable soil conditions; fill and compact to density equal to or greater than requirements for subsequent fill material. Commence proofrolling operations after a suitable period of dry weather to avoid degrading acceptable subgrade surfaces.

3.4 EXCAVATING

A. For Structures: Conform to elevations and dimensions shown. For footings and foundations extend excavation below frost line and do not disturb bottom of excavation.

B. For Pavements: Cut surface to comply with cross-section, elevations and grades as shown.

C. For Trenches: Grade bottoms of trenches as required/indicated, notching under pipe bells to provide solid bearing for entire pipe.

D. Underpin adjacent structures which may be damaged by excavating work.

E. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and site structures and construction operations.

F. Excavate to working elevations and dimensions. Coordinate special requirements for piling.

G. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction as specified.

H. Slope banks with machine to angle of repose or less until shored.

I. Do not interfere with 45 degree bearing splay of foundations.

J. Grade top perimeter of excavating to prevent surface water from draining into excavation.

K. Hand trim excavation. Remove loose matter.

L. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

M. Correct areas over excavated as specified.

N. Stockpile excavated material in area designated on site; remove excess or unsuitable material from site.

3.5 BACKFILLING

A. All Trenches: Building Area - Backfill compacted to 95% of the maximum dry unit weight, density ASTM-C-698-78.

B. After permanent construction is in place, forms, shores, wood, trash and etc. removed, and inspections complete, backfill with approved materials and compact.

C. Backfill at walls and footings shall be placed in 6” layers or less, tamped in place to at least 90% of Standard Proctor Density ASTM-D-698-78.

D. Backfill areas to grades, contours, levels and elevations indicated with unfrozen materials.

E. Water may be added to backfill material as an aid to compaction; however, material shall not be wet to form mud or paste.

F. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

G. Employ a placement method that does not disturb or damage other work.

H. Maintain optimum moisture content of backfill materials to attain required compaction density.

I. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

J. Make gradual grade changes. Blend slope into level areas.

K. Remove surplus backfill materials from site.

L. Leave fill material stockpile areas free of excess fill materials.

3.6 COMPACTION

A. Deposit fill in uniform layers not more than 8” loose layers. Compact each layer thoroughly and obtain satisfactory density prior to proceeding with the next lift.

B. The top 8” shall be stabilized after placement where required such as beneath Portland Cement concrete pavement and sidewalks and 6” stabilized beneath asphaltic concrete and gravel pavement.

C. Compact select fill to a minimum 95% of the maximum dry unit weight as obtained in the laboratory by means of ASTM-D-698.

D. Structures, Building Slabs and Steps. Pavements: Compact each layer at 90% maximum density for cohesive material or 95% relative density for cohesionless material.

E. Lawn or Unpaved Areas: Compact each layer at 85% maximum density for cohesive soils and 90% relative density for cohesionless material.

F. Walkways: Compact each layer at 90% maximum density for cohesive soils and 95 relative density for cohesionless material.

G. Suitable compaction equipment such as a sheepsfoot roller should be used.

H. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The surface grade shall be consistent with the drainage intent indicated on the Drawings such that no ponding shall occur.

3.7 FIELD QUALITY CONTROL

A. Quality Assurance: Field inspection and testing.

B. Provide for visual inspection of bearing surfaces.

C. Severe slope, ramps or steps shall not be permitted at store front, sides, or rear of building. Maximum permitted slope on site shall be 1:20 (5%). Minimum permitted slope on site shall be 1.5% to insure positive drainage. Maximum entrance slab slope up to doorway shall not exceed 2.0%

D. Compaction testing will be performed in accordance with ASTM D1557, ASTM D698 and ASTM 2049.

E. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

3.8 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Provide shoring/bracing required to support adjoining soils, buildings, etc.

D. Keep excavations, and entire subgrade area free of water. Do not operate any system that will loosen existing soils or cause the subsoils to be removed or shifted from their original position.

E. Provide for the control of erosion in accordance with Section 02115.

3.9 DISPOSAL/STOCKPILING

Disposal of Cleared Materials: Subject to approval of the Owner, material from clearing operations may be disposed of by burning and/or removal from the worksite. Materials shall not be burned on the premises without special permission of the Owner and in compliance with applicable laws and regulations.

A. Disposal of Materials by Burning:

1) The Contractor shall secure the necessary burning permits. All burning shall be in accordance with state and local laws.

2) All materials to be burned shall be piled in designated burning areas in such a manner as will cause the least fire hazard. Burning shall be thorough and

complete and all charred pieces remaining after burning, except for scattered small pieces, shall be removed from the construction area and disposed of as otherwise provided in Paragraph 2.

3) The Contractor shall, at all times, take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by the Contractor's burning operations.

4) The Contractor shall have available, at all times, suitable equipment and supplies for use in preventing and suppressing fires and shall be subject to all laws and regulations locally applicable for presuppression, and prevention of fires.

B. Disposal of Materials by Removal:

1) Material disposed of by removal from the construction area shall be removed prior to the completion of the work under these Specifications. All materials removed shall become the property of the Contractor.

2) Materials to be disposed of by dumping shall be hauled to an approved dump. It shall be the responsibility of the Contractor to make any necessary arrangements with private parties and with local officials pertinent to locations and regulations of such dumping. Any fees or charges required to be paid for dumping of materials shall be paid by the Contractor.

3) In hauling any material from the site, it shall be the responsibility of the Contractor to prevent debris from dropping from vehicles and littering the site or area streets and roads. The Contractor shall promptly remove any debris which falls from vehicles.

3.10 STOCKPILING

A. All acceptable cleared soil and topsoil from the stripping operations shall be stockpiled in the areas designated by the Owner.

B. Materials shall be deposited and spread in such a manner as to ensure proper drainage and prevent severe erosion of the stockpile.

C. To prevent erosion, seed all stockpiles that will be left undisturbed for more than 30 days. Use seed appropriate for the season. Refer to Section 02115, "Erosion and Sedimentation Control", for additional seeding requirements.

3.11 FINISH GRADING

A. After rough grading has been completed and site cleared of debris, cover areas disturbed by construction or graded to provide new finish grades with a layer of topsoil not less than 6" thick.

B. Reuse stockpiled topsoil, cleaned of foreign matter, or provide additional approved topsoil as required.

C. Final grades shall be as shown or as directed by Architect and shall slope away from building and shall provide drainage for area.

D. Finish surfaces shall not be more than 0.10 feet above or below established grade elevation.

E. Uniformly distribute topsoil to required grades; feather back to where grades remain unchanged.

F. Vertical curbs or rounds shall be provided at abrupt changes in slope.

G. Severe slope, ramps or steps shall not be. Maximum permitted slope on site shall be 1:20 (5%). Minimum permitted slope on site shall be 1.5% to insure positive drainage. Maximum entrance slab slope up to doorway shall not exceed 2.0%.

3.12 PROTECTION OF FINISHED WORK

A. Protect finished Work from construction and weather damage, washing, erosion and rutting, and repair such damage that occurs.

B. Reshape and re-compact fills subjected to vehicular traffic.

C. Correct any settlement below established grades to prevent ponding of water.

D. At locations where lime, concrete or other foreign matter has penetrated or been mixed with earth, remove damaged earth an replace with clean material.

E. Remove excess stockpiled material, debris, waste, and other material from site and leave work in clean finished condition for final acceptance. Contractor is responsible for disposal of debris and excess materials.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section pertains to the provisions for the control of erosion in the construction area and in stockpile areas including seeding, sodding, hydromulching, silt fences, sediment barriers, the construction of temporary swales and sedimentation basins as required and shown on the Drawings.

B. Contractor is responsible for meeting all local, state and federal regulations regarding erosion control including the applicable provisions of the National Pollution Discharge Elimination System (NPDES) regulations from the Federal Clean Water Act.

C. Work under this section shall be coordinated with the Storm Water Pollution Prevention Plan.

1.2 RELATED SECTIONS

A. Section 31 23 00 – Excavation and Fill

1.3 REFERENCES

A. Texas Department of Transportation - 1993 Standard Specifications for Construction of Highways, Streets, and Bridges (TxDOT).

1) Item 162 - Sodding for Erosion Control
2) Item 164 - Seeding for Erosion Control

2. PART 2 PRODUCTS

2.1 GRASS

A. Materials for sodding shall be Common Bermudagrass block sod conforming to TxDOT Item 162.

B. Materials for seeding shall be Common Bermudagrass seed conforming to TxDOT Item 164.

2.2 FERTILIZER - Use commercial grade fertilizers at a rate of 20 pounds per 1,000 square feet to ensure germination and growth. Fertilizer analysis by weight shall be 16-4-8 or 15-5-10 for Nitrogen, Phosphoric Acid and Potash, respectively.

2.3 WATER - Use clean potable water for maintaining the grass.

2.4 SILT FENCE - Lundin “Silt Buster”, Mirafi “Envirofence” or approved equal.

2.5 STRAW BALES - Standard rectangular hay bales bound by bailing wire

3. PART 3 EXECUTION

3.1 GENERAL

Contractor shall keep disturbed areas to the minimum required to adequately perform the work. At all times the Contractor shall maintain the site in such a manner that minimizes erosion of the

site. The execution of work under this Section shall be in conformance with the NPDES rulings and the site Storm Water Pollution Prevention Plan.

3.2 SEEDING

A. Disturbed portions of the site and stockpile areas shall be seeded within 14 days if the phasing of the construction operations are anticipated to leave those portions of the areas unworked for 21 days or more.

B. Seeding operations shall be performed in accordance with TxDOT Item 164, “Seeding for Erosion Control”, using the materials specified for this region and the season in which the seeding operations are to occur.

C. Seeded areas shall be maintained until the Project is accepted by the Owner. Maintenance shall include but not be limited to watering, fertilizing, reseeding, mowing and erosion repair as may be required. Grass shall be cut when the average height of the grass reaches six (6) inches. Clippings may be mulched back into the seeded areas.

3.3 TEMPORARY AND PERMANENT SWALES

A. Description

1) Temporary and permanent drainage swales shall be provided as required to carry drainage away from the work area to an approved outfall point.

2) Unless otherwise shown on the Drawings, swales shall be earthen “V” shaped channels graded to a sufficient depth and slope to carry the anticipated runoff, but at least two (2) feet deep with a slope of 0.1%.

3) Swales not designated to remain in place at the completion of the contract shall be cleaned of any muck, debris and other unsuitable material and filled with approved fill before final grading operations begin.

4) Swales shall have erosion control barriers as required.

5) All permanent swales shall be block sodded to a minimum width of ten (10) feet on either side of the centerline of the swale in accordance with TxDOT Item 162, “Sodding for Erosion Control”.

B. Maintenance

1) During the course of construction all temporary swales constructed for this contract shall be maintained so as to allow proper drainage from the construction area. Before Contractor leaves the site at the end of construction, all temporary swales to remain shall be placed in good working condition.

2) Contractor shall work with other contractors at the site in maintaining existing swales and ditches.

3) Where necessary for access to the work areas, adequately sized culverts shall be installed and maintained to provide the access without disturbing the site drainage.

4) Care shall be taken not to rut and damage sodded swales. Damaged swales shall be repaired immediately.

5) Keep sodded swales mowed.

3.4 DRAINAGE DITCHES

A. Drainage ditches shall be hydromulched immediately upon final grading.

B. Erosion of the banks of the drainage ditches shall be repaired immediately and re-stabilized.

C. Sediment barriers shall be placed at intervals along the ditch as shown on the Drawings and as necessary to help trap sediment on the site. Sediment and other debris trapped by the barriers shall be removed on a daily basis, as needed.

D. Ditch side slopes shall not be steeper than three (3) feet horizontal to one (1) foot vertical.

E. Maintenance of the ditches during construction shall include but not limited to mowing, regrading, sediment removal, re-hydromulching, bank repair and debris removal.

F. Sediment removed from the ditches may be respread on the site, as directed by the Owner.

3.5 FILL AND CUT SLOPES

A. Fill slopes in all cases shall be no steeper than 3:1 unless specifically stated on the Drawings or approved by the Owner’s geotechnical engineer.

B. When cut slopes exceed 2:1 for depths over three (3) feet, proper bracing and shoring per OSHA requirements shall be used and maintained.

C. For permanent slopes, cut or fill, between 2:1 and 10:1, erosion protection shall be provided with hydromulching, sodding, seeding, or other method, as approved.

3.6 EROSION CONTROL BARRIERS

A. Erosion control barriers shall be provided at intervals along swales and ditches as shown on the Drawings and as necessary to meet the requirements of the Storm Water Pollution Prevention Plan.

B. The barriers shall be silt fence or hay bales placed as shown on the Drawings and details.

C. Barriers shall be maintained in good working condition and replaced when damaged.

END OF SECTION

SECTION 31 31 16

TERMITE CONTROL

PART 1 - GENERAL

1.1. SCOPE

A. Provide all labor, materials, equipment and services necessary to complete all work involved in properly poisoning the soil (by chemical treatment, etc.) for all foundations and slab in grade construction to provide a chemical barrier to protect the building and contents against attack by subterranean termites.

1.2. RELATED DOCUMENTS

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

1.3. SUBMITTAL OF PRODUCT DATA

A. Submit manufacturer's technical product data, installations, and recommendations for each product. Include data substantiating that materials comply with specified requirements.

B. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a “Material Safety Data Sheet” (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.

C. Asbestos and PCB Certificate: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Article 3 of General Conditions.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Owner.

2.2 MATERIALS

A. Approved soil chemicals, as a water emulsion at no less than the concentration and volumes designated are as follows:

1. Chloropyifos (Dursban TC or Cyren TC): 1.0% in water solution

2. Permathrin (Dragnet/Torpedo): 0.5% in water emulsion.

B. Materials must be delivered to the job in the original sealed and labeled containers of the manufacturer.

C. A copy of the proposed materials, along with the supporting data indicating the manufacturer's recommended application instruction shall be submitted to the Architect for approval prior to application.

PART 3 - EXECUTION

3.1. TIME OF APPLICATION

A. Give sufficient notice to all parties concerned to allow application to be made at least 12 hours prior to concrete placement. Treatment shall not be made when soil is excessively wet. Application of chemical shall be made only after all preparation for slab placement has been completed and carefully coordinated by the General Contractor and/or Architect with sufficient notice to have a representative present to view installation work and cooperate with the furnishing of substantiating test, etc., verifying percentages of application.

3.2. WORKMANSHIP AND APPLICATION

A. All materials and workmanship shall be in strict accordance with the manufacturer's instructions. Provide a blue “spray indicator” mixed with termiticide to indicate treated areas.

B. Application shall be made under the entire surface of the floor slab, beams, around piers, etc., as required for a complete chemical treatment. Sidewalks, platforms and any other slabs or construction abutting the building shall be similarly treated for an area three feet wide adjacent to the building.

C. Thoroughly saturate with one percent (1%) Chloropyrifos or other approved soil chemicals all soil under the entire floor slab of the building at the rate of one and one-half (1-1/2) gallons per 10 square feet; treat beam areas at the rate of four (4) gallons per 10 lineal feet.

D. Treat soil adjacent to the inside of foundation walls and piers, expansion and construction joints, and all areas of the slab or beams penetrated by construction features, with one percent (1%) Chloropyrifos chemical or other approved chemicals at the rate of four (4) gallons per lineal feet.

E. Flood all voids in foundation walls, beams and piers with soil chemicals after forming. Utilize four (4) gallons per 10 lineal feet. Termiticide must come in contact with the foundation wall. Applying the termiticide to the outer surface of foundation insulation boards, or protection boards is not acceptable.

F. Spray plates, base of studs or other frame members in contact with the floor slab or foundations with chemical treatment as required.

G. Trench 6" x 6" completely around the outside perimeter of the completed foundation. Treat trench with one percent (1%) Chloropyrifos soil chemical at the rate of two (2) gallons per five (5) lineal feet, and backfill at the rate of two (2) gallons per five (5) lineal feet.

H. Reapply treatment to areas disturbed by construction activity following application.

3.3. CERTIFICATION AND GUARANTY

A. The subcontractor performing this work shall prepare and forward a notarized statement that the application of this work has been made in accordance with these specifications and the manufacturer's instructions.

B. In addition, he shall issue a Perpetual Surety Bond with a damage replacement clause to the owner warranting that the effectiveness is guaranteed for the period of the bond. Any evidence of subterranean termite activity or damage to the structure resulting from such activity within the guaranty period shall be treated and/or repaired at no cost to the owner. This bond issued shall be for one (1) year, and included in the original cost of the job, and shall be renewable at standard rates after the first full year (perpetual).

C. All services and material used shall conform to the most current applicable Federal, State and Local regulations governing their use.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1-MATERIALS

1.1 MATERIALS

This item will consist of finished pavement constructed of Portland cement concrete on the prepared subgrade or other base course, with reinforcement, in conformity with the plans, as herein specified. Concrete shall be considered of satisfactory quality provided it is made of materials accepted for the job, mixed, placed, finished and cured in accordance with the requirements of this specification.

A. Portland Cement

The cement shall conform to ASTM specifications C-150 for Type 1, and specifications for air-entrainment ASTM C-175. If high-early-strength Portland cement is required, it shall conform to ASTM Designation C-150 for Type III, and current revisions.

B. Aggregates

Concrete aggregates shall conform to ASTM C-33.

C. Mixing Water

Water for use in concrete and for curing shall be free of oil, acids, organic matter or other deleterious substances and shall not contain more than 1,000 parts per million of chlorides as C1, or more than 1,000 parts per million of sulfates as S04. Water from municipal supplies approved by the State Health Department will not require testing, but water from other sources will be sampled and tested before use.

D. Steel Dowel Bars

Steel dowel bars, if shown and required on the Plans shall be of the size and type indicated thereon and shall be open hearth, new billet steel of intermediate or hard grade conforming to the requirements of ASTM Designation A-615. The free end of the dowel bars shall be smooth and free of shearing burs.

E. Steel Bar Reinforcement

Steel reinforcing, if shown and required on the Plans, shall be of the size and type indicated thereon and shall be open hearth new billet steel of structural, intermediate or hard grade, ASTM Designation A-615, or shall be rail steel concrete reinforcement bars, ASTM Designation A-16. All steel shall be bent cold. When tie bars are to be bent, they shall be of structural or intermediate grade.

F. Steel Wire Fabric Reinforcement

When steel wire fabricated reinforcement is specified, or permitted as an option, the wire fabric shall conform to the gauge and wire spacing shown on the Plans and the requirements of the standard specifications for “Coldrawn Steel Wire for Concrete Reinforcement”, ASTM Designation A-82.

Longitudinal and transverse wires shall be electrically welded together at all points of intersection and the welds shall be of sufficient strength that they will not be broken during handling or placing. All welding and fabrication of the fabric sheets shall conform to the requirements of the standard specifications for “Welded Steel Wire Fabric for Concrete Reinforcement”, ASTM Designation A-185. Welded steel wire fabric shall be furnished in flat sheets as per plan dimension and steel fabric having been previously

bundled into rolls will not be accepted. If wire fabric is used, it will replace only the longitudinal and transverse bars. The tie bars and load transmission units at joints will not be affected.

G. Steel Chairs

When reinforcing steel, tie bars, dowels, etc., are required, they shall be placed as shown on the Plans, and held securely in place during placing of concrete by steel chairs approved by the engineer. These chairs shall be placed at every other intersection of longitudinal and transverse bars.

H. Joint Sealing Material

Joint sealing material shall be flexible modified PVC type joint sealer as listed herein. The Joint material shall be installed per manufacturer's recommendations and shall form an effective seal against infiltration of water throughout repeated cycles of expansion and contraction. The material shall not crack or break when exposed to low temperatures.

Ells, Tees and Crosses at intersections shall be factory fabricated to ensure solid connections. Field Joints will be Butt-Joints adhered with manufacturer's adhesive. Minimize joints wherever possible to keep the watertight integrity of the seal.

Joint Material shall be "G-SEAL" as manufactured by Greenstreak or approved equal. Contact Melbar, Inc. (ATTN: R. York Schulte) at 1-800-444-0196 or 281-485-8510.

Profile shall be as indicated on drawings, or as applicable for each installation requirement.

Attach Joint material to expansion board prior to concrete placement, using staple or nails per manufacturer's recommendations.

I. Membrane Curing Compound

The membrane curing compound shall be type 2 white pigmented and shall comply with the requirements of ASTM Designation C-3090. It shall be of such nature that it shall not produce permanent discoloration of concrete surfaces, nor react deleteriously with the concrete.

The compound shall not peel or pick up under traffic and shall disappear from the surface of the concrete by gradual disintegration.

J. Admixtures

No admixture of any type shall be used without written approval of the Engineer. Fly Ash is not permitted.

K. Concrete Proportions and Consistency

The compressive strength shall be as indicated in SECTION 03300 and shall not be less than 5 sacks of cement per cubic yard.

PART 2 - CONSTRUCTION METHODS

2.1 FORMS

Forms shall conform to the shapes, lines and dimensions as shown on the plans, and shall be sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain shape.

2.2 MIXING

The concrete shall be mixed in an approved method conforming to the requirements of this specification. Ready-mix concrete will be permitted in lieu of the paver-mixer. When ready-mix concrete is used, provisions of ASTM Designation C-94 Alternate No. 2 will govern. All materials for concrete placed in pavements shall conform to the requirements of the governing item of this specification.

2.3 PLACING CONCRETE

Unless otherwise provided for on the Plans, the full width of the finished pavement shall be constructed monolithically. The concrete shall be rapidly deposited on the subgrade in successive batches and shall be distributed to the required depth and for the entire width of the pavement by shoveling or other approved methods. The placing operation shall be continuous. At the end of the day, or in case of unavoidable interruption or delay of more than thirty (30) minutes, a transverse construction joint shall be placed at the point of work stoppage, provided the point at which work has been suspended is not less than eight feet (8') from the last regularly established joint. If the length is less than eight feet (8'), the concrete shall be removed back to the last regularly established joint.

A. Special care shall be taken in placing and spading the concrete against the forms and at all joints and assemblies so as to prevent honeycombing.

   Excessive voids and honeycombing in the edge of the pavement, revealed by the removal of the side forms, may be cause for rejection of the section of slab in which the defect occurs.

B. No concrete shall be placed when the air temperature is less than thirty-five (35) degrees Fahrenheit, unless permission to do so is granted by the Engineer in writing. When and if such permission is granted, the Contractor shall furnish sufficient protective material and devices to enclose and protect the fresh concrete in such a way as to maintain the temperature of the air surrounding the fresh concrete at not less than forty-five (45) degrees Fahrenheit for a period of at least (5) days. It is to be distinctly understood that the Contractor is responsible for the quality and strength of the concrete placed under any weather conditions. No concrete shall be placed on a frozen subgrade.

2.4 CURING

The curing of concrete pavement shall be thorough and continuous throughout the entire curing period. Failure to provide proper curing as herein prescribed will be considered as sufficient cause for immediate suspension of the paving operations. The curing method as herein specified does not preclude the use of any of the other commonly used methods of curing, and the engineer may approve them if so required by the Contractor. If any selected method of curing does not afford the desired results, the Engineer shall have the right to order that another method of curing be instituted. Immediately after the finishing of the surface, the pavement shall be covered with a continuous, uniform, water-impermeable coating. The impermeable coating shall be of type specified in Section 03300. After removal of the side forms, the sides of the slab

shall receive a like coating before earth is banked against them. The solution shall be applied, under pressure with a spray nozzle, in such a manner as to cover the entire surfaces thoroughly and completely with a uniform film.

The rate of application shall be such as to insure complete coverage and shall not exceed two-hundred (200) square feet per gallon of curing compound. When thoroughly dry, it shall provide a continuous and flexible membrane, free from cracks or pinholes, and shall not disintegrate, check, peel or crack during the curing period. If for any reason the seal is broken during the curing period, it shall be immediately repaired with additional sealing solution.

END OF SECTION